# HETEROSIS AND VEGETATIVE PROPAGATION STUDIES IN INTERSPECIFIC FODDER SORGHUM HYBRID

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The  $F_1$  hybrids between CO - 27 (2n=20) and Sorghum halepense (2n=40) were evaluated for fodder attributes and their ability for vegetative multiplication. The heterosis study indicated that the hybrids was superior than CO-27 for fodder attributes. The vegetative propagation study indicated that the  $F_1$  hybrids can be multiplied by stem cuttings and rooted slips.

Keywords: Fodder; Hybrid; Vegetative propagation.

### Introduction

Keeping in view the importance of sorghum as a fodder crop in India, breeders have started to develop high yielding, multicut forage sorghum hybrids. In this context, wide hybridization plays a major role in the production of high yielding hybrids. Moreover, allotriploid hybrids are more vigorous than the diploid hybrids as in the case of Cumbu-Napier hybrid. So this present stydy was taken up to explore the possibilities of obtaining sterile triploid hybrids amenable for vegetative multiplication by heterosis and regeneration ability studies.

#### **Materials and Methods**

The experimental material of this sudy consisted of a fodder sorghum variety namely Co-27 (2n=20) as a female parent and Sorghum halepense (2n=40) as a male parent. Crossing was effected by hand emasculation technique1. F,'s were raised along with the parents and a check namely SSG-59-3. The biometrical observations were recorded for nine fodder attributing characters. The three kinds of heterosis were estimated and their significance was worked out as suggested by Snedecor and Cochran<sup>2</sup>. Two noded stem cuttings and rooted slips were taken from both the parents and the F, hybrids after flowering, and were planted vertically on beds. The survival percentage was worked out on 15th day after

planting for showing its amenability for vegetative multiplication.

#### **Results and Discussion**

A study on the magnitude of heterosis in the  $F_1$  hybrids is a basic requisite to assess the extent of exploitable heterosis. In this study, relative heterosis (di), heterobeltiosis (dii) and standard heterosis (diii) were considered as the criteria for the purpose of discussion (Table 2).

For days to 50 per cent flowering, the  $F_1$  hybrid showed negative values for all the 3 types of heterosis indicating earliness of the hybrid. The hybrids recorded significant and positive relative heterosis for plant height. Similar observations were made in the interspecific fodder sorghum hybrid<sup>3</sup>.

Regarding the number of tillers, the  $F_1$  hybrids showed superiority over the female parent (Co-27) based on the mean performance (Table 1.) For biomass yield, the  $F_1$  hybrids recorded significant positive relative heterosis and significant negative heterobeltiosis and standard heterosis. Heterosis for biomass yield in sorghum interspecific hybrids was reported<sup>4</sup>.

The heterosis study of days to flowering, plant height and biomass yield indicated the possibilities of obtaining superior fodder types, even though negative heterosis for tillering and leaf L/b ratio was observed.

Character	Co-27	S. halepense	SSG 59-3 (check)	Flammed age Manifest
IN TRACTORISTIN TO AND	Min Marine	64.3 64.3	ang Auber 1077	60
Days to 50 % flowering	57.9	129.5	192	180.3
Plant height (cm)	175	20.9	10	8.4
Number of tillers	1. 1. 1. 1. 3.9	THEY STATE THE ALL A REPORT OF	5.4	5.5
Number of nodes	. 4.4	1 View notice 4.4 in set	6.5	6.1
Number of leaves	4.8	4.2	15.7	13.6
Leaf L/B ratio	12.5	19.7	1.9	of the 3.4
Earhead L/B ratio	2.9	interied and 1.7001	3.1	3.5
Stem girth (cm)	2.8	1.8	693	662.3
Biomass yield (g)	260	780	093	natroduction

Table 1. Mean performance of parents and hybrid.

Table 2. Mean Performance and heterosis in the  $F_1$  hybrids.

