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Effect of Weather Parameters on Brinjal Jassid, *Amrasca biguttula biguttula* Ishida

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ABSTRACT

Jassid, *Amrasca biguttula biguttula* Ishida, an important regularly occurring insect-pest of brinjal in Gujarat is found throughout the year. Among the various weather parameters studied to know their effect on population build up of this pest minimum temperature (r = -0.56), average temperature (r = -0.41) and vapour pressure (r = -0.64) showed significant negative association, whereas sunshine hours (r = 0.45) had positive association. However, only vapour pressure contributed 41 per cent variation in jassid population.

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INTRODUCTION

The life cycle, severity and threshold population of insect depend upon the prevalence of weather conditions. In semi arid tropics, various generations of jassid *Amrasca biguttula biguttula* Ishida overlap each other and all stages of jassid could be seen throughout the year. The information regarding effect of weather parameters on the population build up of insect pest is very useful in predicting the pest outbreak. Varma (1975), Balasubramanian *et al.* (1981) and Dubey and Ballal (1991) have studied such relationship for *Myzus persicae Scirpophaga incertulas* and *Aproaerema modicella*, respectively but no information is available for jassid, *A. biguttula buguttula*. Hence study was carried out on the seasonal incidence of *A. biguttula biguttula* infesting brinjal at the Gujarat Agricultural University, Anand during 1983 to 1985.

MATERIALS AND METHODS

To make the brinjal crop available throughout the year, brinjal 'Doli 5' was raised at 90 cm x 90 cm spacing at every two months interval in 0.04 hectare area. The agronomic practices in vague on the farm were followed. The jassid population was recorded by counting the number of nymphs on five leaves at different height of each of the twenty five plants selected at random at weekly interval after one month of transplanting of each crop to removal of the crop.

The meteorological parameters were monitored daily in the Agrometeorologi-

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cal observatory which was about 100 m away from experimental site. The cause and effect analysis and step wise regression analysis were carried out for determining the contribution of weather parameters having significant effect on build up of jassid population.

RESULTS AND DISCUSSION

The three years study on effect of weather parameters on population buildup of jassid, *A. biguttula biguttula* (Fig. 1) revealed activity of jassid throughout the year. However, the maximum jassid population per leaf was observed in the range of 1.16 to 2.81 during the 10th and 11th standard week (2nd and 3rd week of March), whereas minimum population ranged from 0.02 to 0.05 jassid per leaf during the 24th and 35th standard week (3rd week of June and 1st week of September). Thereafter population steadily increased to 2 or 3 jassids per leaf from the 38th standard week (3rd week of September). This increasing trend of jassid population coincided with the decrease in vapour pressure from 22 mm of Hg to 10 mm of Hg and minimum temperature from 20°C to 8°C. It indicated that these two weather parameters played important role in the building up of the jassid population. The influence of maximum temperature was not found, however increase in sunshine hours increased the jassid population.

TABLE 1

Correlation co-efficient between jassid population and weather parameters.

Year	Temperature °C		Vapour pressure	Sunshine
	Min	Av	mm of Hg	hours
1983	-0.63	-0.50	-0.66	0.43
1984	-0.64	-0.47	-0.75	0.53
1985	-0.61	-0.45	-0.70	0.49
Pooled	-0.56	-0.41	-0.64	0.45

The rainfall occuring during July to September might be responsible for low population build up of jassid during 26th to 35th standard week.

The results of correlations co-efficient between weather parameters and jassid population (Table 1) revealed significant negative association between jassid population and weather variables viz., minimum temperature (r = -0.56), average temperature (r = -0.41) and vapour pressure (r = -0.64) had positive association with sunshine hours (r = 0.45).

To quantify the cause and effect analysis of weather parameters and jassid population, path co-efficient analysis was performed. The results (Table 2) revealed negative significant association of jassid with minimum temperature, which had negative low direct effect and was balanced out by its indirect positive effect through average temperature. The minimum temperature had maximum but negative indirect effect through vapour pressure. The average temperature having negative association with jassid population showed positive direct effect. The direct effect of average temperature was nullified by

