VARIABILITY IN F_4 GENERATION OF IRRADIATED INTERSPECIFIC HYBRIDS IN OKRA (*ABELMOSCHUS ESCULENTUS* [L.] MOENCH)

Resistance to yellow vein mosaic virus disease is the most important attribute sought for in okra (*Abelmoschus esculentus* [L.] Moench). Interspecific hybridization in *Abelmoschus* spp. has shown the preponderance of yellow vein mosaic resistant plants with wild characters in the segregating generations. Irradiation of interspecific hybrids of okra creates more genetic variability in the further generations indicating the breakage of undesirable linkages (Sheela, 1994; Animon, 1996 and John, 1997).

The study was undertaken in the Department of Plant Breeding and Genetics, College of Agriculture, Vellayani, Trivandrum with the objective of estimating the extent of variability present in the F_4 generation of irradiated interspecific hybrids in okra. The experimental material comprised of 52 treatments, consisting of 50 progenies selected from the superior plants of the F_3 generation of a cross between *A. esculentus* var. Kiran with *A. manihot* and the F_1 seeds subjected to gamma irradiation and of the two parents. The experiment was laid out in a randomized block design with two replications. The spacing adopted was 60 x 45 cm and the crop was raised during summer season. Observations were recorded on the important yield attributes and subjected to analysis of variance.

Significant variability was observed for all the characters studied (Table 1). Late flowering lines were observed in the generation. The number of branches, flowers and fruits per

Table 1. Mean values for the characters in F_4M_4 generation

Treatments	No. of branches per plant	No. of fruits per plant	Average fruit wt. (g)	W · f its per plant (g)	Incidence of YVM disease (score 1-5)	Incidence of fruit and shoot borer (%)	Crude fibre content of fruits (%)
T1	0.3 (1.1)	9.1 (3.1)	11.4	101.9	1.9	13.9	1.9
T2	0.2 (1.1)	10.4 (3.4)	12.1	126.2	1.4	17.9	1.7
T3	0.4 (1.1)	13.9 (3.9)	11.2	1S3.7	1.2	20.1	1.4
T4	0.5 (1.2)	16.1(4.1)	1 1.5	184.5	1.1	19.0	1.6
T5	8.7 (3.1)	46.1 (6.9)	5.8	264.3	1.2	3.5	2.4
T6	0.3 (1.1)	15.3(4.0)	14.9	226.0	1.0	3.1	2.5
T7	0.4 (1.2)	14.0 (3.9)	12.9	181.5	1.1	13.9	1.6
T8	0.1(1.1)	12.3(3.6)	11.8	145.8	1.3	16.9	1.6
T9	0.4(1.1)	12.5 (3.7)	11.7	146.5	3.1	13.3	2.7
T10	0.5 (1.2)	12.5(3.7)	11.6	142.9	1.2	16.2	1.6
T11	0.8 (1.3)	14.3 (3.9)	11.9	166.0	1.0	14.7	1.4
T12	0.5 (1.2)	11.6 (3.5)	11.8	138.9	4.1	15.9	2.2
T13	8.7 (3.1)	32.8 (5.8)	5,6	186.4	1.0	3.4	2.5
T14	0.5 (1.2)	9.8 (3.3)	11.3	110.7	1.0	10.1	1.4
T15	8.2 (3.0)	34.1 (5.9)	8.3	184.0	1.0	1.6	2.4
T16	0.2(1.1)	7.5 (2.9)	12.1	89.9	1.2	16.0	1.5
T17	0.3 (1.1)	10.3 (3.4)	11.5	120.1	1.0	14.8	1.5
T18	0.3(1.1)	9.0 (3.2)	14.7	132.9	1.0	4.7	2.4
T19	10.8(3.4)	62.4 (8.0)	5.4	336.6	1.0	10.0	2.4
T20	0.5 (1.2)	11.1 (3.5)	11.1	121.8	1.2	16.2	1.7
T21	0.1 (1.1)	8.9 (3.1)	11.7	103.1	1.3	15.5	1.7
T22	0.5 (1.2)	10.5 (3.4)	11.5	119.5	1.0	10.5	1.6
T23	0.2 (1.1)	12.2 (3.6)	12.0	145.0	4.1	14.3	2.9
T24	0.2(1.1)	8.2 (3.0)	11.9	96.8	1.2	13.2	1.6

