

Evaluation of Sponge Gourd Hybrids for Yield and Related Traits

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Abstract: Ten F₁ hybrids of sponge gourd developed through Line × Tester method were evaluated for yield and related traits. Significant variation in mean performance was noticed for all the characters studied. Different hybrids were found best for different traits. The best performing hybrids for different characters include DSG-6 × 'Pusa Sneha' for earliness; DSG-7 × PSG-9 for fruit length and average fruit weight; DSG-6 × CHSG-2 for fruit diameter and vine length; DSG-7 × NSG-1-11 for number of fruits per plant, average fruit weight and total yield per plant.

Spongegourd (*Luffa cylindrica* Roem.), is a very popular vegetable in the tropical and subtropical regions. It is an important component of crop rotation during spring-summer and rainy season in North Indian condition and is cultivated both on commercial scale and in kitchen gardens (Choudhury, 1996). The young tender fruits of the non-bitter types are eaten as cooked vegetable, or used in soups. The seed oil is colourless, odourless and tasteless which is used in cooking. The plants have medicinal properties too. Fiber is obtained from fully ripen and dried fruits which is useful in cleaning the motor car, glassware, kitchen utensils, commercial filters, for insulation in pot-holders, bathmats, and related uses (Porterfield, 1955). Despite its importance and diversified use, very little attention has been made for improvement in horticultural traits. Very few varieties and hybrids are grown for commercial cultivation in India. Being monoecious and essentially cross pollinated, it provides ample scope for successful exploitation of hybrid vigour. Hence the present study was undertaken to evaluate the performance of hybrids of sponge gourd along with their parents for yield and related traits.

Material and methods

Seven diverse lines obtained through National Bureau of Plant Genetic Resources, New Delhi were maintained as inbreds at Division of Vegetable Science, Indian Agricultural Research Institute, New Delhi. These

inbreds were crossed in Line × Tester mating design to obtain ten F₁ hybrids and these hybrids along with seven parents were evaluated for yield and yield related traits. The experiment was laid out in randomized block design with three replications. Plant to plant distance was maintained 80 cm and rows were made at 120 cm apart. A single non-experimental row was planted on either sides of each block so as to minimize environmental error due to border effect. All the recommended cultural practices were followed to raise a healthy crop. Data were recorded on ten randomly selected plants in each treatment (hybrids and parents) for seven characters *viz.* vine length, days to first fruit picking, number of fruits per plant, fruit length, fruit diameter, average fruit weight and total yield per plant.

Results and Discussion

The mean performances of parents (inbreds) and hybrids for various traits have been presented in Table 1. The analysis of variance (data not presented) was carried out to test the significance of differences among parents and their hybrids. This result clearly indicated that there were significant variations in mean performance among parents and their hybrids for all the characters studied. A perusal on average performance of parents and hybrids (Table 1) revealed that the mean values of parents for vine length ranged from 4.0 m ('Pusa Sneha') to 6.4 m (DSG-7) whereas for hybrids it ranged from 4.5 m to 6.8 m and the hybrid, DSG-6 × CHSG-2 was found to be the best. The mean for days to first female flowering ranged from 53.67 (DSG-6) to 65.33 days (CHSG-2) among the parents, whereas the hybrid, DSG-6 × 'Pusa Sneha' took least time (50.0 days) to produce marketable fruits, and DSG-6 × PSG-9 took maximum time (64.0 days; Table 1). The number of fruits per plant varied from 5.1 (PSG-9) to 22.6 (DSG-6) in parents and among the F₁ hybrids, DSG-7 × NSG-1-11 produced the highest average number of fruits per plant (29.4) and DSG-6 × CHSG-2 produced the least (9.9). The mean value of fruit length varied from 13.4 (DSG-6) to 14.2 cm

('Pusa Sneha') for parental lines. The F₁ hybrid, DSG-7 × PSG-9 showed the highest fruit length (20.3 cm) and DSG-7 × CHSG-1 produced the shortest fruit (12.0 cm). The fruit diameter varied from 3.5 cm (DSG-7 × CHSG-2) to 4.9 cm (DSG-6 × CHSG-2) while comparing both parental lines and F₁ hybrids. The average fruit weight ranged from 96.3 g (CHSG-1 and CHSG-2) to 126.0 g (DSG-6), while in F₁ hybrids it varied from 118.0 g (DSG-7 × CHSG-1) to 154.0 g (DSG-6 × PSG-9 and DSG-7 × NSG-1-11). Yield/plant is considered the most important character for any crop improvement. In the present study among the parents, DSG-6 produced highest fruit yield per plant (2.85 kg) and PSG-9 produced the least fruit yield per plant (0.50 kg) while among crosses, the total yield per plant was maximum in DSG-7 × NSG-1-11 and least in DSG-7 × CHSG-2 (1.28 kg). Based on *per se* performance of the F₁ hybrids, DSG-6 × 'Pusa Sneha' was found to produce early yield and DSG-7 × NSG-1-11 was the most high yielding hybrids. The earliness may be attributed to minimum days to male and female flowering, lower node of flowering, while increased yield was due to increase in fruit size, weight and number of

