REACTION OF VARIOUS OKRA CULTIVARS TO IMPORTANT SUCKING PESTS

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

N.M. COLLEGE OF AGRICULTURE
NAVSARI AGRICULTURAL UNIVERSITY
NAVSARI- 396 450, GUJARAT, INDIA

***E-mail: patel_ketan2009@yahoo.co.in**

ABSTARCT

A field experiment was conducted at Navsari Agricultural Univesity, Navsari on five okra cultivars, Parbhani Kranti, Arka Anamika, Pusa Sawani, Go 2 and AOL 03-1 to study the reaction to important sucking pests. The periodic incidence of different sucking pests on okra during the crop season was significant at different period of crop growth. The period mean revealed that the aphid population was reached to its peak level (18.50 aphids / leaf) during 13th weeks after sowing (first week of October), whereas the peak period of jassids and whitefly was third week of September and last week of August, respectively. The cultivar, AOL 03-1 recorded least population i.e. 3.28 aphids per leaf, which was at par with GO 2 (5.15 aphids/leaf), were found to be moderately resistance to aphid. The cultivar, Arka Anamika supported minimum population (2.03 jassids/leaf), which was at par with GO 2 (2.05 jassids/leaf) and AOL 03-1 (2.07 jassids/leaf) cultivars, were proved to be resistant, whereas, GO-2 cultivar found moderately resistant. The minimum whitefly population was observed in cultivar Pusa Sawani (1.10 adults/leaf), which was at par with AOL 03-1 (1.18 adults/leaf), Arka Anamika (1.18 adults/leaf) and GO 2 (1.29 adults/leaf) proved to be resistant.

KEY WORDS: Aphid, cultivars, jassid, okra, sucking pests, whitefly

INTRODUCTION

Bhindi [*Abelmoschus esculentus* (L.) Moench], 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 is attacked by number of insect pests and mites, during different growth stages and seasons. The major pests of okra include aphid, jassid, whitefly, mite and shoot and fruit borer. Among these, aphids, *Aphis gossypii* is a polyphagous sucking pest and also found damaging okra all over India. It also acts as vector of virus and transmits 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). 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). Considering the importance the present experiment was laid out 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 during Kharif 2007. The experiment was laid out in randomized block design in four replications with a plot size of 4.5 m x 2.25 m. The experiment was kept free from any insecticidal application. Observations on the pest activity were recorded in five cultivars *viz.*, Parbhani Kranti, Arka Anamika, Pusa Sawani, Go 2 and AOL 03-1 starting from twenty days after sowing till to the harvesting of the crop at weekly interval. To record the observation of sucking pest populations, five plants per plot were randomly selected and from each randomly selected plant three leaves each from the top, middle and lower part were observed.

RESULTS AND DISCUSSIONS

Reaction of various okra cultivars to 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 incidence of aphid at different period of crop growth. The period mean revealed that the aphid population (0.44 aphids/ leaf) commenced in fifth weeks after sowing i.e. the first week of August. Thereafter, the population gradually increased and reached to its peak level (18.50 aphids / leaf) during 13th weeks after sowing (first week of October). The results are in line that reported by Dhamdhere *et al.* (1984), as he reported peak population of A. gossypii in last week of September.

The result revealed significant differences in aphid population among different okra cultivars. The cultivar, 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 aphid 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.

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

The jassid population differed significantly at different period of crop growth irrespective of cultivar. Perusal of results presented in table 2 indicated that the incidence of jassids (1.18 jassids/leaf) started from fourth week after sowing (last week of July). The jassid population 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. Atwal *et al.* (1969) also observed higher incidence of jassids in the month of September.

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 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, 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 cultivars. Srinivasa and Sugeetha (2001) also reported cultivar Parbhani Krani was more preferred by jassid during the kharif season.

Reaction of various okra cultivars to 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 weeks after sowing (the last week of July) (0.52 adult/ leaf) and reached to a peak level during the last week of August (4.18 adults/leaf). The whitefly population gradually declined and reaching the low level (1.38 adults/leaf) during the third week of October, after which it reached to negligible level. 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).

Perusual 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 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 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.

CONCLUSION

From the results, it can be concluded that among the five cultivars, AOL 03-1, GO 2 and Pusa Sawani found to be moderately resistance to aphid, whereas the 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. Parbhani Kranti proved to be highly susceptible against jassid. Similarly, Pusa Sawani and AOL 03-1, Arka Anamika and GO 2 were supported low population

against whitefly and proved to be resistant, while Parbhani Kranti found to be susceptible against whitefly.

