SCREENING OF OKRA GENOTYPES AGAINST JASSID, *AMRASCA BIGUTTULA BIGUTTULA* (ISHIDA) (HOMOPTERA: CICADELLIDAE)

Jamshaid Iqbal[1], Mansoor ul Hasan[1], Muhammad Ashfaq[1], Shahbaz Talib Sahi[1] and Amjad Ali[2]
[1]University of Agriculture, Faisalabad
[2]Ayub Agricultural Research Institute, Faisalabad

The study was conducted for preliminary screening trial of 30 genotypes of okra for relative susceptibility/resistance against jassid, *Amrasca biguttula biguttula* (Ishida) during 2006. From these screening trials 3 genotypes showing comparatively susceptible (Pusa sawani, Dera local and Okra-3), 3 with intermediate (Karam-5, Sabz pari and Clean spineless) while 3 with resistant (Makhmali, Punjab selection and Green wonder) responses against jassid were selected for final screening trial during 2007. Differences were found to be significant among genotypes of okra during both the study years. The trend in selected genotypes towards susceptibility/resistance against jassid was similar to that observed during preliminary screening trial. Pusa sawani showed maximum Host Plant Susceptibility Indices (HPSI) i.e. 18 % and was susceptible, while Green wonder was comparatively resistant with minimum HPSI i.e., 5 %.
Keywords: Okra, jassid, pest genotypes, Homoptera, susceptibility of jassid

INTRODUCTION

Okra is a summer and fall crop, widely cultivated from tropics to sub tropics (Kochhar, 1986). Okra, like other Malvaceae, is susceptible to a variety of pests that hinder its yield. *Amrasca biguttula biguttula* (Ishida) (Homoptera: Cicadellidae) is especially important in the tropics and subtropics because environmental conditions are often conducive year round for growth and development of host and pest. This pest is amongst the most important sucking insects that attack okra crop (Singh *et al*. 1993; Kakar and Dobra, 1988; Dhandapani *et al*., 2003) where it lays maximum number of eggs and thus becomes suitable place for survival and feeding (Hussain *et al*., 1979; Bernardo and Taylo, 1990; Sharma and Singh, 2002). The yearly increase in the cost of pesticides has gone out of the reach of common farmer. Therefore there is a need to develop alternates for handling such economically important pests approach. With the environmental friendly pest management approach, Host Plant Resistance (HPR) is one of the most cost-effective and safe methods. Plants contain a large number of substances, which have their primary use as a means of defense against natural enemies. A resistance variety can provide a base on which to construct an integrated control system (Maxwell *et al*. 1972, Gallun *et al*., 1975) and may be most fruitful when used in connection with other methods of control. HPR is seen to be a sustainable approach to pest management and varietals trials of different okra plants to jassid is essential. This was an attempt to identify the response by different available genotypes of okra to jassid in order to determine resistance/ susceptibility.

MATERIALS AND METHODS

Studies were carried out during 2006 and 2007 to screen okra genotypes based on per leaf population density count. Thirty genotypes of okra were sown in the experimental area of Post-graduate Agricultural Research Station, University of Agriculture, Faisalabad on March 31, 2006 (Table-1). Based on per leaf population density of jassid, three genotypes each showing resistant, susceptible and intermediate response for test insect were selected for further experiments. Nine genotypes of okra selected on per leaf population density-count-data from preliminary screening trial were sown on March 31, 2007. Experiments were laid out in a Randomized Complete Block Design (RCBD) with three replications. The row to row distance was kept at 75 cm and plant to plant was 30 cm. The plot size was maintained at 15 m × 20 m during the study seasons. No plant protection measure was applied and the material was screened under natural insect pressure. All the recommended agronomic practices were adopted during the experiment.

Jassid population was recorded early in the morning twice in a week 24 days after sowing. For counts of jassid population, 15 plants of each genotype in each replication were selected at random and tagged. The leaves were observed in such a way that, one leaf at upper portion of the first plant, one leaf in middle portion from the second plant and one leaf from bottom portion of the third plant of each variety was taken in to account. The data were analyzed statistically using M-Stat package. The means were compared by LSD test at P = 0.05.

