



Performance of parents and hybrids of okra (*Abelmoschus esculentus* (L.) Moench)

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Abstract : In okra, through a 7x7 diallel analysis 2 cross combinations viz. OHD-1 x Varsha Uphar and Varsha Uphar x Arka Anamika were adjudged to be the best among the 33 cross combinations based on the mean performance for yield and yield components like number of fruits / plant, individual fruit weight, fruit length and fruit girth. These two hybrids were also resistant to Yellow Vein-Mosaic Virus in the field.

Key words : Okra, Varsha Uphar, Arka Anamika, OHD-1.

Introduction

Okra (*Abelmoschus esculentus* (L.) Moench) is a major vegetable crop grown throughout India for its green tender fruits during summer and rainy seasons. Heterosis is a special genetic mechanism wherein the distant genotypes are brought together in a specific pattern to express their ability to make a dramatic shift in the magnitude of a particular trait. In okra, heterosis has been reported for yield and other yield related traits like number of fruits as reported by Poshia and Shukla (1986) and Thakar *et al.* (1982). In this study, the results obtained through a diallel analysis is discussed.

Materials and Methods

The parents used MF-1(P₁), MF-2 (P₂), MF-3 (P₃), OHD-1(P₄), OHD-2 (P₅), Arka Anamika (P₆) and Varsha Uphar (P₇) were selected from the germplasm maintained in the Department of Olericulture, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore based on the phenotypic diversity in different biometric traits and also their resistance to yellow vein mosaic virus. The seven parents were crossed in a diallel fashion and 33 hybrids were developed successfully. The 33 direct crosses were evaluated in comparison to their parents for yield and yield components like number of fruits per plant, fruit weight, fruit length and fruit girth.

Based on the performance of parents and hybrids during Season-I (Feb-May) not only

for yield, but also for resistance / tolerance to yellow vein mosaic disease, the following four parents were chosen and crossed in half diallel fashion viz., MF-3 (P₁), OHD-1 (P₂), Varsha Uphar (P₃) and Arka Anamika (P₄). Mean performance of the parents and hybrids in Season-II (July-October) indicated that the performance of parents and hybrids was better than that of the parents and hybrids in Season-I.

Results and Discussion

The mean performance of parents and hybrids in Season-I are presented in Table 1 and the mean performance of parents and hybrids in Season-II are presented in Table 2. The mean number of fruits per plant, one of the most important characters for yield in Okra ranged from 19.3 in P₁ to 25.18 in P₄. Among the hybrids, it ranged from 18.2 in P₁ x P₂ to 34.53 in P₃ x P₇. The hybrid P₄ x P₇ ranked second with 34.51. The hybrids involving the parents P₃ and P₄ produced higher number of fruits. This may be due to the multiplicative interaction of parents. This was in corroboration with the findings of Elangovan (1979). Further the parents were from diverse origin leading to high heterozygosity in the hybrids.

In the case of individual fruit weight the parent P₇ recorded the maximum fruit weight (17.67g) whereas the parent P₁ recorded higher fruit weight (15.67g). Among the hybrids, minimum fruit weight was recorded by the cross P₂ x

Table 1. Mean performance of parents and hybrids (Season-I)

Genotypes	No. of fruits/plant	Fruit weight (g)	Fruit length (cm)	Fruit girth (cm)	Yield of fruits/plant (g)
Parents					
	19.30	15.67	15.08	6.15	252.3
	20.32	16.67	14.70	5.95	290.4
	19.40	15.68	15.35	6.30	374.4
	25.18	15.76	15.63	6.45	408.4
	22.78	16.33	12.68	5.85	353.1
	23.03	16.26	14.25	6.33	397.6
	24.98	17.67	14.50	6.32	462.4
Mean	23.70	16.29	14.73	6.19	362.66
P ₁ P ₂	18.20	12.20	13.09	6.15	242.26
P ₁ P ₃	21.60	11.67	13.10	6.00	257.60
P ₁ P ₄	20.49	13.73	15.02	5.49	267.33
P ₁ P ₆	21.50	16.67	15.32	5.41	380.57
P ₁ P ₇	20.60	17.70	13.25	6.01	448.13
P ₂ P ₁	30.56	9.87	14.64	6.15	289.41
P ₂ P ₃	28.13	12.40	14.20	5.31	389.10
P ₂ P ₄	23.56	15.50	14.35	6.10	302.20
P ₂ P ₆	32.39	14.93	13.76	5.63	391.60
P ₂ P ₇	32.39	13.93	16.65	6.91	492.40
P ₃ P ₁	23.75	16.13	16.13	6.08	379.10
P ₃ P ₂	30.26	17.15	15.95	5.81	490.10
P ₃ P ₄	34.53	17.25	16.95	5.99	491.84
P ₃ P ₆	25.37	14.88	15.45	5.98	379.80
P ₃ P ₇	30.21	16.00	14.64	5.82	420.11
P ₄ P ₁	32.21	18.33	14.97	6.13	440.11
P ₄ P ₂	27.04	17.13	16.01	6.58	490.10
P ₄ P ₃	35.51	18.13	16.65	6.71	511.80
P ₄ P ₆	23.03	14.33	13.01	5.35	380.00
P ₄ P ₇	25.02	14.01	14.64	6.02	353.10
P ₅ P ₁	25.91	15.10	14.97	6.05	350.70
P ₅ P ₂	26.50	14.91	15.60	5.85	361.25
P ₅ P ₃	25.02	14.90	14.27	6.09	362.97
P ₅ P ₄	26.33	15.66	15.33	5.25	412.97
P ₅ P ₆	21.11	15.86	15.85	6.12	357.60
P ₅ P ₇	28.17	14.60	18.33	5.83	328.20
P ₆ P ₁	24.09	15.38	18.55	6.10	311.50
P ₆ P ₂	25.17	15.90	15.09	5.39	491.20
P ₆ P ₃	26.97	18.13	14.65	5.85	479.10
P ₆ P ₄	24.12	18.90	16.50	6.35	453.84
P ₆ P ₅	22.44	15.31	18.81	5.55	420.40
P ₆ P ₇	28.09	16.13	14.90	5.69	499.80
P ₇ P ₁	32.63	19.48	16.68	6.53	522.90
Mean	26.42	18.21	15.89	6.72	398.79
SEd	1.392	1.151	0.605	0.255	18.024
CD (0.05)	2.815	2.330	1.230	0.516	36.457

