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Varietal resistance of okra against cotton jassid *Amrasca biguttula biguttula* (Ishida)

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Abstract

An experiment was carried out to evaluate the resistance of different okra varieties against cotton jassid at Entomology Section of Rice Research Institute, Dokri, Larkana, during kharif season 2015. The highest infestation of jassid was observed in last week of May on Arizona (18.00) per plant followed by Super green (17.00), Sabzpari (16.66) and Reham (14.33). Similarly minimum infestation of jassid was observed in initial week of May on Sabzpari variety (2.00) followed by Super green (2.00), Arizona (2.33) and Resham (2.66). The data further showed the overall mean population of jassid on okra varieties i.e. Arizona (7.12 ± 5.22) followed by Super green (6.96 ± 4.30), Resham (6.42 ± 4.40) and Sabzpari (6.22 ± 4.93). It is concluded from the data that jassid population was significantly ($P < 0.05$) affected by different dates, whereas non-significantly ($P > 0.05$) by varieties and their interaction. Maximum jassid population was recorded on 29-05-2015, whereas minimum jassid population was observed on 19-06-2015. Jassid population was noted in variety Arizona while minimum population was recorded in variety Sabzpari.

Keywords: *Abelmoschus esculentus* L., varieties, resistance, cotton jassid, population

1. Introduction

Okra is a summer and fall crop, widely cultivated from tropics to sub tropics. Among the vegetable crops, okra (*Abelmoschus esculentus* L.) also known as lady's finger or bhendi, belongs to family Malvaceae and is a common vegetable crop grown in Sindh, Pakistan. It has good nutritional value, particularly the high content of Vitamin C (30 mg/100 g), Calcium (90 mg/100 g), Iron (1.5 mg/100 g) and other minerals like magnesium and potassium, Vitamin A and B, fats and carbohydrates [1]. Tender fruits are used as vegetables or in culinary preparations as sliced and dried pieces. It is also used for thickening gravies and soups, because of its high mucilage content. The roots and stems of okra are used for cleaning cane juice. Matured fruits and stems containing crude fibre are used in paper industry. Its tender green fruits are used as a vegetable and are generally marketed in the fresh state but sometimes in canned or dehydrated form [2]. Its fruits can be cooked in different ways. It can be fried in butter or oil and cooked with necessary ingredients [3]. One of the important limiting factors in the cultivation of okra is insect pests. Many of the pests occurring on cotton are found to ravage okra crop. As high as 72 species of insects have been recorded on okra, of which, the sucking pests including jassid cause significant damage to the crop [4].

Adult jassid, *Amrasca devastans*, is a tiny insect oval in shape, green in colour with four wings. Adult male is smaller in size than female. Nymphs resemble adults in shape and colour but are wingless. The pest usually rests on lower side of the leaves during day time. The female lays eggs singly inside the prominent veins of mature leaves and eggs hatch in about four days. The newly hatched nymph measures about 2.28 mm in length and is green in colour. Both adults and nymphs cause damage to okra leaves by sucking plant sap and inject toxic saliva into plant tissues. The edges of leaves become crinkled which is the prominent feature of jassid attack [5]. Due to the attack of jassid, plants become weak with retarded growth and leaves turn brown with greyish margins and edges of leaves turn down. Severe attack may result in death of plants [6]. Okra, like other Malvaceae is susceptible to a variety of pests that hinder its yield. Jassid is especially important in the tropics and sub tropics 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 where it

lays maximum number of eggs and thus becomes suitable place for survival and feeding [7]. Both nymphs and adults of jassid suck the cell sap usually from the ventral surface of the leaves and while feeding inject toxic saliva into the plant tissues, affected leaves turn yellowish and curl [8]. 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 then environmental friendly pest management approach. Host plant resistance is one of the most cost-effective and safe methods [9]. Plants contain a large number of substances, which have their primary use as a means of defence against natural enemies. A resistant variety can provide a base on which to construct an integrated control system and may be most fruitful when used in connection with other methods of control [10]. Host plant resistance is seen to be a sustainable approach to pest management and varietal trials of different okra plants to jassid is essential. Therefore research work was carried out at Rice Research Institute, Dokri, Larkana. To identify the response by different available varieties of okra to jassid in order to determine resistance/susceptibility. This data will be helpful for those who are related to vegetable production.

2. Materials and Methods

Experimental work was carried out at Entomology Section of Rice Research Institute, Dokri, Larkana, during kharif season 2015. To determine the resistance of okra varieties against cotton jassid during kharif season. Four okra varieties viz., Arizona, Resham, Sabzpari and Super green were sown in randomized complete block design (RCBD). The experiment was distributed into three replications and four treatments; the plot size was (25L x 15W) meters. All the agronomic practices were carried out from sowing to harvest of the crop. Observations on jassid population were recorded at weekly intervals. Five plants from each replication were randomly

selected with six leaves per plant for pest count from each treatment. Meteorological data was obtained from regional agro met centre Moen Jo Daro. The data collected from experimental trial were subjected to statistical analysis. Population means and standard errors were calculated. The collected data were subjected to statistical analysis using analysis of variance to know the significance of differences among varieties, and LSD (Least Significance Difference) test was also used.

