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Screening of Okra Varieties Against Important Sucking Pests

K.B. PATEL, M.B. PATEL AND K.M. PATEL

ASPEE College of Horticulture and Forestry
Navsari Agricultural University, Navsari- 396 450, Gujarat
email: ketan_ento@nau.in

ABSTRACT

A field experiment was conducted at N.M. College of Agriculture, Navsari Agricultural University, Navsari on okra cultivars Parbhani Kranti, Arka Anamika, Pusa Sawani, Go-2 and LSVT (AOL-03-1) to screen for resistance to major sucking pests. Cultivars LSVT (AOL-03-1), GO-2 and, Pusa Sawani found to be moderately resistance to aphid, whereas, highest population of aphid was registered on cultivar Parbhani Kranti and found to be highly susceptible. Moreover, cultivar Arka Anmika exhibited low jassid population and proved to be resistant, whereas, GO-2 cultivar found moderately resistant. Cultivar Parbhani Kranti proved to be highly susceptible against jassid. However, Pusa Sawani, LSVT (AOL-03-1), Arka Anamika and GO-2 were supported low population of whitefly and proved to be resistant, while Parbhani Kranti found to be susceptible against whitefly.

Key words *Okra, sucking pests, aphid, jassid, whitefly, varietal screening*

Bhindi (*Abelmoscus esculentus* Linn.) is one of the popular vegetable of common man, cultivated in India for its immature fruits. It is noted for its rich iron content and nutritive value. Okra crop is usually heavily infested by various insect pests, which affect the crop both quantitatively and qualitatively. The major pests of okra include aphid, jassid, whitefly, mite and shoot and fruit borer. Among these aphid *A.gossypii* is a polyphagous sucking pest and also found damaging okra all over India. It also act as vector of virus and transmit mosaic, leaf curl etc. (Butani and Verma, 1976). Jassids are other serious pests of okra throughout the India. In early stage of its growth considerable damage is caused by jassid , *Amrasca biguttula biguttula* resulting in discoloration, curling and deformation of leaves and deterioration of yield quality and quantity. Due to heavy infestation 40 to 50 per cent yield reduction was reported (Krishnaiah,1980). Similarly, whitefly *B. tabaci* is a serious pest as well as vector of the yellow vein mosaic disease. It is found that in advance stage of virus infection, the photosynthetic activity is reduced to a tune of 15 to 20 per cent in infested plant (Goodman *et al*., 1967). The virus is reported to cause reduction in pigments (Mandahar and Singh, 1972 and Ramaih *et al*., 1972), reduction in leaf size, delayed flowering (Dubey, 1974) and reduction in plant growth (Sastry and Singh, 1974). Host plants play an important role in development and survival of insect pest. Moreover, it is one of the most important components of IPM. Considering the importance the present experiment was layout to investigate the reactions of some okra cultivars against important sucking pests under the natural infestation condition.

MATERIAL AND METHODS

Field trial was conducted at N.M. College of Agriculture, Navsari Agricultural University, Navsari. The experimental plots were remain free from insecticidal application. The experiment was laid out in a randomized block design with four replication having a plot size of 4.5 x 2.25 m. Observations on the pest activity were recorded in five cultivars *viz*; Parbhani Kranti, Arka Anamika, Pusa Sawani, Go-2 and LSVT(AOL-03-1) starting from twenty days after sowing at weekly interval till the harvesting of the crop. To record the observations of important sucking pests population, five plants per plot randomly selected, from each plant three leaves each from the top, middle and lower part were observed at weekly interval starting from twenty days after sowing till uprooting the crop.