fruits per plant. These two most promising hybrids can be recommended for commercial cultivation in North Indian plains to benefit the growers to catch the early market as well as increased yield. Similar reports of superior performance of hybrids were reported by Shaha and Kale (2003) and Hedau and Sirohi (2004) in ridge gourd and Lou *et al.* (2005) in angular sponge gourd.

Literature Cited

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Table 1. *Per se* performance of parents, their hybrids, and heterosis over better parent for yield and yield related traits

Parents / F ₁	Vine length (m)	Days to first fruit picking	Number of fruits/plant	Fruit length (cm)	Fruit diameter(cm)	Fruit weight(g)	Total yield/plant (kg)
DSG-6	5.49	59	22.63	13.37	3.93	126	2.85
DSG-7	6.38	61.33	20.90	13.47	3.8	123.67	2.59
'Pusa Sneha'	4.00	60.67	18.67	14.17	3.67	117.33	2.19
PSG-9	5.74	62	5.13	13.67	3.67	96.33	0.50
NSG-1-11	5.79	62.67	6.5	14.27	3.6	96.33	0.63
CHSG-1	6.06	65	7.37	13.47	3.73	111	0.81
CHSG-2	5.89	65.33	8.23	13.87	3.67	108.67	0.89
DSG-6 × 'Pusa Sneha'	5.72 (4.19)	50.0 (-15.25**)	25.27 (11.67*)	18.23 (28.65**)	4.77 (21.37*)	148.0 (17.46**)	3.86 (31.93**)
DSG-6 × PSG-9	6.32 (10.10)	63.33 (7.34)	28.40 (25.50**)	18.0 (31.67**)	4.47 (13.74)	154.0 (22.22**)	4.38 (53.68**)
DSG-6 × NSG-1-11	5.45 (-5.87)	64.33 (9.03)	25.80 (14.01**)	16.47 (15.42)	4.37 (11.20)	152.67 (21.17**)	3.94 (38.25**)
DSG-6 × CHSG-1	4.71(-22.28**)	63.33 (7.34)	24.03 (6.19)	14.37 (6.68)	3.73 (-5.09)	144.33 (14.55**)	3.48 (22.11**)
DSG-6 × CHSG-2	6.81(15.62)	54.33 (-7.92)	27.63 (22.09**)	19.27 (38.93**)	4.87 (23.92*)	150.67 (19.58**)	4.17 (46.32**)
DSG-7 × 'Pusa Sneha'	5.42 (-15.05)	51.67 (-14.83**)	22.57 (7.99)	15.43 (8.89)	4.53 (19.21*)	143.67 (16.17**)	3.24 (25.10**)
DSG-7 × PSG-9	4.55 (-28.68**)	59.33 (-3.26)	18.83 (-9.90)	20.33 (48.72**)	3.70 (-2.63)	135.33 (9.43)	2.56 (-1.16)
DSG-7 × NSG-1-11	5.32 (-16.61*)	56.67 (-7.60)	29.43 (40.81**)	20.0 (40.15**)	4.60 (21.05*)	154.0 (24.52**)	4.53 (74.90**)
DSG-7 × CHSG-1	4.62 (-27.59*)	55.33 (-9.78*)	11.40 (-45.45**)	12.07 (-10.39)	3.57 (6.05)	118.0 (-4.58)	1.34 (-48.26**)
DSG-7 × CHSG-2	5.91 (-7.37)	51.0 (16.84**)	9.9 (-52.63**)	14.27 (2.88)	3.5 (-7.89)	128.33 (3.77)	1.28 (-50.58**)
Mean value of Parents	5.62	62.29	12.78	13.76	3.72	111.33	1.49
Mean value of hybrids	5.48	56.93	22.33	16.84	3.86	142.9	3.27
SE _(d)	0.52	2.71	1.02	1.23	0.35	7.01	0.23
CD _(0.05)	1.05	5.53	2.08	2.50	0.72	14.29	0.46
CD _(0.01)	1.41	7.43	2.80	3.36	0.96	19.21	0.62

() : Percent heterosis over better parent is given; * Significant at 5% level; ** Significant at 1% level.