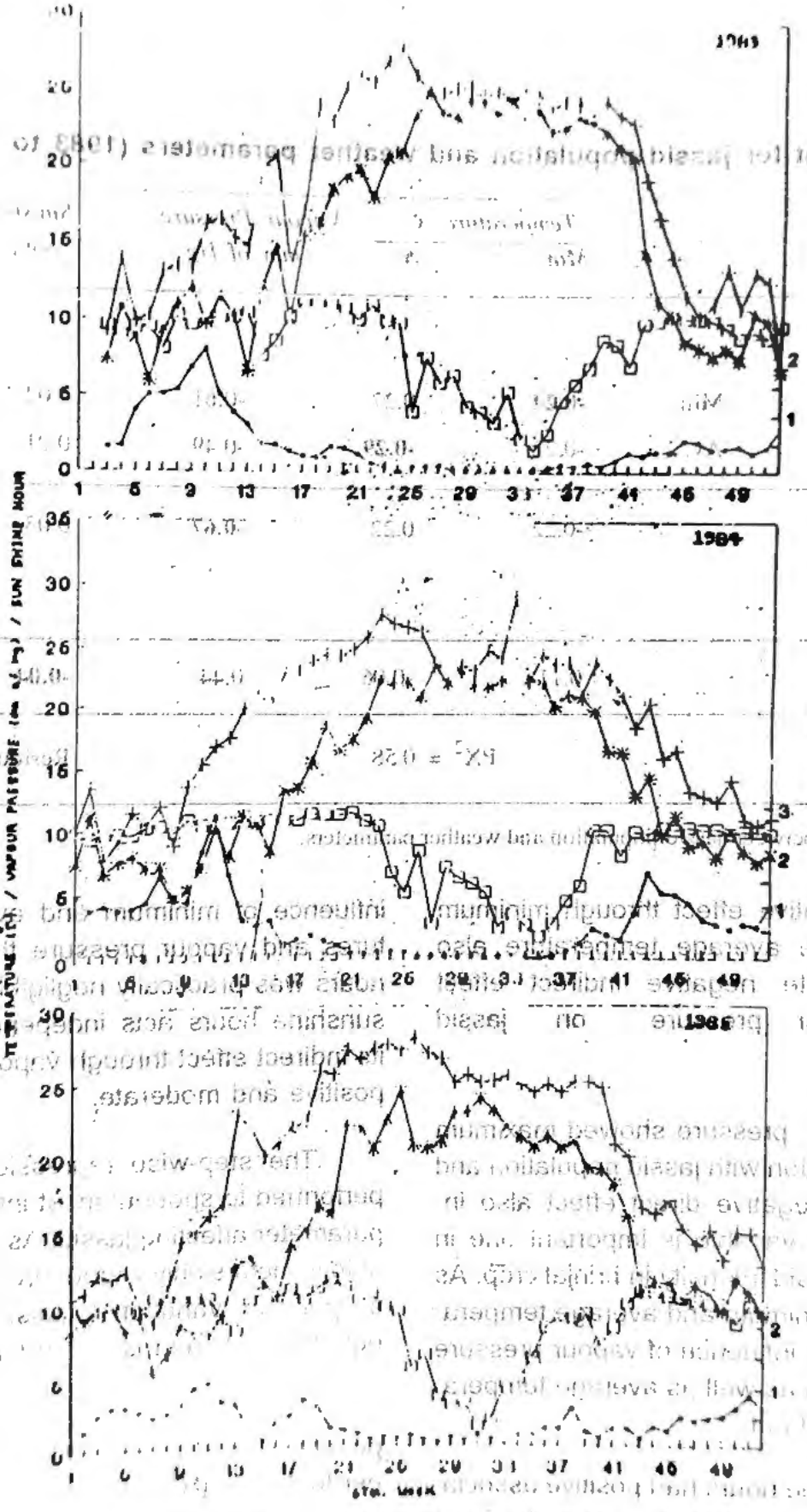


Fig. 1 : effect of weather parameters on jassid population

TABLE 2

Path co-efficient for jassid population and weather parameters (1983 to 1985 pooled).

Weather parameters		*Temperature ℃*		*Vapour Pressure mm of Hg*	*Sunshine hours*	*r**
		Min	*Av*			
Temperature C						
	Min.	**-0.24**	0.27	-0.61	0.02	-0.56
	Av.	-0.22	**-0.29**	-0.49	0.01	-0.41
Vapour pressure mm of Hg		-0.22	0.22	**-0.67**	0.03	-0.64
Sunshine hours		0.11	-0.06	0.44	**-0.04**	0.45
$R^2 = 0.42$			$PX^2 = 0.58$		Residual = 0.76	

* Total correlation between jassid population and weather parameters.

its indirect negative effect through minimum temperature. The average temperature also showed moderate negative indirect effect through vapour pressure on jassid population.

The vapour pressure showed maximum negative association with jassid population and had maximum negative direct effect also indicating that this variable is important one in predicting the jassid intensity in brinjal crop. As observed with minimum and average temperatures, the indirect influence of vapour pressure through minimum as well as average temperatures was evened out.