RESULT AND DISCUSSION

Reaction of various okra cultivars against aphid, *A. gossypii*

The periodic incidence of aphid on okra during the crop season is given in Table-1. The result indicated significant differences in the

Table 1. Periodic incidence of aphid, *A. gossypii* on different cultivars of okra

Standard Week	WAS	Mean number of aphid per leaf					Period mean
		Parbhani Kranti	Arka Anamika	Pusa Sawani	GO-2	LSVT (AOL-03-1)	
31	4	0.71(0.00)*	0.71(0.00)*	0.71(0.00)*	0.71(0.00)*	0.71(0.00)*	0.71(0.00)*
32	5	0.81(0.20)	0.92(0.40)	0.89(0.40)	1.19(1.00)	0.82(0.20)	0.93(0.44)
33	6	1.63(3.20)	1.07(0.80)	1.11(0.80)	1.26(1.20)	1.05(0.65)	1.22(1.33)
34	7	1.69(3.60)	1.37(1.60)	1.37(1.40)	1.33(1.40)	1.15(0.90)	1.38(1.78)
35	8	2.23(5.00)	1.63(2.20)	1.69(2.40)	1.49(1.80)	1.27(1.15)	1.66(2.51)
36	9	2.31(5.40)	1.96(3.40)	2.20(4.40)	1.98(3.60)	1.45(1.65)	1.98(3.69)
37	10	2.50(6.20)	2.18(4.40)	2.37(5.20)	2.05(4.00)	1.72(2.50)	2.16(4.46)
38	11	3.06(9.20)	2.48(5.80)	2.69(7.00)	2.36(5.20)	1.94(3.30)	2.51(6.10)
39	12	3.28(10.40)	4.81(25.40)	5.11(28.00)	2.59(6.40)	3.58(13.25)	3.27(16.69)
40	13	6.22(40.00)	3.92(15.80)	3.75(14.00)	4.05(16.00)	2.59(6.70)	4.11(18.50)
41	14	4.53(20.60)	3.48(12.40)	3.33(10.80)	3.52(12.00)	2.33(5.40)	3.44(12.24)
42	15	3.79(14.00)	2.84(7.80)	3.03(8.80)	3.10(9.20)	1.95(3.70)	2.94(8.70)
Cultivar Mean		3.73(9.82)	2.28(6.67)	2.10(6.93)	2.14(5.15)	1.71(3.28)	2.19 (6.37)

	S. Em. ±	C.D. (0.05)	CV %
Cultivar (C)	0.088	0.244	
Period (P)	0.136	0.378	27.19
C X P	0.305	0.845	

Data in the parentheses are original value, while those outside are square root ("X + 0.5) transformed value

WAS = Week After Sowing

incidence of aphid at different period of crop growth. The period mean revealed that the aphid population commenced fifth weeks after sowing i.e. the first week of August, when 0.44 aphid was recorded per leaf. Thereafter, the population gradually increased up to 11th WAS i.e. third weeks of September and reached to its peak level (18.50 aphids/leaf) 13th WAS coinciding with first week of October.

The result revealed significant differences in aphid population among different okra cultivars. The cultivar LSVT (AOL-03-1) recorded least population i.e. 3.28 aphids per leaf which was at par with GO-2 (5.15 aphids/leaf) whereas, highest population (9.82 aphids/leaf) was recorded in Parbhani Kranti followed by Pusa Sawani (6.93 aphids/leaf) and Arka Anamika (6.67 aphids/leaf) cultivars. The interaction effect due to cultivar × period was also significant. This indicated that various okra cultivars differed in their reaction to aphid population at different period of crop growth. According to Dhamdhere *et al.,* 1984 reported peak population of *A. gossypii* in last week of September.

Reaction of various okra cultivars against jassid, *A. biguttula biguttula*

The jassid population differed significantly at different period of crop growth irrespective of cultivar. Perusal of results further indicated that the incidence of jassid started from fourth week after sowing (the last week of July) (1.18 jassids/ leaf), initially increased slowly up to ten week after sowing (2nd week of September). However, its population reaches to its peak level in third week of September (5.52 jassids/ leaf). Thereafter, the population started steady decline and reached at low level of 2.46 jassids per leaf at the end of the crop season.

