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Population Dynamic of Leaf Hopper (*Amrasca biguttula biguttula*) on Brinjal and Effects of Abiotic Factors on its Dynamics

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Abstract: Population dynamic of leaf hopper (*Amrasca biguttula biguttula*) on brinjal crop and effect of abiotic factors on its dynamic were studied. The leaf hopper started the activity soon after transplanting. The serious activity was noticed from 21st May to 6th August. The highest leaf hopper number per leaf was found as 12.96 + 0.93 on 9.7.96. Mean maximum and minimum temperature were found as positively and significantly correlated with population change. Relative humidity and rainfall was found as negatively and non-significantly correlated with population fluctuation. Sunshine was also positively but non-significant correlated factor.

Key words: Leafhopper, population dynamic, abiotic factors

Introduction

Brinjal (*Solanum melongena* L.) is an important summer vegetable crop and grown almost all over in Pakistan. It is attacked by a number of insect pests particularly jassid, *Amrasca biguttula biguttula*, aphid (*Aphis gossypii* Glov), shoot and fruit borer, *Leucinodes orbonalis* Guen. (Atwal, 1976). Among these pests, *Amrasca devastans* is considered as an important pest of this crop (Iqbal and Reddy, 1980; Ahmed and Verma, 1984; Shah *et al*., 1984; Parkash and Verma, 1986; Ahmad, 1986; Patel and Patel, 1998; Sudhakar *et al*., 1998; Borah, 1995; Ratanoara *et al*., 1994; Naik *et al*., 1993).

Keeping in view the importance of this pest, it was considered desirable to study the population dynamic and effect of abiotic factors on its dynamic.

Materials and Methods

A local cultivar of brinjal (Local gool) was transplanted on 15.4.96 at National Agricultural Research Centre, Islamabad. The sampling of leafhopper started 23rd April and continued to the end of August. Plant to plant and row to row distances were 50 and 60 cm respectively. The length of each row was 5 meters. There were three replication, each comprised of 12 rows. On each sampling date, 46 randomly selected leave from upper and middle parts of plant were taken and number of leafhopper per leaf was determined. Leafhopper on lower (older) leaves was not sampled as it is rarely attacked by this pest (Pearson, 1958).

Later on, correlation between leafhopper numbers and abiotic factors like maximum temperature, minimum temperature, relative humidity, rain fall and sun shine was computed.

Results and Discussion

Population fluctuation of leaf hopper(*Amrasca biguttula biguttula*) on brinjal is presented in Table 1. The leafhopper started the activity soon after transplanting. Two leafhoppers per leaf was considered as indicative threshold level for okra (Ahmed, 1982). The serious activity was noticed from 21st May to 6th August 2001. The highest leaf hopper number per leaf was found as 12.96 ± 0.93 on 9.7.96. The period of maximum activity was seen in the month of July, while Ahmed and Naveed (1981) reported highest leafhopper population during the month of June on okra. This difference is may be due to different ecological conditions and difference crop on which the experiment was conducted. From the last week of July a downward trend in population was noticed.

The experiment provides a basic study for population dynamic and it is extremely difficult to predict the status of pest and economic loss, which may occur to brinjal crop due to this pest. However, it has been reported as a very serious pest of brinjal in other countries (Parkash and Verma, 1986; Ahmed, 1986; Naik *et al*., 1993; Ratamoara *et al*., 1994; Borah, 1995; Patel and Patel, 1998). There is a need of further experiments to estimate economic loss and the status of this pest.

Table 1: Population dynamic of leafhopper (*Amrasca biguttula biguttula*) on brinjal

Date of sampling	No. of leafhoppers ± S.E
23.4.96	0.11 ± .05
30.4.96	0.40 ± .09
07.5.96	0.96 ± .16
14.4.96	1.91 ± .21
21.5.96	4.40 ± .52
28.5.96	4.31 ± .53
04.6.96	5.20 ± .47
11.6.96	3.85 ± .34
18.6.96	3.51 ± .35
25.6.96	4.51 ± .35
02.7.96	11.24 ± .84
09.7.96	12.96 ± .93
16.7.96	8.42 ± .64
23.7.96	7.73 ± .56
30.7.96	2.15 ± .29
06.8.96	3.56 ± .34
13.8.96	1.73 ± .23
20.8.96	1.78 ± .22
27.8.96	1.73 ± .23
27.8.96	1.84 ± .20

