Table 1. Genetic variability in tomato

Characters	Heritability (%)	Genetic advance (5%)	Range	General mean	PCV	GCV	CV (%)	SED
Days to fruit set	65.13	2.91	65.30-101.61	95.68	1.82	1.61	0.92	0.982
Days to fruit maturity	67.09	3.17	105.23-161.84	137.93	1.92	1.87	0.83	0.794
Plant height (cm)	96.45	42.19	32.81-191.48	95.68	23.04	21.05	4.64	1.241
Primary branches/plant	47.80	1.26	7.91-16.11	13.12	11.53	10.41	8.75	0.329
Nodes between two inflorescences	87.91	2.06	0.91-7.30	2.58	2.17	2.03	0.12	0.019
Nodes to first inflorescence	78.16	3.59	3.32-8.06	5.17	10.47	9.33	1.03	0.263
Flowers/inflorescence	94.91	6.74	2.91-10.72	6.41	20.71	20.20	3.89	1.002
Fruit/inflorescence	93.40	2.86	1.07-8.12	4.33	29.34	28.06	5.56	1.947
Locules/fruit	78.56	1.14	1.94-5.68	3.78	24.51	21.62	11.11	0.461
Equatorial perimeter of fruit (cm)	91.25	31.16	3.02-9.13	6.37	29.14	27.20	13.06	3.842
Average fruit weight (g)	97.80	20.33	4.98-51.43	36.91	33.98	32.44	4.60	2.433
Total soluble solids (%)	95.14	9.78	4.57-10.91	7.63	19.41	18.76	2.13	0.871
pH	92.09	8.35	3.21-6.87	5.51	10.34	9.98	0.73	0.092
Fruits/plant	87.40	43.21	3.02-141.00	19.11	133.80	123.14	56.42	1.443
Fruit yield/plant (g)	68.43	28.24	168.00-1011.16	551.03	42.21	39.13	20.45	2.912

The characters, *viz.*, flowers per inflorescence, fruits per inflorescence, total soluble soilds and pH had high heritability values but low value of genetic advance, while the characters, *viz.*, primary branches per plant, days to fruit set and days to fruit maturity had low values of heritability and genetic advance. This indicated that all these characters are controlled by the non-additive effects of genes thus, discouraging the scope for selection based on these characters in tomato. These findings are in close agreement with those of Paranjothi (1974), Kumar *et al.*, (1980) and Reddy and Gulshan Lal (1987).

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PERFORMANCE OF INTERSPECIFIC HYBRIDS OF *Sorghum bicolor* (L.) MOENCH x *S.halepense* (L.) PERS FOR VEGETATIVE CHARACTERS

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ABSTRACT

Per se performance for vegetative fodder characters in 30 inter specific hybrids involving 11 parents (six *S.bicolor* varieties and five *S.halepense* accessions) was studied. The parents SS 33, SS 31, SS 25, SS 30 for green fodder yield, CO 27 for earliness, FD 1690, FD 1694, FD 1692 and CO 27 for number of leaves and tillers per plant were identified as donors for the improvement of fodder types.

Sorghum is a major grain cum fodder crop in India and it is extensively grown for fodder in the Northern States. Interspecific hybrids and their derivatives derived from species easily crossable to the cultivated sorghum with other desirable traits is worthy of exploitation. Among the different species of sorghum, *S.halepense* has been found easily crossable with cultivated sorghum possessing desirable traits such as perenniality, thin stem, leafiness, resistance to drought and insect pests and

Table 1. Mean performance of the parents and hybrids of fodder crop - vegetative characters.