3. Results

The data on the population of jassid was recorded from 1st May to 3rd July 2015. The data in Table-1 reveals that the highest infestation of jassid was observed in last week of May on Arizona (18.00) per plant followed by Super green (17.00), Sabzpari (16.66) and Reham (14.33). Similarly minimum infestation of jassid was observed in initial week of May on Sabzpari variety (2.00) followed by Super green (2.00), Arizona (2.33) and Resham (2.66). The data further showed the overall mean population of jassid on okra varieties i.e. Arizona (7.12 ± 5.22) followed by Super green (6.96 ± 4.30), Resham (6.42 ± 4.40) and Sabzpari (6.22 ± 4.93). It is concluded from the data that jassid population was significantly ($P < 0.05$) affected by different dates, whereas non-significantly ($P > 0.05$) by varieties and their interaction. Maximum jassid population was recorded on 29-05-2015, whereas minimum jassid population was observed on 19-06-2015. Numerically maximum but statistically similar ($P > 0.05$) jassid population was noted in variety Arizona while minimum population was recorded in variety Sabzpari. The data in Table-2 presents the meteorological record during experimental months. This data reveals that higher temperature range (48.27 °C) and the relative humidity range (64.55%) favored the pest attack during last week of May with highest pest population (18.00).

Table 1: Mean population of jassid on different varieties of okra during kharif season 2015.

Date of Obs.	Varieties				Mean for dates
	Sabzpari	Resham	Arizona	Super green	
01-05-2015	2.33	2.66	3.66	5.33	3.50 DE
08-05-2015	2.66	3.33	3.66	2.66	3.07 DE
15-05-2015	2.00	2.66	3.66	2.66	2.75 DE
22-05-2015	7.66	7.33	6.33	8.33	7.41 C
29-05-2015	16.66	14.33	18.00	17.00	16.49 A
05-06-2015	10.66	12.00	13.33	13.00	12.24 B
12-06-2015	10.33	10.66	10.00	9.00	9.99 B
19-06-2015	2.66	2.33	2.33	2.0	2.33 E
26-06-2015	3.66	4.33	4.66	5.33	4.49 D
03-07-2015	3.66	4.66	5.66	4.33	4.57 D
Mean for varieties	6.22± 4.93	6.42± 4.40	7.12 ±5.22	6.96± 4.30	--
	Dates	Varieties	D x V		
SE	1.0700	0.6767	2.1400		
LSD 5%	2.1302	-----	----		
CV%	39.27				

Table 2: Meteorological data during kharif season 2015.

Date of Record	Temp: °C	RH%
01-05-15	41.87	66.29
08-05-15	42.46	55.22
15-05-15	43.13	62.91
22-05-15	43.29	60.26
29-05-15	44.18	61.11
05-06-15	45.23	59.15
12-06-15	48.27	64.55
19-06-15	48.07	65.94
26-06-15	48.12	69.27
03-07-15	43.36	67.21

Table 3: Coefficient correlation (r) of jassid population with abiotic factors.

Parameter	Population
Temperature	r = 0.117866
Relative humidity	r = -0.29483

4. Discussion

The highest infestation of jassid was observed in 3rd week of June on variety Super green (28.53 ± 9.94) followed by Arizona (25.46 ± 7.23), Resham (18.83 ± 9.18) and Sabzpari (15.96 ± 7.84). Similarly minimum infestation of jassid was observed in 1st week of May on varieties, Sabzpari (1.90 ± 0.32) followed by Resham (3.96 ± 1.32), Super green (5.93 ± 1.82) and Arizona (6.33 ± 1.88). The data also showed the overall mean population of jassid on okra varieties such as Super green (17.63 ± 6.47) followed by Arizona (16.75 ± 5.29), Resham (10.59 ± 5.31) and Sabzpari (7.93 ± 3.88). The data suggested that the mean population remained high during entire season especially in the months of May and June. The two varieties i.e., Sabzpari and Resham escaped the jassid attack with low population of jassid per leaf. Therefore these varieties showed considerable resistance against jassid due to unknown physiochemical composition which might have not favored the pest population. Remaining two varieties of okra such as Super green and Arizona were heavily attacked by jassid, hence these varieties remained relatively susceptible to pest attack in comparison to Sabzpari and Resham varieties. The data regarding the meteorological record during experimental months revealed that mean temperature (38.16 °C) and the relative humidity range (64.55%) favored the pest attack during 3rd week of June with highest pest population (28.53 ± 9.94). Reduction in pest population during month of July was recorded probably due to the maturity/old age of crop and rainfall during last week of June and start of July. Our results are in confirmation with those of [11] who stated that a significant relationship was observed between jassid population level and maximum temperature. The population of jassid increased during monsoon season when the temperature remained around 37 °C along with at least 10 hours of bright sunshine. Our results match with those of [12] who reported that jassid caused heavy losses took record resulting in loss of yield both in quality and quantity. Both nymphs and adults cause more serious damage to young plants either by sucking the juice of leaves or by injecting toxic substances into the plant, there by weakening and retarding the growth process in plant. Our results are also in accordance with the studies carried out by [13] who investigated seasonal abundance of jassid, *Amrasca biguttula biguttula*, on okra in Assam, India. They reported that meteorological parameters played an important role in the population build-up of jassid. The jassid population was

maximum in the last week of May (37.53 nymphs per leaf) and middle of April (30.00 nymphs per leaf). High temperature ($30-36$ °C), evening relative humidity (below 80%) and low rainfall period coupled with bright sunshine hours favored the development of jassid population. Our results also tally with those of [14] who suggested that jassid breeds round the year except two months in winter. High humidity favors the attack and the infestation is highest in hot summer when the ambient temperature is high.

5. Conclusion

It is concluded from the data that jassid population was significantly ($P < 0.05$) affected by different dates, whereas non-significantly ($P > 0.05$) by varieties and their interaction. Maximum jassid population was recorded on 29-05-2015, whereas minimum jassid population was observed on 19-06-2015. Numerically maximum but statistically similar ($P > 0.05$) jassid population was noted in variety Arizona while minimum population was recorded in variety Sabzpari.

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