Table 2. Mean performance of parents and hybrids (Season-II)

Genotypes	No. of fruits/plant	Fruit weight (g)	Fruit length (cm)	Fruit girth (cm)	Yield of fruits plant (g)
<i>Parents</i>					
P ₁	20.50	18.68	14.10	5.41	394.80
P ₂	26.78	16.76	14.65	5.98	429.40
P ₃	26.98	19.10	15.60	6.10	484.40
P ₄	25.03	17.88	13.89	5.31	428.80
Mean	24.82	18.10	14.46	5.70	434.35
P ₁ P ₂	30.29	18.69	14.75	5.49	502.40
P ₁ P ₃	31.16	17.89	15.20	5.98	501.94
P ₁ P ₄	30.53	17.61	14.98	6.01	498.33
P ₂ P ₃	32.03	17.59	15.32	5.72	531.80
P ₂ P ₄	29.94	18.38	14.89	5.99	510.21
P ₃ P ₄	32.01	18.92	15.98	6.12	549.90
Mean	30.99	18.26	15.19	5.89	515.76
SEd	1.366	0.897	0.543	0.153	6.787
CD (0.05)	2.679	1.759	1.064	0.299	11.304

P₁ (9.87g) and the maximum by the cross P₇ x P₆ (19.48g). The crosses P₄ x P₅, P₇ x P₃ and P₇ x P₆ recorded more fruit weight than the hybrid mean value (18.21 g). Such an increase in fruit weight can be attributed to the conglomeration of favourable genes in the hybrids.

In respect of fruit length, among the seven parents, it was the highest in P₄ (15.65cm) while it was the lowest in P₅ (12.68cm). The hybrid P₆ x P₅ recorded the maximum fruit length (18.55 cm) while the minimum by P₅ x P₁ (13.01 cm). The crosses involving the parents P₆ and P₇ produced higher fruit length than the other parents.

When the fruit girth is taken into consideration, it ranged from 5.85 cm in P₅ to 6.33 cm in P₆. Among the hybrids, it ranged from 5.31 cm in P₂ x P₅ to 6.91 cm in P₃ x P₄. There was not much variation between the parents and hybrids from fruit length and fruit girth. The general reduction in fruit length can be associated with the increase in number of fruits per plant as they are negatively linked characters. The present results were similar to those obtained by Swamy Rao (1977) and Elangovan (1979).

Among the seven parents, the fruit yield (g/plant) ranged from 252.3g in P₁ to 462.4g in P₇. Among the 33 hybrids, the hybrid P₆ x P₅ recorded the maximum yield of 522.9g and the minimum yield was recorded by the P₁ x P₂ (242.26g). The nine hybrids P₇ x P₅ (522.90g), P₄ x P₇ (511.80g), P₇ x P₅ (499.80g), P₃ x P₄ (492.40g), P₃ x P₇ (491.84g), P₆ x P₇ (491.20g), P₃ x P₆ (490.13g), P₄ x P₆ (490.10g) and P₇ x P₁ (479.10g) recorded higher yields than the best parent. It can be seen that in all the above hybrids one or both of the parents were high yielders. Even among these hybrids, the high x high parental combinations P₇ x P₆ and P₄ x P₇ topped the others. This was in line with the findings of Elangovan (1979), Vijay and Manohar (1986) and Sivagama Sundari (1991).

On the other hand, P₇, P₄ and P₆ ranking first, second and third among the parents, are involved as one of the parents in three heterotic hybrids. This may be due to epistatic gene as reported by Swamy Rao (1977). All these parents P₇, P₆ and P₄ are involved either as male or female parent in the above hybrids thus suggesting their versatile nature in the production of F₁ hybrids.

The general mean performance of the hybrids (398.79g) was greater than that of parents (362.66g) indicating the possibility of exploiting hybrid vigour in okra as expressed by Swamy Rao (1977).

Mean performance of parents and hybrids in Season-II (Table 2) indicated that parents and hybrids performed better than the parents and hybrids in Season-I. The heterosis for yield in Season-II showed that all the six hybrids recorded positive and significant heterosis. Among the six promising combinations, Varsha Uphar x Arka Anamika topped in yield followed by OHD-1 x Varsha Uphar. Based on the two season trials, two hybrid combinations viz. Varsha Uphar x Arka Anamika and OHD-1 x Varsha Uphar have been adjudged as superior in respect of yield per plant and other component traits.

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