

RESEARCH NOTE

Population dynamics of *Maruca vitrata* (Gayer) on groundnut

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A field study was conducted at Dharwad, India, during 2016 - *kharif* season, to determine the population dynamics of *Maruca vitrata* (Gayer), on groundnut. The infestation of *M. vitrata* commenced from 32nd meteorological standard week (MSW) (when crop was 4 weeks old), attained peak of 15.90 larvae per meter row at 35th MSW (when crop was 7 weeks old), and decreased gradually to reach nil during 39th MSW of 2016 (when crop was 11 weeks old) during the year 2016. The pest population such as larval counts and their webs per meter row, per cent leaf damage exhibited positive correlation with maximum temperature. However, the same parameters exhibited negative and non-significant correlation with other meteorological observations such as minimum temperature, both morning and evening relative humidity and wind velocity.

Key words: Groundnut, Pod borer, Population dynamics

Groundnut or peanut (*Arachis hypogaea* L.) the 'King' of oilseeds, is an annual legume grown primarily for high quality edible oil. It is one of the most important food and cash crop of our country and an important economic oilseed crop of the world. The *Maruca vitrata* (Geyer), popularly known as legume pod borer or spotted pod borer was reported to feed on 39 host plants including wild hosts and a serious pest of cowpea, pigeon pea, black gram, greengram, beans and soybean has been extending its host range and also becoming serious on already reported hosts like groundnut year after year, since 2011 at Dharwad (Anon., 2015). The pest infestation in major grain legumes like cowpea and pigeon pea ranges from 25 to 40 per cent and 9 to 84 per cent, respectively across the globe (Ganapathy, 2010). Unlike on the pulse crops, the pest is purely a defoliator on groundnut and use to feed on leaves and growing shoots. Hitherto, very little work has been done in groundnut with respect to this pest. There is a need to look into the population dynamics of *M. vitrata* on groundnut specially in Karnataka.

The experiment was conducted during *kharif*, 2016 in field of MARS, Dharwad to study the population dynamics of *Maruca vitrata* (Gayer). The groundnut variety JL-24 was sown in non-replicated plot on 27th of June 2016 with spacing of 30 cm × 10 cm, following normal agronomic practices except plant protection measures against *M. vitrata*. Five spots, each measuring one meter length was selected randomly and marked. The data was recorded at weekly interval starting

from 15 days old groundnut plants up to 15 days before harvest. The observations were made on number of *M. vitrata* larvae, webbings per meter row of groundnut plants, total number of leaves and total damaged leaves were recorded on five plants (Table 2). The insect population recorded was correlated with weather parameters collected from MARS, UAS Dharwad viz., maximum temperature, minimum temperature, morning relative humidity, evening relative humidity, rain fall and wind velocity of corresponding week to know their influence on the incidence of *Maruca vitrata* (Gayer) (Table 3). Per cent leaf damage caused by *M. vitrata* was calculated by using the following formula:

$$\text{Per cent leaf damage} = \frac{\text{Number of damaged leaves}}{\text{Total number of leaves}} \times 100$$

The incidence of *Maruca vitrata* (Gayer) on groundnut crop was first noticed during 32nd meteorological standard week (MSW) of 2016 (i.e. 5th to 11th Aug. 2016) with initial population of 1.71 larvae per meter row (LPMR) and its population gradually increased till 35th MSW (i.e. 26th Aug. to 1st Sept., 2016) to reach a peak of 15.90 LPMR when the groundnut crop was 60 days old. Later the larval population declined to reach 1.92 LPMR at 38th MSW (i.e. 16th Sept. to 22nd Sept., 2016) and the pest disappeared from the crop after 39th MSW (i.e. 23rd Sept. to 29th Sept., 2016) onwards (Table 1). These findings are in agreement with the reports of Patil *et al.* (1992), who recorded the *M. vitrata* incidence on 60 days old *kharif* groundnut crop during 1990-91 and 1991-92 at University of Agricultural Sciences, Dharwad. Sharanabasappa *et al.* (2013) at Shivmoga region of Karnataka reported a higher incidence of maruca pod borer on 70 to 90 days old groundnut crop. The reported little deviation in the peak incidence period may be due to difference in the regional weather and also cropping pattern.

The later instars of *Maruca vitrata* (Gayer) formed the leaf webs and fed on leaves being inside the webs. The number

Table 1. Population dynamics of *Maruca vitrata* (Gayer) on groundnut crop

MSW(2016)	<i>Maruca vitrata</i> per meter row	No. of webbings/ meter row	Leaf damage (%)
29	0.00	0.00	0.00
30	0.00	0.00	4.12
31	0.00	0.00	14.25
32	1.71	0.00	21.05
33	5.12	2.45	25.01
34	10.7	7.12	34.91
35	15.90	12.34	59.76
36	13.02	8.05	43.12
37	7.10	6.12	40.09
38	1.92	1.23	20.12
39	0.00	0.53	11.19
40	0.00	0.00	8.70

MSW - Meteorological standard week

Table 2. Correlation between insect populations and weather parameters in groundnut crop

Stage/Symptoms	Temperature ($^{\circ}\text{C}$)		Relative humidity (%)		Rainfall (mm)	Wind velocity (kmph)
	Max.	Min.	Morn.	Even.		
<i>Maruca vitrata</i>	0.484	-0.172	-0.283	-0.494	-0.370	-0.219
Leaf damage (%)	0.376	-0.245	-0.222	-0.438	-0.282	-0.134
No. of webs	0.540	-0.227	-0.275	-0.493	-0.352	-0.331

**, Correlation is significant at the 0.01 level (2-tailed).

*, Correlation is significant at the 0.05 level (2-tailed).

of webs were ranged from 0.53 to 12.34 per meter row during the season. Initially a lower number of webs (2.45 webs per meter row) recorded during 33rdMSW (*i.e.* 12th to 18th of Aug., 2016) and gradually increased in later weeks to reach peak of 12.34 webs per meter row during 35thMSW (*i.e.* 26th Aug. to 1st Sept., 2016) of 2016. There was no further increase in the number of webs and the lowest was 0.53 webs per meter row recorded at 39thMSW (*i.e.* 23rd to 29th Sept., 2016) during *kharif* - 2016 season. The leaf damage due to *M.vitrata* was recorded from 32ndMSW (5th to 11th Aug., 2016) and increased gradually to reach a peak of 59.76 % during 35thMSW (*i.e.* 26th Aug. to 1st Sept., 2016). The leaf damage decreased as the season progressed along with pest population (Table 1). These results also indicated that the pest was active from first week of August to last week of September and the peak population coincides with the early part of reproductive stage of the

groundnut crop (pegging to pod formation stage). The earlier published report by Sharanabasappa *et al.* (2013) supports the present findings.

The correlation study of *Maruca vitrata* (Geyer) with weather parameters revealed that larval population was positively correlated with maximum temperature ($r = 0.484$). However, it was negatively correlated with minimum temperature ($r = -0.172$), morning and evening relative humidity ($r = -0.283$ and -0.494 , respectively), rainfall ($r = -0.370$) and wind velocity ($r = -0.219$). Similarly trend of correlation was observed in case of both per cent leaf damage and number of webbings caused by the pest (Table 2). The present findings are in confirmation with Ramesh Babu *et al.* (2006), who reported that minimum temperature and sunshine hours exert significant negative influence on *M. vitrata* larval population in groundnut. The present results are also in line with findings of Naik and Mallapur (2015) in blackgram ecosystem.

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