The results further revealed significant differences in jassid population on different cultivars. The cultivar Arka Anamika supported minimum population (2.03 jassids/leaf) which was at par with GO-2 (2.05 jassids/leaf) and LSVT (AOL-03-1) (2.07 jassids/leaf) cultivars, while, the maximum jassid population (4.71 jassids/leaf) was observed in Parbhani Kranti, which was at par with Pusa Sawani (4.23 jassids/leaf). The descending order of susceptibility of different cultivars to the jassid was Parbhani Kranti, Pusa Sawani, LSVT (AOL -03-1), GO-2 and Arka Ananika. The interaction effect due to cultivar × period on incidence of jassid was found to be non-significant which indicated that the susceptibility of different cultivars was not affected by the age of okra

Table 2. Periodic incidence of jassid, *A. biguttula biguttula* on different cultivars of okra

Standard Week	WAS	Mean number of jassid per leaf					Period mean
		Parbhani Kranti	Arka Anamika	Pusa Sawani	GO-2	LSVT (AOL-03-1)	
31	4	1.62(2.32)*	1.23(1.30)*	1.39(1.60)*	0.91(0.38)*	0.88(0.30)*	1.21(1.18)*
32	5	1.72(2.72)	1.31(1.30)	1.79(2.80)	1.10(0.75)	1.13(0.83)	1.41(1.68)
33	6	1.77(2.82)	1.39(1.50)	1.83(3.00)	1.24(1.08)	1.36(1.43)	1.52(1.96)
34	7	1.94(3.50)	1.44(1.60)	1.96(3.50)	1.27(1.15)	1.46(1.73)	1.61(2.30)
35	8	1.92(3.40)	1.44(1.60)	1.96(3.50)	1.43(1.58)	1.55(1.98)	1.66(2.41)
36	9	2.32(5.62)	1.66(2.40)	2.18(4.50)	1.44(1.60)	1.55(2.00)	1.83(3.22)
37	10	3.05(9.72)	1.66(2.40)	2.25(4.90)	2.25(4.58)	1.64(2.23)	2.17(4.76)
38	11	2.91(8.72)	1.94(3.40)	2.93(8.30)	2.02(3.60)	2.02(3.60)	2.36(5.52)
39	12	2.36(5.42)	1.85(3.00)	2.52(6.00)	1.87(3.00)	1.97(3.40)	2.11(4.16)
40	13	2.31(5.12)	1.74(2.60)	2.35(5.20)	1.86(2.75)	1.75(2.60)	1.99(3.65)
41	14	2.02(3.92)	1.54(2.00)	2.03(3.80)	1.80(2.20)	1.74(2.58)	1.79(2.90)
42	15	1.26(3.22)	1.26(1.30)	2.00(3.70)	1.63(1.95)	1.61(2.15)	1.65(2.46)
Cultivar Mean		2.15(4.71)	1.54(2.03)	2.10(4.23)	1.55(2.05)	1.60(2.07)	1.78(3.02)

	S. Em. ±	C.D. (0.05)	CV %
Cultivar (C)	0.0591	0.164	
Period (P)	0.0916	0.254	23.05
C X P	0.205	NS	

Data in the parentheses are original value, while those outside are square root ("X + 0.5) transformed value

WAS = Week After Sowing

cultivars. Atwal *et al.,* 1969 observed higher incidence of jassids in the month of September. Srinivasa and Sugeetha, 2001 reported cultivar Parbhani Krani was more preferred by jassid during the *kharif* season.

Reaction of various okra cultivars against whitefly, *B. tabaci*

The results on periodic fluctuation of whitefly on okra are presented in Table-3. The results showed significant differences in population build up of whitefly at different stages of crop growth. The period mean indicated that the pest started fourth WAS (the last week of July) (0.52 adult/ leaf) and reached a peak level during the last week of August (4.18 adults/leaf). The whitefly population gradually declined reaching the low level (1.38 adults/leaf) during the third week of October, after which it reached to negligible level.