REFERENCES

Atwal, A. S., Chaudhary, J. P. and Sohi, B. S. (1969). Effect of temperature and humidity on development and population of jassids, Empoasca devastants Distant. *J. of Res. (PAU)*, **6**(1): 255-261.

Butani, D. K. and Verma, S. (1976). Insect-pests of vegetables and their control-3: Lady's finger. *Pesticides*, **10**(7): 31-37.

Dhamdhere, S. V., Bahudur, J. and Misra, U. S. (1984). Studies on occurrence and succession of pests of okra at Gwalior. *Indian J. Pl. Prot*., **12**(1): 9-12.

Dubey, G. S. (1974). Yellow vein mosaic of bhendi. *Indian Farmer's Digest*, **7**(8): 23.

Goodman, R.N.; Kiraly, S. and Zaitlin. (1967). The biochemistry and physiology of infections plant disease. D. Van Nostrate Company Inc., Princeton, New Jersey.

Krishnaiah, K. (1980). Methodology for assessing crop losses due to pests of vegetables. In : Govindu, H. C.; Veeresh, G. K.; Walker, P. T. and Jenkyn, J. F. (Eds.) *Proc. of workshop on assessment of crop losses due to pests and diseases*, UAS Tech. Series No.33 Pp. 259-267.

Mandahar, C. L. and Singh, J. S. (1972). Effect of bhendi yellow vein mosaic virus on its host. *Acta Phytopathol. Acad. Sci. Hung*., **7**(1-3): 187-191.

Patel, B.S. (1988). Population dynamics and control of insect pests on okra (Abelmoschus esculentus L. Moench), M.Sc. (Agri.) Thesis (Unpublished) submitted to Gujarat Agricultural University, Sardarkrushinagar.

Ramaih, M., Vidhyasekran, P. and Kandasamy, T. K. (1972). Changes in photosynthetic pigments of bhendi infested by yellow vein mosaic diseases. *Madras Agric. J.*, **59**(6): 402-404.

Sastry, K. S. M. and Singh, S. J. (1974). Effect of yellow vein mosaic virus infection on growth and yield of okra crop. *Indian Phytopathology*. **27**(1): 294-297.

Sidhu, A. S. and Dhawan, A. K. (1981). Seasonal abundance of different insect pests on Deshi cotton. *J. Res. (PAU).*, **17** (3): 275-281.

Srinivasa, N. and Sugeetha, G. (2001). Field screening of certain varieties for resistance against major pests. *Insect Environment*; **7**(2): 74-76

Table 1: Periodic incidence of aphid, *A. gossypii* on different cultivars of okra during *kharif* 2007

Standard Week	WAS	Date of Observation	Mean Number of Aphid per Leaf					Period Mean
			Parbhani Kranti	Arka Anamika	Pusa Sawani	GO 2	AOL 03-1	
31	4	30/07/2007	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	06/08/2007	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	13/08/2007	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	20/08/2007	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	27/08/2007	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	03/09/2007	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	10/09/2007	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	17/09/2007	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	24/09/2007	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	01/10//2007	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	08/10//2007	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	15/10//2007	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 ($\sqrt{X + 0.5}$) transformed value
WAS = Week After Sowing

Table 2: Periodic incidence of jassid, *A. biguttula biguttula* on different cultivars of okra during *kharif* 2007

Standard Week	WAS	Date of Observation	Mean Number of Jassid per Leaf					Period Mean
			Parbhani Kranti	Arka Anamika	Pusa Sawani	GO 2	AOL 03-1	
31	4	30/07/2007	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	06/08/2007	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	13/08/2007	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	20/08/2007	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	27/08/2007	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	03/09/2007	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	10/09/2007	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	17/09/2007	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	24/09/2007	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	01/10//2007	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	08/10//2007	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	15/10//2007	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

Table 3: Periodic incidence of whitefly, *B.tabaci* on different cultivars of okra during *kharif* 2007

Standard Week	WAS	Date of Observation	Mean Number of Whitefly per Leaf					Period Mean
			Parbhani Kranti	Arka Anamika	Pusa Sawani	GO 2	AOL 03-1	
31	4	30/07/2007	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	06/08/2007	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	13/08/2007	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	20/08/2007	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	27/08/2007	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	03/09/2007	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	10/09/2007	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	17/09/2007	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	24/09/2007	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	01/10//2007	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	08/10//2007	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	15/10//2007	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)

	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

[MS received: August 4, 2012] ***[MS accepted: September 12, 2012]***