Parents and Hybrids	Plant height on the 30th day (cm)	Days to 50 per cent flowering	Plant height on 50 per cent flowering (cm)	Leaf length (cm)	Leaf breadth (cm)	Number of leaves per plant	Number of tillers per plant	Stem diameter (cm)	Leaf stem ratio	Green fodder yield per plant (g)
Lines										
SS 25	70.02	65.00	189.82	70.92	7.02	8.37	1.00	1.80	0.24	411.00
SS 30	76.46	65.50	203.20	81.12	7.37	9.89	1.00	1.71	0.38	376.00
SS 31	88.40	68.00	186.30	79.85	7.09	10.20	1.00	1.63	0.26	432.00
SS 33	96.78	69.00	178.20	77.70	7.40	10.37	1.00	1.84	0.24	450.00
SS 44	100.90	70.00	233.40	78.21	7.31	9.39	1.00	2.00	0.33	385.00
CO 27	107.60	55.50	164.15	70.16	5.56	7.73	2.22	1.08	0.22	379.00
Testers										
FD 1690	65.89	75.00	152.50	60.00	2.40	185.22	21.50	0.60	0.68	355.00
FD 1691	71.40	88.50	136.22	42.25	2.40	111.85	10.80	0.55	0.53	305.00
FD 1692	90.32	77.50	176.40	62.65	2.50	78.70	16.60	1.06	0.66	205.00
FD 1693	61.83	78.00	150.10	58.57	1.90	99.35	10.40	0.38	0.63	335.00
FD 1694	73.24	69.50	155.33	57.70	2.61	137.00	15.30	0.70	0.50	267.00
SS 25xFD 1690	96.83	62.00	236.00	82.65	5.24	18.00	2.63	1.50	0.27	565.00
SS 25xFD 1691	98.62	62.00	202.10	79.13	6.41	31.37	3.66	1.41	0.34	452.00
SS 25xFD 1692	75.86	60.00	240.51	81.31	6.77	19.00	2.67	1.55	0.29	550.00
SS 25xFD 1693	89.88	61.00	211.20	82.28	6.74	39.62	3.42	1.41	0.29	445.00
SS 25xFD 1694	85.52	61.00	225.24	74.61	6.28	20.12	3.00	1.36	0.28	437/00
SS 30xFD 1690	76.50	62.50	236.63	82.40	6.31	20.00	2.67	1.20	0.38	397.00
SS 30xFD 1691	71.15	61.50	238.12	81.90	6.12	31.66	2.66	1.37	0.38	410.00
SS 30xFD 1692	102.25	61.00	231.50	82.58	6.20	25.70	2.54	1.01	0.34	480.00
SS 30xFD 1693	93.49	62.00	236.37	88.02	5.63	29.75	2.75	1.19	0.40	548.50
SS 30xFD 1694	90.00	63.00	254.32	86.00	6.44	30.70	3.40	1.31	0.38	549.50
SS 31xFD 1690	89.45	63.00	204.79	81.88	7.03	31.99	3.00	1.16	0.27	487.50
SS 31xFD 1691	113.90	61.00	242.22	82.03	6.50	31.30	2.90	1.23	0.27	496.00
SS 31xFD 1692	96.70	61.00	212.10	84.23	7.04	33.54	3.20	1.25	0.29	491.00
SS 31xFD 1693	98.20	63.00	206.35	87.42	6.57	30.60	2.80	1.23	0.27	672.00
SS 31xFD 1694	89.00	62.00	231.12	85.35	6.21	30.97	3.45	1.07	0.29	520.50
SS 33xFD 1690	126.31	64.00	192.01	81.93	5.73	25.50	3.26	1.18	0.27	499.00
SS 33xFD 1691	110.25	62.00	221.69	92.16	6.25	33.10	2.80	1.24	0.27	608.50
SS 33xFD 1692	97.09	64.00	203.42	84.59	6.73	32.50	2.75	1.29	0.26	484.00
SS 33xFD 1693	117.00	62.50	194.54	83.49	4.63	28.55	3.31	1.48	0.28	519.00
SS 33xFD 1694	112.81	64.50	203.16	87.35	6.71	33.32	2.75	1.13	0.22	521.50
SS 44xFD 1690	107.90	64.00	242.30	85.14	6.64	37.80	3.00	1.45	0.35	496.00
SS 44xFD 1691	102.16	64.50	244.33	84.04	5.31	36.50	3.00	2.10	0.38	399.50
SS 44xFD 1692	119.49	65.00	249.97	88.68	5.45	27.25	3.41	1.41	0.38	529.50
SS 44xFD 1693	100.95	64.50	248.00	84.48	5.41	29.49	2.78	1.85	0.33	424.00
SS 44xFD 1694	108.45	63.00	275.03	82.91	6.42	30.49	2.80	1.94	0.34	537.50
SS 27xFD 1690	113.15	52.50	176.90	73.16	4.35	31.80	4.10	0.90	0.24	392.50
SS 27xFD 1691	105.90	51.50	187.40	73.21	4.36	34.00	4.12	0.98	0.22	427.50
SS 27xFD 1692	126.01	52.00	183.21	81.24	4.10	28.00	3.40	0.90	0.26	419.50
SS 27xFD 1693	107.99	54.00	199.20	74.23	4.17	39.53	3.76	1.21	0.29	420.50
SS 27xFD 1694	127.30	53.00	163.47	72.53	4.20	35.30	4.40	0.95	0.23	394.00
Mean of lines	90.02	65.50	192.51	76.33	6.96	9.32	1.20	1 68	0 2	
Mean of testers	72.54	77.70	154.11	56.23	2.36	122.42	14.92	0 65	0.6	
Mean of parents	82.08	71.04	175.06	67.19	4.87	60.73	7.43	1.21	0 4	
Mean of hybrids	101.64	60.90	219.78	82.35	5.86	30.25	3.14	1.31	0 3	
SEp	0.31	0.86	2.32	0.69	0.12	0 89	0.13	0 04	0 0	
CD at 5% level	0.62	1.74	4.69	1.39	0.23	1.79	0.26	0.09	0.0	