Table 1. Means comparison of the data regarding per leaf population of jassid on various genotypes of okra during 2006

Genotypes	Means*
Pusa Swani	3.32 a
Dera Local	3.24 b
Okra-3	2.98 c
Okra-Sindh	2.87 d
COK-1418	2.78 e
Ikra-2	2.76 ef
COK-1396	2.69 fg
Diksha	2.65 gh
SPA-2001	2.65 gh
PMS-55	2.61 hi
Ikra-24	2.57 i
Park-Karenti	2.49 j
Ikra-1	2.27 k
Karam-5	2.18 l
Sabz Pari	2.17 lm
Clean Spineless	2.10 mn
P-1999-31	2.06 no
Ikra-3	2.02 op
Ikra Anamika	2.00 op
PMS-beauty	1.98 pq
Namdahari	1.92 qr
Lakshmi-24	1.86 rs
Pusa Green	1.84 rs
Arka Anamika	1.81 s
Zeenat	1.73 t
Green Star	1.59 u
Super Star	1.51 v
Makhmali	1.41 w
Punjab Selection	1.29 x
Green Wonder	1.22 x

*Means sharing similar letters are not significantly different by LSD Test at P = 0.05

RESULTS AND DISCUSSION

The results (Table 1) reveal that the genotype Pusa sawani showed maximum jassid population i.e. 3.32 per leaf followed by 3.24, 2.98 and 2.87 per leaf on Dera local, Okra-3 and Okra Sindh, respectively and differed significantly from one another. Minimum jassid population was recorded (1.22 per leaf) on Green wonder with non significant difference from Punjab selection having 1.29 jassid per leaf. Overall, ranking of genotypes on the basis of jassid population per leaf under descending order are: Pusa sawani (3.32), Dera local (3.24), Okra-3 (2.98), Okra-Sindh (2.87), Cok-1418 (2.78), Ikra-2 (2.76), Cok-1396(2.69), Diksha (2.65), SPA-2001 (2.65), PMS-55 (2.61), Ikra-24 (2.57), Park Karenti (2.49), Ikra-1 (2.27), Karam-5 (2.18), Sabz pari (2.16), Clean spineless (2.10), P-1999-31 (2.06), Ikra-3 (2.02), Ikra anamika (2.00), PMS-beauty (1.98), Namdahari (1.91), Lakshami-24 (1.86), Pusa green (1.84), Arka anamika (1.81), Zeenat (1.73), Green star (1.59), Super star (1.51), Makhmali (1.41), Punjab selection (1.29) and Green wonder (1.22). The present findings are in conformity with those of Mahal and Singh (1979), Uthamasamy (1986), Singh (1988), Mahal *et al*. (1991), Mahal *et al*. (1993), Sharma and Sharma (1997) who reported that Pusa swani was a susceptible genotype of okra to jassid. In the present study, the genotype Pusa green was found to be moderately resistant with 1.84 jassid per leaf and these findings are in conformity with those of Shakeel *et al.,* (2000). In the present results, the genotype Arka anamika appeared moderately resistant to jassid while Pusa swani as susceptible. Similar results were recorded by Kumar and Singh (2002) who observed lower population of jassid on Arka anamika while highest on Pusa swani.

Table 2. Means comparison of the data regarding per leaf population of jassid on selected genotypes of okra during 2007

Genotypes	Means*
Dera Local	4.73 a
Pusa Swani	4.65 a
Okra-3	3.42 b
Sabz Pari	2.86 c
Karam-5	2.80 cd
Clean Spineless	2.76 d
Makhmali	1.54 e
Green Wonder	1.26 f
Punjab Selection	1.25 f

Means sharing similar letters are not significantly different by DMR Test at P = 0.05

Based on the data of jassid population per leaf during the study year 2006 in a preliminary screening trial, 3 genotypes (Pusa sawani, Dera local and Okra-3) showing comparatively highest population, 3 genotypes (Karam-5, Sabz pari and Clean spineless) having intermediate response based on jassid population and 3 genotypes (Makhmali, Punjab selection and Green wonder) with the lowest population of jassid were selected for final screening trial during the year 2007. The result (Table 2) reveal that maximum jassid population was recorded as 4.73 per leaf on genotype Dera local that did not differ significantly from Pusa sawani with 4.65 jassids per leaf. The minimum jassid population was observed to be 1.25 and 1.26 per leaf each on Punjab Selection and Green wonder. Non significant difference was

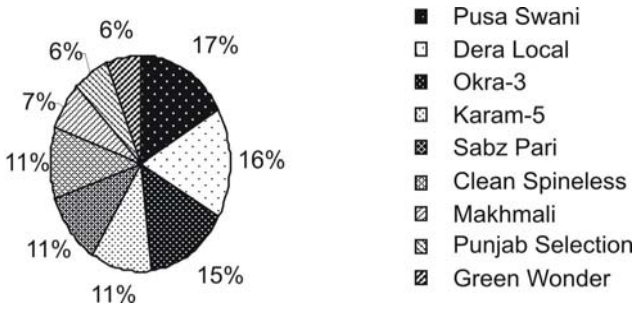

Figure 1. Plant susceptibility indices (%) based on *A. biguttula biguttula* (Ishida) population on various genotypes of Okra, *Abelmoschus esculentus* (L.) during 2006

