

HETEROSIS IN INTERSPECIFIC HYBRIDS OF FODDER SORGHUM

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ABSTRACT

Heterosis was significantly positive for green fodder yield in the main fodder crop as well as ratoon crop in five out of 30 hybrids of interspecific crosses involving *Sorghum bicolor* and *S. halepense*. The study revealed good scope for commercial exploitation of heterosis for green fodder yield in sorghum as in the bajra-napier hybrids.

Key words: Heterosis, interspecific hybrids, fodder sorghum.

Several fodder sorghum varieties have been evolved through intervarietal hybridization and selection. Most of these varieties are annuals that can stand maximum one or two cuts. In this context, this study was carried out to identify an interspecific sorghum hybrid with high green fodder yield under multicut. Information on the magnitude of heterosis in different cross combinations is a basic requisite to assess for identifying crosses that exhibit high amount of exploitable heterosis. The presence of heterosis in interspecific hybrids for fodder yield has been reported by [1, 2]. In the present study heterosis was estimated over mid parent (MP), better parent (BP) and the commercial variety CO 27 (SH).

MATERIALS AND METHODS

Five sweet sorghum varieties, SS 25, SS 30, SS 31, SS 33 and SS 44, besides CO 27, were crossed as lines with five accessions of *S. halepense* ($2n = 40$), FD 1690, FD 1691, FD 1692, FD 1693 and FD 1694 as testers following line x tester mating design. The eleven parents and 30 F₁ hybrids were evaluated in randomized block design with two replications. Necessary plant protection and normal cultural measures were applied. Five random plants per treatment in each replication were harvested at 50% flowering for recording green fodder yield in the main crop. These plants were allowed to regenerate and harvested at 50% flowering to evaluate hybrid vigour in the ratoon crop for green fodder yield. The three

kinds of heterosis were estimated following the standard procedures and significance was tested by t test as per [3]. CO 27 was used as the standard check for comparison as it is the only fodder sorghum variety presently released for Tamil Nadu.

RESULTS AND DISCUSSION

For green fodder yield, all the 30 hybrids recorded significant positive heterosis over midparent (MP), better parent (BP) and the standard check variety (SH).

The MP heterosis for green fodder yield ranged from 6.9% (CO 27 x FD 1690) to 79.5% (SS 44 x FD 1692) in the main fodder crop and from 11.7% (SS 31 x FD 1692) to 88.2% in the ratoon crop. The BP heterosis ranged from 3.6% (CO 27 x FD 1690) to 55.6% (SS 31 x FD 1693) and from -13.0% (SS 44 x FD 1690) to 52.7% (SS 30 x FD 1694) in the main fodder and ratoon crops, respectively. The heterosis ranged from 3.9% (CO 27 x FD 1694) to 77.3% (SS 31 x FD 1693) and from 60.9% (SS 31 x FD 1692) to 165.1% (SS 30 x FD 1694) in main and ratoon crops, respectively.

The best five hybrids for fodder yield are given in Table 1. Considering the parents in the heterotic hybrids, the genotypes SS 44, SS 31, SS 30, FD 1693, FD 1694 and FD 1692 had maximum contribution to green fodder yield in the hybrids. Positive heterosis for green fodder yield in sorghum genotypes was also recorded by [2, 4-7]. The hybrids mentioned above, besides showing heterosis in the main fodder crop, they also maintain hybrid vigour in the ratoon crop, indicating their consistency of performance for developing multicut fodder hybrid of sorghum with high green fodder yield.

This investigation identifies promising interspecific hybrids of *S. bicolor* x *S. halepense* for green fodder yield. An attempt was also made to study the regeneration capacity of these hybrids by planting rooted slips and two-noded stem cuttings. Preliminary observations showed that they are capable of propagation by vegetative means which confirms a possibility of developing jowar—Johnson hybrids similar to the bajra—Napier hybrids in *Pennisetum*.

Table 1. Heterosis for fodder yield in the best five hybrids of sorghum

Hybrid	Heterosis		
	MP	BP	SH
Main fodder crop			
SS 31 x FD 1693	75.2**	55.6**	77.3**
SS 30 x FD 1694	70.9**	46.1**	44.9**
SS 30 x FD 1693	54.3**	47.9**	44.7**
SS 44 x FD 1694	64.9**	29.6**	41.8**
SS 44 x FD 1692	79.5**	37.5**	39.7**
Ratoon crop			
SS 31 x FD 1693	33.2**	6.6*	130.9**
SS 30 x FD 1694	88.2**	52.7**	165.8**
SS 30 x FD 1693	40.7**	5.5*	128.5**
SS 44 x FD 1694	33.6**	2.9*	78.9**
SS 44 x FD 1692	77.2**	41.2**	123.3**

**Significance at 5% and 1% levels, respectively.

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