Perusal of results revealed significant difference in relative abundance of whitefly in different cultivars of okra. The minimum population was observed in cultivar Pusa Sawani (1.10 adults/ leaf) which was at par with LSVT (AOL-03-1) (1.18 adults/leaf), Arka Anamika (1.18 adults/leaf) and GO-2 (1.29 adults/leaf). The highest population was observed in Parbhani Kranti (5.51 adults/leaf). The descending order of susceptibility of different cultivars to this pest was Parbhani Kranti, GO-2, Arka Anamika, LSVT (AOL-03-1) and Pusa Sawani. The interaction effect due to the cultivar × period on incidence of whitefly was significant. This indicated that various okra cultivars differed in their reaction to whitefly at different periods of crop growth.

From the results, it can be concluded that the whitefly appeared from the last week of July to the third week of October with the period of peak population during the last week of August. Earlier to this, Sidhu and Dhavan, 1981 reported that activity of whitefly *B. tabaci* was maximum during July to August while Patel, 1988 found the activity of whitefly reaching its peak level after seven to eight weeks of sowing. Thus, the present findings tally with the reports of Patel, 1988 while it differs with the reports of Sidhu and Dhawan, 1981. Who reported that the variation in whitefly activity may be due to location, date of sowing of okra crop and environmental conditions in the particular area.

Table 3. Periodic incidence of whitefly, *B. tabaci* on different cultivars of okra

Standard Week	WAS	Mean number of whitefly per leaf					Period mean
		Parbhani Kranti	Arka Anamika	Pusa Sawani	GO-2	LSVT (AOL-03-1)	
31	4	1.51(2.00)*	0.71(0.00)*	0.82(0.20)*	0.89(0.40)*	0.71(0.00)*	0.93(0.52)*
32	5	1.51(2.00)	0.77(0.10)	0.82(0.20)	1.00(0.60)	0.82(0.20)	0.98(0.62)
33	6	1.86(3.00)	0.95(0.50)	1.06(0.70)	1.00(0.60)	0.88(0.30)	1.15(1.02)
34	7	2.07(3.80)	1.80(2.80)	1.12(0.80)	1.77(2.70)	1.12(0.80)	1.58(2.18)
35	8	3.45(11.40)	1.48(1.80)	1.67(2.50)	1.69(2.40)	1.77(2.80)	2.01(4.18)
36	9	3.09(9.10)	1.42(1.60)	1.41(1.60)	1.53(2.00)	1.67(2.40)	1.82(3.34)
37	10	2.73(7.00)	1.42(1.60)	1.38(1.50)	1.42(1.60)	1.49(1.80)	1.69(2.70)
38	11	2.65(6.60)	1.36(1.40)	1.31(1.30)	1.31(1.30)	1.49(1.80)	1.62(2.48)
39	12	2.61(6.40)	1.31(1.30)	1.26(1.20)	1.31(1.30)	1.43(1.60)	1.58(2.36)
40	13	2.43(5.50)	1.31(1.30)	1.26(1.20)	1.31(1.30)	1.36(1.40)	1.53(2.14)
41	14	2.35(5.10)	1.25(1.10)	1.20(1.00)	1.06(0.70)	1.06(0.70)	1.38(1.72)
42	15	2.16(4.20)	1.06(0.70)	1.20(1.00)	1.00(0.60)	0.94(0.40)	1.27(1.38)
Cultivar Mean		2.37(5.51)	1.24(1.18)	1.21(1.10)	1.27(1.29)	1.23(1.18)	1.46(2.05)

	S. Em. ±	C.D. (0.05)	CV %
Cultivar (C)	0.0465	0.129	
Period (P)	0.720	0.199	22.02
C X P	0.161	0.446	

Data in the parentheses are original value, while those outside are square root ("X + 0.5) transformed value

WAS = Week After Sowing

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