Effect of abiotic factors on leafhopper population on brinjal: The abiotic factors i.e., relative humidity, rainfall and sunshine, which did not show increasing or decreasing the leaf hopper population significantly (Table 2). Both minimum and maximum temperatures were found as positively correlated with leafhopper numbers (Table 2). Relative humidity and rainfall were observed as negatively correlated factors with population fluctuation. The preferred habitate for jassid nymphs were the underside of leaves, it is unlikely that the direct action of raindrop afford any significant control. However, the research in Sudan has shown that mud splashed on the underside of leaves during heavy rain resulted in good control of jassid numbers on cotton (Hanna, 1950). The mud splashed on to the underside of leaves may reduce the jassid nymphs when lower leaves are included in sampling. The decrease may be non-significant as observed in present experiment due to height of sampling leaves (middle and upper part of plant) which might reduce the intensity of mud splashed on the underside of leaves as reported by Mabbet *et al*. (1984). Sunshine was also found positively correlated with population dynamic.

Table 2: Effect of abiotic factors on population dynamic of leafhopper (*Amrasca biguttula biguttula*)

Abiotic factors	Mean	Correlation	Regression equation
Mean max. temperature	34.78	0.479*	Y=32.99+0.421x
Mean mini. temperature	-0.028NS	0.481*	Y=17.18+0.508x
Relative humidity %	61.37	-0.028NS	Y=54.06-0.125x
Rain fall (mm)	05.09	-0.058NS	Y=40.72-1.210x
Sunshine(hr.)	09.30	0.199NS	Y=9.18+0.084x

*:Significant at 0.05% level of significance NS: Non-significant

The serious activity was noticed from 21st May to 6th August. Mean maximum and minimum temperature were found as positively and significantly correlated with the population change.

References

Ahmed, M., 1986. Leaf hopper infestation on brinjal (*Solanum melongena*) and its relationship with various factors of growth of the plant. Pak. J. Zool., 18: 209-214.

Ahmed, M. and R. Naveed, 1981. Leaf hopper infestation on vegetable and fruits in Sind Pakistan. Pak. J. Agric. Sci., 3: 51-58.

Ahmed, R. and S. Verma, 1984. Residue of dimethoate and phosphamidon in brinjal fruits and determination of waiting period. Indian J. Entomol., 46: 111-114.

Atwal, A. S., 1976. Agricultural Pest of India and South East Asia, Kalyani Pub. Ludhiana, pp: 256-57.

Borah, R.K., 1995. Insect pest complex in brinjal (*Solanum melongena* L.). Ann. Agric. Res., 16: 93-94.

Hanna, A.D., 1950. The effect of rainfall on cotton jassid, *Empoasca* spp. *lybica* in Gezira, Anglo-Egyptian Sudan. Bulletin Entomol. Res., 44: 359-369.

Iqbal, M.N. and G.P.V. Reddy, 1980. Efficacy of fenitrothion in the control of brinjal and okra pests and its persistance. Indian J. Pl. Prot., 8: 23-28.

Mabbett, T.H., M. Nachapong, K. Monglakul and J. Medeang, 1984. Distribution on cotton of *Amrasca devastans* and *Ayyaria chaetoplora* in relation to pest scouting techniques for thailand. Tropical Pest Management, 30: 133-134.

Naik, B.G., S. Verma and K. G. Phadke, 1993. Occurrence of pests in relation to degradation of insecticides in brinjal crop during summer and kharif seasons. Pesticide Res. J., 5: 94-103.

Patel, Z.P and J.R. Patel, 1998. Resurgence of jasssid, *Amrasca biguttula biguttula* in brinjal. Indian J. Entomol., 60: 152-164.

Parkash, O. and A.N. Verma, 1986. Effect of different granular insecticides applied by different methods against jassid, *Amrasca devastans* (Dist) and white fly, Bemisia tabaci (Genn) on brinjal during pre-fruiting crop stage. Indian J. Entomol., 47: 66-70.

Pearson, E.D., 1958. The insect pests of cotton in tropical Africa. Pub. Common Wealth Agric. Bureau, London, pp: 335.

Ratanoara, A., M. Shekh, J.R., Patel and N.M. Patel, 1994. Effect of weather parameters on brinjal jassid, *Amrasca biguttula buguttula*. Ishdia Gujrat Agric. Univ. Res. J., 19: 39-43.

Shah, A.H., M.S. Purohit, R.C. Jhala and M.B, Patel, 1984. Efficacy of granular insecticides against jassid, aphid and shoot and fruit borer of brinal. Gujrat Agric. Univ. Res. J., 9: 25-28.

Sudhakar, K.K. C., Punnaiah and P.V. Krishnawa, 1998. Efficacy of certain selected insecticides on the sucking pest complex of brinjal. Indian J. Entomol., 60: 214-244.