

**Short Communication**

**Effect of weather parameters on population dynamics of gram pod borer (*Helicoverpa armigera*) in North West Plain Zone of Rajasthan**

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Chickpea (*Cicer arietinum*) is an important food legume. It is an important source of protein in human diet (20 to 25 % protein). In India this crop is grown about 10.4 million hectares in both rainfed as well as in irrigated conditions. The area, production and productivity have shown an increasing trend in recent years. In North West plain zone of Rajasthan, it is a major crop having sizeable area under its cultivation. The most limiting factor in gram production is infestation of *Helicoverpa armigera* generally known as Gram pod borer. The damage caused by this insect is responsible for reducing crop yield between 18-26 percent. The most conducive stage of crop for attack is 100 percent flowering. Seeing the importance of the crop and insects, present study was conducted at Agricultural Research Station, Sriganaganagar with the following specific objectives; to study the population dynamics of *Helicoverpa armigera* in Gram and to ascertain the association of *Helicoverpa armigera* with local weather parameters.

The experiment was conducted at Agricultural Research Station, Sriganaganagar (Rajasthan) during rabi seasons of the year 2005-06 to 2009-10. The gram crop was sowed in the first fortnight of November during each Rabi season. For monitoring of *Helicoverpa* population, 5 pheromone traps were installed in experiment field and their septa were replaced in every 10 days. The observation on adult moth catches was recorded on daily basis. The meteorological observations of daily Maximum, minimum temperature, relative humidity of morning and evening and rainfall were collected from weather observatory of IMD located at Sriganaganagar and weekly values for the period are computed. The data were processed statistically and correlation of *Helicoverpa* population with weather parameters was established.

***Helicoverpa* weekly incidence**

Monitoring of gram pod borer through pheromone trap from 2005-06 to 2009-10 indicated that mean activity of the pest was observed from 6th standard week (second

week of February) in all these five years and mean higher moth catches was observed during 10th standard week to 15th standard week (second week of March to mid April). However, mean peak moth catch was recorded during 13th and 14th standard weeks (last week of March & first week of April) in all the five years. It was also observed that highest total mean catches was recorded in the years 2006-07, 2008-09 & 2009-10. The results obtained in the study are in line with Chatar et al (2010) and Tripathy et al (1998). Thus, the present on *Helicoverpa armigera* on gram crop are more or less in accordance with earlier workers.

***Weekly weather during the study period***

It was considered suitable for study the weather data of the location and during the study period. The weekly values of the weather data have been calculated with their minimum, maximum and mean values and have been presented in Table 1. The weekly as well as seasonal variations in weather parameters may be attributed to contribute for year to year variation in the *Helicoverpa* population and its level of incidence. An analysis of meteorological weather data showed that there is a high variability in weather parameters under the study period. The variation in the maximum temperature ranged between 19.4 to 38.9°C during the study period. The minimum temperature ranged between 5.0°C to 19.2°C during the study. The relative humidity (Mor.) varied by 5 to 10 % during the study period. The weekly average rainfall variability was recorded high during the study period. It was lowest in 46th week and maximum in 12th week except in the 5th standard week in which no rainfall was recorded.

***Association of pest population with weather conditions***

An analysis of correlation of *Helicoverpa* population with selected weather parameters was done and has been presented in Table 2. In general the *Helicoverpa* population was observed low during the study period 2005-06 to 2009-10. The pest population builds up occurred over wide range

**Table 1:** Seasonal incidence of pod borer (*H. armigera*) population in gram crop (2005-06 to 2009-10) & weather parameters

Std. met. week (SMW)	Temp. °C		RH(%)		Rainfall (mm)	Pan evapo. (mm)	Average moth catches per trap (Mean)
	Max	Min	Mor.	Eve.			
01	19.8	5.1	94	56	3.0	8.7	0.1
02	19.4	5.0	94	58	9.4	8.8	0.1
03	20.3	7.5	83	62	29.3	8.9	0.2
04	22.0	6.2	89	49	3.6	10.4	0.2
05	23.5	7.7	93	55	0.0	12.0	1.5
06	22.2	9.0	91	61	32.3	12.4	2.3
07	24.3	9.0	88	53	21.9	13.8	2.6
08	27.7	10.9	88	46	8.9	16.4	4.2
09	29.5	12.2	85	43	5.3	20.5	4.6
10	29.5	12.9	80	46	2.7	23.9	7.4
11	31.0	13.9	85	47	24.7	24.9	10.0
12	33.9	16.3	74	40	50.4	28.0	12.1
13	34.2	16.5	70	37	20.5	29.7	17.5
14	35.6	17.4	62	30	17.4	34.6	20.2
15	38.9	19.2	49	23	3.3	40.2	5.5
Mean	27.5	11.3	82	47	15.5	19.5	4.0

**Table 2:** Correlation coefficient (R) between *Helicoverpa armigera* population and weather parameters

Weather parameters	2005-06	2006-07	2007-08	2008-09	2009-10	Pooled data
Temp max.	0.58	0.65	0.75	0.66	0.73	0.75*
Temp min.	0.63	0.72	0.75	0.69	0.78	0.80*
RH mor.	-0.62	-0.48	-0.89	-0.63	-0.64	-0.69*
RH eve.	-0.64	-0.57	-0.84	-0.67	-0.73	-0.75*
RF	0.34	0.63	0.11	0.37	0.43	0.46

of weather parameters Viz. maximum temperature range, Minimum temperature range. It has been observed that pest population was multiply fast when maximum temperature was 33°C, minimum temperature was 13°C and above rainfall was ranging between 17-50 mm during 5 years study period. The temperature and relative humidity are closely related with *Helicoverpa* incidence and the association with rainfall was poor. The *Helicoverpa* population was significantly positive with relative humidity and negative and significantly associated with temperature. Chatar et al (2010) reported

significant positive correlation with morning and evening relative humidity and negative correlation with maximum and minimum temperature. The present study result on some weather parameters are not in line because of locational difference of the studies. Umbarkar et al. (2010) reported highly significant correlation in relative humidity and *H. armigera* support the findings of the study.

It can be concluded from the present study that highest incidence of *H. armigera* in gram crop occurred in

flowering cum podding stages between 2nd fortnight of February to first fortnight of March month months. Weather parameters like temperature and relative humidity have significant association with pest incidence. Emphasis on management practices for *H. armigera* is needed to take up during this active period of the pest.

### REFERENCE

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