Table 1 Continued

Treatments	No. of branches per plant	No. of fruits per plant	Average fruit wt. (g)	Wt. of fruits per plant (g)	Incidence of YVM disease (score 1-5)	Incidence of fruit and shoot borer (%)	Crude fibre content of fruits (%)
T25	0.6(1.3)	12.1 (3.6)	11.4	139.4	1.0	10.8	1.5
T26	5.1 (2.5)	30.2 (5.6)	5.4	165.1	1.1	1.8	2.7
T27	0.6(1.3)	11.9 (3.6)	12.4	149.8	4.0	13.4	2.9
T28	0.2(1.1)	9.2 (3.2)	11.7	105.8	1.0	16.8	1.4
T29	0.3(1.1)	10.7 (3.4)	12.7	139.0	3.6	14.2	2.8
T30	0.5 (1.2)	11.0 (3.4)	12.4	126.6	1.1	14.8	1.4
T31	12.4 (3.7)	71.3(8.5)	5.4	387.8	1.2	3.7	2.6
T32	0.2(1.1)	9.6(3.3)	14.0	133.1	1.0	4.7	2.9
T33	0.3 (1.1)	24.7 (5.1)	13.1	322.7	4.1	13.0	2.9
T34	9.8 (3.3)	55.6 (7.5)	5.1	277.7	1.0	2.2	2.7
T35	0.5(1.2)	17.9(4.3)	15.0	266.1	1.1	15.5	1.6
T36	0.1 (1.1)	12.1 (3.6)	12.6	138.1	1.0	23.2	1.4
T37	0.3(1.1)	13.6(3.8)	12.6	169.8	1.7	14.6	2.3
T38	0.0(1.0)	10.3 (3.4)	15.5	184.9	1.1	5.11	2.9
T39	0.1 (1.1)	11.4 (3.5)	13.2	149.4	1.5	14.6	2.1
T40	0.1 (1.1)	10.3 (3.4)	13.1	134.6	1.8	14.4	1.8
T41	6.6 (2.8)	59.0 (7.8)	5.1	297.7	1.0	1.4	2.7
T42	8.4 (3.1)	51.5 (7.3)	5.3	273.7	1.1	2.5	2.3
T43	0.7 (1.3)	16.7(4.2)	14.2	236.7	1.3	18.5	1.7
T44	0.6 (1.3)	15.4(4.1)	14.5	222.1	1.3	14.7	1.3
T45	0.3(1.1)	15.9(4.1)	14.5	228.6	1.3	14.9	1.4
T46	0.8 (1.3)	16.4 (4.2)	14.1	230.3	1.4	20.8	1.6
T47	1.1 (1.5)	17.5 (4.3)	14.8	255.2	1.9	16.5	2.6
T48	0.7 (1.4)	18.3 (4.4)	14.6	271.2	3.1	23.2	2.6
T49	0.6(1.3)	18.3(4.4)	14.1	258.6	1.3	16.9	1.3
T50	0.8(1.3)	16.5 (4.2)	13.3	233.0	1.7	21.4	1.5
T51(P1)	0.3 (1.1)	12.7 (3.7)	12.8	164.1	3.2	27.5	1.7
T52(P2)	0.3 (1.1)	13.5 (3.8)	15.2	207.5	1.0	4.8	2.6
CD(0.05)	0.22	0.63	1.66	60.07	0.54	2.04	0.22
SE	0.77	0.22	0.58	21.13	0.19	0.72	0.08

Figures in parenthesis represent values after $\sqrt{(x+1)}$ transformation

plant was higher and high fruit yield per plant was noticed in spite of lower average fruit weight. Crude fibre content of fruits, incidence of yellow vein mosaic disease and incidence of shoot and fruit borer were less in the F_4M_4 generation which provide scope for selection of high yielding yellow vein mosaic disease resistant types from the population.

Number of branches per plant and number of fruits per plant recorded increased mean values with respect to both the parents. These observations are in conformity with the results reported by Kuwada (1970), Cheriyan (1986) and John (1997). Most of the F_4M_4 progenies exhibited lower mean values for average fruit weight compared to the cultivated parent. However, fruit yield per plant exhibited higher mean values in the progenies than both the parents as a result of increase in number of fruits per plant. Abraham (1985), on the contrary, noticed that gamma irradiation of the seeds resulted in reduced fruit yield.

Incidence of yellow vein mosaic disease was less in the F_4M_4 generation. Forty-seven progenies in the F_4M_4 generation recorded lower scores for incidence of the disease than the cultivated parent. All the 50 F_4M_4 progenies showed lower percentage of incidence of shoot and fruit borer compared to the cultivated parent. Twenty-three progenies exhibited lower mean values for crude fibre content of fruits than the cultivated parent.

Significant variability noted for all the yield-relating characters studied in the progenies enables effective selection of high yielding varieties from the population. Further, the broad range of variability exhibited for incidence of yellow vein mosaic disease and incidence of shoot and fruit borer ensures the selection of disease resistant, high yielding varieties of okra.

Thus, 25 outstanding lines with respect to high yield and YVM disease resistance were selected from the F_4M_4 population. As a future line of work, these lines will be advanced to further generations to obtain stability for the characters under consideration, so that the resultant lines can be released as high yielding YVM disease resistant varieties.

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