multitillering nature and hence has been found to be potential material in the hybridization programme. Sorghum breeders have evolved varieties with high brix value indicating increased sugar content with high palatability. Through interspecific crosses of *S.bicolor* x *S.halepense*, it could be possible to develop perennial and multicutt sorghums with palatability, which may ensure regular higher fodder supply.

MATERIALS AND METHODS

Five sweet sorghum varieties *viz.*, SS 25, SS 30, SS 31, SS 33 and SS 44 besides CO 27 as lines and five accessions of *S.halepense* (2n = 40) *viz.*, FD 1690, FD 1691, FD 1692, FD 1693 and FD 1694 as testers were crossed following line x tester mating design. The eleven parents and 30 F_1 hybrids were evaluated during *rabi* 1990 in a randomised block design with two replications. A spacing of 45 cm between rows and 30 cm between plants was adopted. At 50 per cent flowering, observations were recorded on five randomly selected plants in each treatment for ten biometric traits. The data were subjected to analysis of variance following Panse and Sukhatme (1967).

RESULTS AND DISCUSSION

The mean performance of parents and hybrids for biometrical characters in the fodder crop is presented in the Table. There were significant differences between parents and hybrids for all the characters.

Among the parents, CO 27, SS 44 and SS 33 recorded high mean values for plant height on the 30th day. The maximum height was recorded in the hybrid CO 27 x FD 1694. The genotype CO 27 ranked first in the earliness to 50 per cent flowering followed by SS 25. All the hybrids involving CO 27 recorded low mean values for number of days to 50 per cent flowering indicating that they are earliest to flower. Hence the genotype CO 27 can be utilized as donor for earliness.

Among the parents, SS 44 ranked first for plant height at 50 per cent flowering followed by SS 30. The hybrid SS 44 x FD 1694 recorded the maximum height. In general, the ovule parents (*S.bicolor*) recorded higher leaf length than the pollen parents (*S.halepense*). Among the parents, SS 33 had broad leaves followed by SS 30. In general, the pollen parents had linear leaves as compared to the ovule parents. All the hybrids registered intermediate leaf breadth.

Considering number of leaves per plant, FD 1690 ranked first followed by FD 1694. In general, *S.halepense* accessions registered higher number of leaves and tillers per plant than the *S.bicolor* genotypes. All the hybrids registered intermediate expression for leaf number and tiller number per plant. All the hybrids involving CO 27 registered increased number of leaves as also number of tillers per plant.

In general, the pollen parents had thinner stems than the *S.bicolor* varieties. It might be due to high tillering nature of the *S.halepense* accessions. In the hybrids, stem diameter was found to be intermediate. All the parents belonging to cultivated sorghum registered lower leaf stem ratio than the pollen parents belonging to *S.halepense* accessions. But all the *S.bicolor* genotypes had longer and broader leaves than the *S.halepense* types. The reduction in the leaf stem ratio in the ovule parents might be due to increased juice content in the stems of the sweet sorghum genotypes. Thus the stem weight was more than leaf weight in them. All the hybrids showed intermediate expression for leaf stem ratio.

The green fodder yield was less in the pollen parents (*S.halepense* than in the ovule parents (*S.bicolor*) High green fodder yield in the ovule parents might be due to late flowering nature, increased plant height, broader and longer leaves, high stem diameter and also high juice content. Among the hybrids, SS 31 x FD 1693 ranked first in green fodder yield followed by SS 33 x FD 1691, SS 25 x FD 1690, SS 25 x FD 1692 and SS 30 x FD 1694. All the hybrids involving CO 27 were low yielders as compared to other hybrids.

The parents SS 33, SS31, SS 25 and SS 30 for green fodder yield, CO 27 for earliness and FD 1690, FD 1694, FD 1692 and CO 27 for number of leaves and number of tillers per plant have been identified as donors for involving in crossing programme for evolving improved fodder types in sorghum.

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