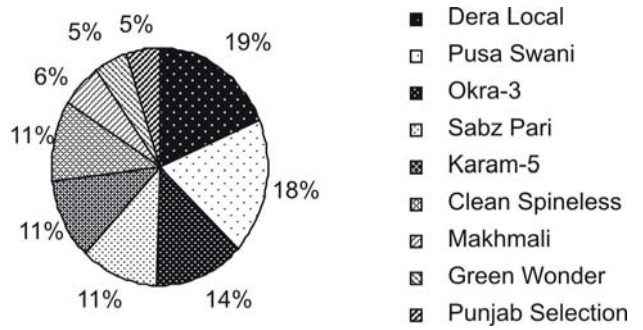

Figure 2. Plant susceptibility indices (%) based on *A. biguttula biguttula* (Ishida) population on various genotypes of Okra, *Abelmoschus esculentus* (L.) during 2007

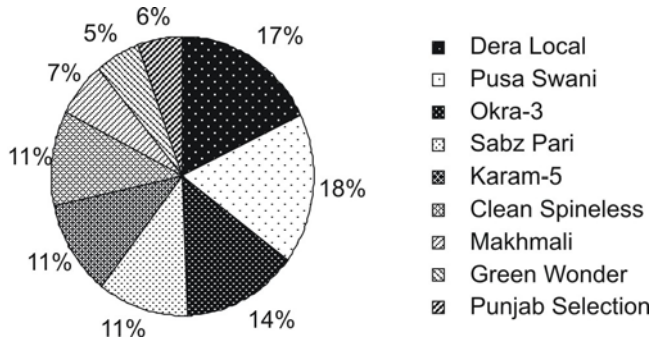

Figure 3. Plant susceptibility indices (%) based on *A. biguttula biguttula* (Ishida) population on various genotypes of Okra, *Abelmoschus esculentus* (L.) on cumulative basis during 2006-07

found among Sabz pari and Karam-5 with 2.86 and 2.80 jassids per leaf, respectively, with the later showing non significant difference to Clean spineless having 2.76 jassids per leaf. From these results it was concluded that the genotype Dera local showed susceptible response followed by Pusa swani whereas Punjab selection and Green wonder were comparatively resistant. The selected genotypes of okra differed significantly regarding jassid population per leaf during 2007. Dera local and Pusa swani were found comparatively susceptible genotypes with highest population of jassid i.e. 4.73 and 4.65 per leaf, respectively and did not show significant difference from one an other, whereas Punjab selection and Green wonder were found to be comparatively resistant with the lowest population of jassid i.e., 1.26 per leaf for each and also did not differ significantly with each other. The present findings can partially be compared with those of Khambete and Desai (1996) who studied the response of jassid on Pusa swani, MR10-1, MR-12 and IC-7194 and reported that Pusa swani was a susceptible genotype. The present findings cannot be compared with those of Lokesh and Singh (2005) because of differences in genotypes as those tested in the present study.

During 2006 the genotype Pusa sawani showed maximum HPSI (Host Plant Susceptibility Indices) i.e. 17% followed by Dera local and Okra-3 with 16% and 15% HPSIs, respectively (Fig. 1). The minimum HPSI was observed to be 6% each in Green wonder and Punjab selection. The genotypes i.e. Karam-5, Sabz pari and Clean spineless each showed 11% HPSIs whereas 7% HPSI was found in genotype Makhmali. The HPSIs based on jassid population per leaf on different genotypes of okra during 2007 are shown in Fig. 2. The genotype Dera local showed maximum HPSI i.e. 19% followed by Pusa sawani with 18% HPSI. The genotype Okra-3 showed 14% HPSI and these three genotypes were found comparatively susceptible to jassid. The genotypes Sabz pari, Karam-5 and Clean spineless each showed 11% HPSIs and were found intermediate. The minimum HPSIs was observed in genotypes Punjab selection and Green wonder each had 5% HPSIs whereas Makhmali showed 6% HPSI and these genotypes were comparatively resistant. The results regarding HPSIs based on average population of jassid per leaf recorded during 2006 and 2007 are shown in Fig-3. It is evident from the results that Pusa sawani showed maximum HPSI i.e. 18%. The HPSIs in Dera local and Okra-3 were 17% and 14%, respectively. The genotypes Sabz pari, Karam-5 and Clean spineless each showed 11% HPSI which were found intermediate. The minimum HPSI was found for Green wonder i.e. 5% whereas Makhmali and Punjab selection showed 6% and 7% HPSIs, respectively and were proved comparatively resistant.

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