The sunshine hours had positive association with jassid population, however its direct effect was practically negligible. The indirect influence of minimum and average temperatures and vapour pressure through sunshine hours was practically negligible indicating that sunshine hours acts independently. However its indirect effect through vapour pressure was positive and moderate.

The step-wise regression analysis was performed to spot out most influencial weather parameter affecting jassid. As a result out of all abiotic factors only vapour pressure contributed 41 per cent variation in jassid population, the equation obtained is as under :

Jassid population per leaf = 1.215 - 0.048 (Vapour pressure mm of Hg) (R^2 = 0.41)

This relation is depicted in Fig. 2

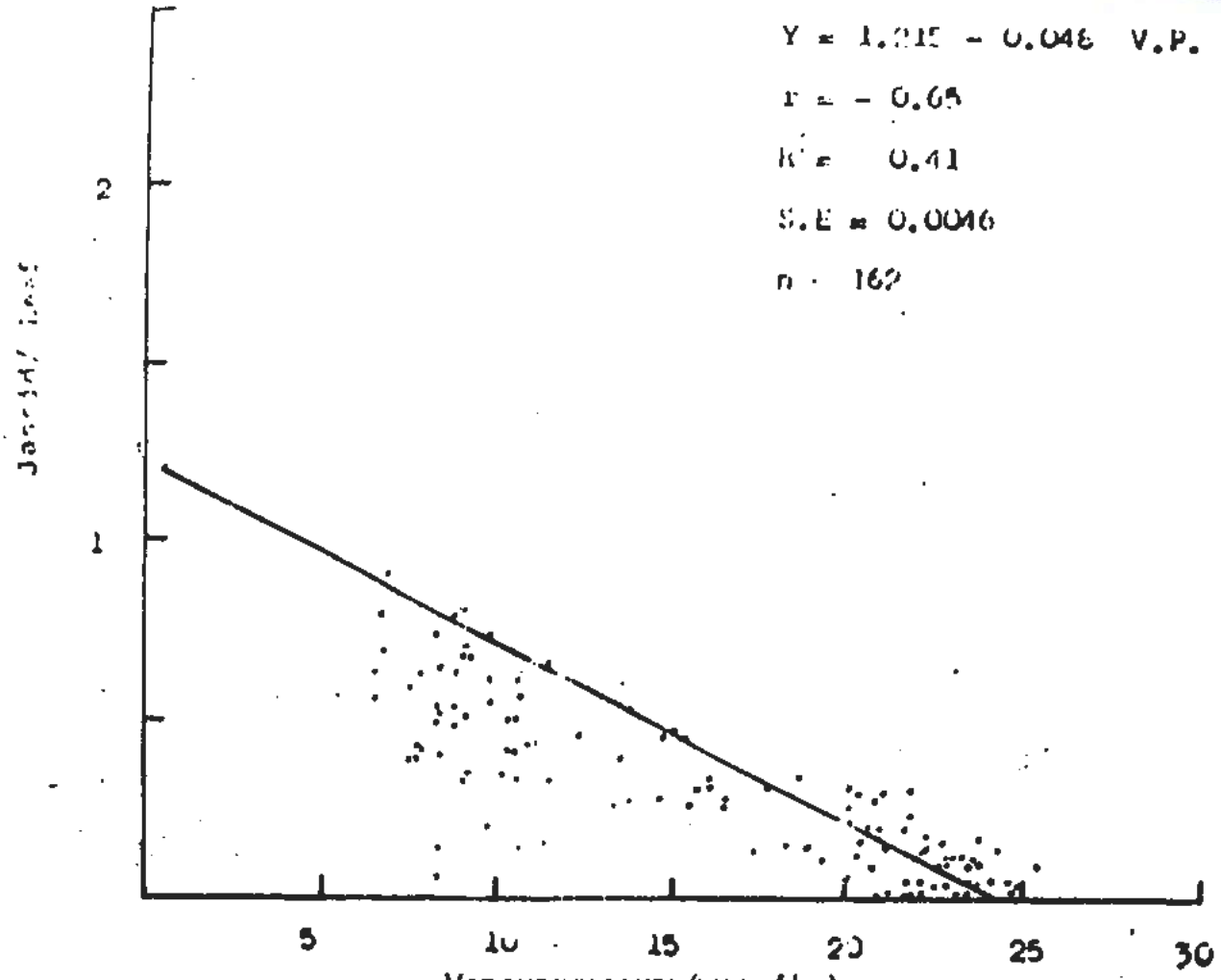


Fig. 2 : Relationship between jassid population and vapour pressure

Whereas, other significant variables viz., minimum temperature and sunshine hour when included in the step-wise regression analysis they did not improve prediction considerably but confined to only 44 per cent. Hence these variables were not considered in developing regression equation.

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