ASSESSMENT OF INCIDENCE OF PIGEONPEA LEAF WEBBER *GRAPHOLITA CRITICA* (MEYR.) IN RELATION TO WEATHER PARAMETERS

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Abstract: Field trial was conducted to study the impact of weather parameters on the population build up of leaf webber *G. critica* (Lepidoptera: Tortricidae) on pigeonpea. The number of webs per 50 plants was in the range of 1.34 to 25.65 in the month of August. In the month of September the number of webs per 50 plants ranged from 5.23 to 36.56. Whereas in October the number of webs per 50 plants ranged from 1.22 to 12.35. Leaf webber damage exerted a negative association with maximum temperature (r = -0.31), minimum temperature (r = -0.05) and positive association with morning relative humidity (r= 0.22), afternoon relative humidity (r = 0.21) and rainfall (r = 0.03). However, only the influence of mean maximum temperature with leaf webber damage was found to be significant. But, the influence of minimum temperature, morning relative humidity, afternoon relative humidity and rainfall with leaf webber damage was not significant.

Key words: Grapholita critica, Seasonal incidence, Pigeonpea.

Introduction: Pigeonpea, *Cajanus cajan* (Linnaeus.) is an important legume crop produced in Asia, Africa, Latin America and the Caribbean region. India is probably the primary center of origin of pigeonpea. In India, it is one of the very important grain legumes and occupies second position in area and production next to chickpea. *Grapholita critica* is becoming a predominant insect pest in the recent past in all pigeonpea growing areas of our country. This pest is a major factor responsible for heavy loss in early and medium late maturing pigeonpea genotypes (Sahoo and Senapati, 2000). *Grapholita critica* incidence is common throughout the pigeonpea growing areas of India, which was a minor pest and becoming major during the course of time. It is a minor pest (Narendra *et al*., 1998) in some pigeonpea growing areas but the chances of becoming a major pest (Akhilesh and Nath, 2003; Sinam and Singh, 2004) is more due to its nature of damage. Studies on relationship between insect pest and weather parameters may provide a clue to improve IPM strategy. Therefore the present study was undertaken to understand the relationship between the leaf webber population and meteorological parameters in pigeonpea.

Materials and Methods: Field trials were conducted at the Agricultural College, Gulbarga, Karnataka during 2012-13. Pigeonpea variety Maruthi (ICP 8863) was grown during *kharif* season under normal agronomical practices. No plant protection measures were undertaken during the entire period. A total of 150 plants were present in each plot of which observations were made on 50 plants per plot. Different dates of sowing *viz*., 28th of June, 5th, 12th, 19th and 26th of July, 2nd and 9th of August was done for the present study. A total of seven different dates of sowing were done randomly from fourth week of June to first week of August. The experiment was replicated thrice and observations were noted down at weekly intervals from 6th of August to 15th of October by counting the total number of webs per 50 plants in each plot. An attempt was made to correlate the possible influence of weather parameters on population build up of pigeonpea leaf webber by using Drysoft.

Results and Discussion: The data on the seasonal incidence of leaf webber revealed that the damage was noticed starting from the one month old crop to the end of vegetative stage. Crop sown during second fortnight of June and first fortnight of July recorded high damage compared to the crop sown during second fortnight of July and first fortnight of August. The present results contradicts with the findings made by Khandwe *et al.* (1994) who recorded the highest leaf webber damage during second week of August and pest infestation of around 30 per cent plants during that period. The average number of webs per 50 plants ranged from 1.34 to 25.65 in the month of August. Whereas in September the average number of webs per 50 plants ranged from 5.23 to 36.56 webs. The leaf webber population steadily declined in the month of October and the average number of webs per 50 plants ranged from 1.22 to 12.35 webs. The average number of webs per 50 plants noticed was high during the 2nd and 3rd week of September (Table 1). The present findings are in close agreement with Akhilesh and Nath (2003b) who reported that the leaf webber infestation was noticed from 24th August to 22nd November with a peak on 8th September. The results of the multiple linear regression analysis showed a R^2 value of 0.16 revealing that 16 per cent of the webs formed by leaf webber was influenced by maximum temperature (Table 2). The leaf webber population was negatively correlated with maximum tempearature and minimum temperature and non significant but positively

correlated with morning relative humidity, afternoon relative humidity and rainfall. The multiple regression equation fitted with weather parameters to predict the leaf webber damage is as follows.

Y = 120.04 –3.67 X1.

The results indicated that an increase of 1°C of maximum temperature would lead to a decrease of 3.67 leaf webs per 50 plants. The present findings contradicts with Akhilesh and Nath (2005) who reported the positive correlation with maximum temperature and water evaporation. Whereas Kuldeep and Ram (2007) reported that larval population showed significant positive correlation with minimum temperature and minimum relative humidity during 2004-05. The variation in results may be due to change in location and climatic conditions existed during the period of study.

Table 1. Effect of date of sowing on the incidence of leaf webber, *Grapholita* critica

Period of observation Month/ Standard week (MSW)	Leaf webber (Webs/50 plants) during						
	June sowing	July sowing				August sowing	
	IV week	I week	II week	III week	IV week	I week	II week
Aug-32	6.32	5.28	2.42	1.68	-	-	-
33	12.03	10.52	5.11	4.14	-	-	-
34	18.24	16.34	8.23	2.66	1.34	2.66	-
35	25.65	24.36	10.34	8.28	7.62	4.57	1.64
Sep-36	36.56	33.45	21.65	19.57	12.38	11.66	5.23
37	30.28	31.67	28.57	27.25	18.32	15.24	9.21
38	22.74	26.24	30.29	31.64	26.51	18.27	15.38
39	6.26	5.36	18.61	15.37	12.63	16.38	14.82
Oct-40	2.58	1.68	12.34	8.24	4.35	12.35	11.37
41	1.31	1.22	3.25	3.43	3.62	8.51	8.94
42	-	-				1.32	3.26

MSW- Meteorological Standard week

Table 2. Stepwise regression analysis showing all the variables against leaf webber in relation with number of webs

Parameters	Multiple regression co-efficient	' t ' value	' F ' value	R^2 value
Maximum temperature	-3.67	2.19*	2.20	0.16
Minimum temperature	1.66	1.37		
Morning relative humidity	-1.07	1.85		
Afternoon relative humidity	0.91	1.90		
Rainfall	-0.08	1.77		

Significance at (p=0.05)

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