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the distance of the state	Range	Mean	TERRITOR DE	heterosis (%)		
Character	Kungo		di holar	dii alq m	diii .	
Days to 50 % flowering Plant height (cm) Number of tillers Number of nodes Number of leaves Leaf L/B ratio Earhead L/B ratio Stem girth (cm)	53-68 110.9-215 4-15 4-7 5-7 10.5-19.3 2.1-4.2 2.7-4.2	60 180.3 8.4 5.5 6.1 13.6 3.4 3.5 662.5	-1.8 18.2** -32.3** 25.0** 35.6** -15.5** 47.8** 52.2** 27.4**	3.6 3.0 -0.6** 25.0* 27.1* -18.3** 15.6* 94.4 -151.1**	-22.0** -0.1** -0.2 1.9 -0.1 -13.4* 78.9* 12.9 -4.4**	

\* Significant at 5% level; \*\* Significant at 1% level; di Relative heterosis; dii Heterobeltiosis; diii Standard heterosis imilar observations were made in the

interspecific fodder sorghum hybrid Table 3. Evaluation of F1 hybrid for vegetative propagation

Tinnite more the function	inter bo Ste	Stem cuttings		ganzan O histori alon Rooted slips			
Genotypent 1570 (Riona somemorized ason salitat	Planted	Regenerated	%	Planted	Regenerated	%	
Co - 27 S. halepense	50 50 125	15 46 65	30 92 52	20 20 20	022 20mm 20 n no27 notic	10 100 35	

SIN MERCHANNER FOR D

in sorghum interspecific Table 4. Standardisation of maturity of stem for vegetative multiplication

Portion of 10 y but a circo should be the stem	Cuttings planted	Regenerated	% of regeneration
Lower Middle Upper	60 60 5	28 28 28 36 36 1 36 1 36 1 36 1 30 30 30 30 30 30 30 30 30 30 30 30 30	46 60 vite 60 20 visitional

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Similar heterosis for tillering was reported in the interspecific hybrids of sorghum<sup>5</sup>.

The  $F_1$ 's showed an average of 27 per cent pollen fertility and poor seed set. So it was tested for its amenability for vegetative multiplication. Vegetative 'propagation as a method of multiplication enables us to maintain the genetic uniformity. Vegetative propagation studies showed that the  $F_1$ 's were superior than Co-27 and they were found to be inferior than *S. halepense* (Table 3) through stem cuttings (52 per cent) and rooted slips (35 per cent). Further the cuttings from the middle portion of the stem were found to be

Pearsail concluses that the water sharboaring green algoa are different in chemical composition that deale favouring dialogs and the green algoe in large takes. Muta-warholds the green algoe in large takes. Muta-warholds the green has this is also gue with meet to mather perfect of water. Assurting to hound the presence of chierophycose in complete water-as due to their higher outries an entrophic water-as due to their higher outries an entrophic water-as due to their higher outries a contents. The present work is mined at to find out the ecological factors which govern the distribution and performers of greens propies of green sizes in the water bodies under

elaterials and Methods barrent late a stonaed in Barrara Fills of Pederabal city and O C pend is streated on Osmania University campus of Hyderanae The water samples were criticated and the sampling was done at monthly intervals for a geriod of two years. The water samples were anglysed for the variant physics chemical tacket by following straatard methods. The solution surface water samples were also objected for the qualitation set quantities to access of angle by following the one superior than the cuttings from the upper and lower portions of the stem (Table 4) for vegetative multiplication.

## References

- 1. Quinby JR and Martin JH 1954, Adv Agron. 6 305
- 2. Snedecor GW and Cochan 1967, Statistical methods Oxford IBH, New Delhi, pp. 1-388
- Surendran C, Chandrasekaran NR, Chandrasekaran P and Rangasamy S R 1988, Madras Agric. J. 75 (1-2): 33
- 4. Bhagmal V S, Mishra and Patil UD 1984, Sorghum Newsletter 27
- 5. Sethupathi Ramalingam R and Raman V S 1974, Cytologia 39 (12) 26

Venkareswaria Multiple Regionsiem Analysis (MRA) A statistical approach which was introduced by Nigeswar Rao, has been employed in order to evaluate the relative importance of various physico-chemical factors on the growth and development of chlorococcilian genera.

worke nucl Discussion

The results of various physics chemical factors are given in Table 1 & 2. The two faces are attached to nature with pH ranges from 7.8 to 9.7. Temperature fluctuated between 21 to 10 degrees consigned, All the physics chemical before are in renewbat higher concentration when compared to 0.0 pend

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