

**Table 3. Morphological Description of X6 and its parents.**

Character	X6	PT732A	PT 3095
Days to 50% flowering	55-60	55-60	55-65
Duration (days)	95-100	87-95	85-95
Plant height (cm)	155-175	70-85	160-175
Number of tillers	4-6	4-6	4-5
Ear length (cm)	20-25	18-25	25-28
Ear shape	Spindle	Spindle to conical	Spindle to cylindrical occasionally conical
Hairiness	Clabrous	Glabrous	Glabrous
Nodal colour	Green	Green	Green
Pigmentation	Green	Green	Green
Grain colour	Slate colour	Slate colour	Slate colour
1000 grain weight (gm)	7.7-8.8	5.6-7.3	6.4-7.8

75. The hybrid now developed has the female parent, PT 732A which is different from that of the parents of the previous released hybrids. Synchronised flowering was observed in both male and female parents. As abundant pollen is produced in male parent, the ratio of planting female and male in hybrid seed production can be altered as against 4:2.

The pearl millet hybrid, X6 is of medium duration with synchronised flowering of 4 to 6 tillers and mean 1000 grain weight of 7.7 to 8.8  
Madras Agric. J., 81(7): 362-364 July, 1994

## HETEROSIS IN FODDER TRAITS OF SORGHUM

R. SANKARAPANDIAN, N. SUBBARAMAN and A. AMIRTHA DEVARATHINAM.

School of Genetics, TNAU, Coimbatore.

### ABSTRACT

Forty two hybrid combinations and their parents were evaluated for heterosis in fodder yield and their component characters. Observations were recorded on six characters namely plant height, number of leaves, leaf-shoot ratio, total soluble solids, crude protein yield, and dry matter production. Significant heterosis was recorded by all hybrids over mid-parent for plant height. For dry matter production yield 3660 A x M 35-1 and 2077 A x M 35-1 exhibited maximum heterobeltiosis. The cross combination 3660 A x Co 23 expressed maximum heterobeltiosis for plant height. The hybrid combination such as 2077 A x FS.1, 2077 A x M 35-1, 2077A x K7 3660 A x Co 25 and 2219 A x FS, are all worth for pursuing for their best per se performance for plant height crude protein yield, total soluble solids and dry matter production.

The varieties with good fodder quality available in the germplasm are found to be either poor quality and palatability are an acceptable to

gms (Table. 3). Its resistance to downy mildew, high protein content (11.4%), medium grain size and market acceptability of the grains are added advantages.

In view of the above desirable attributes, the hybrid UCH 11 has been released as X6 for general cultivation, which is a boon to the farmers of Tamil Nadu.

### ACKNOWLEDGEMENT

The authors are pleased to place on record the involvement of Dr.R. Appadurai, and Dr.T.S. Raveendran for their contribution in developing the female parent 732A. They are also grateful to Mr.P. Manivasagam, Dr. A.R. Muthiah, Dr.R. Rajasekaran, Dr.N.Jayaraman and Dr.L. Mohan and Mr.T. Sundaram for their association with this project at various stages of testing. The valuable guidance offered by Dr.S.R. Sree Rangasamy and Mr.A.Narayanan, Directors is gratefully acknowledged.

### REFERENCES

- ATHWAL, D.S. 1965. Current plant breeding research with special reference to *Pennisetum*. *Indian.J. Genet.*, 26 A: 73-85.
- APPADURAI, R., RAVEENDRAN, T.S. and NAGARAJAN, C. 1982. A new male sterility system in Pearl Millet. *Indian.J. Agric. Sci.*, 52: 832-834.
- BURTON, G.W. 1958. Cytoplasmic male sterility in Pearl Millet (*Pennisetum glaucum* (L) R. Br.) *Agron. J.*, 50:230.

<https://doi.org/10.29321/MAJ.10.A01532>

the consumers. The exploitation of heterosis through the utility of cytoplasmic genic male sterility has been successfully established in

Table 1. Analysis of variance.

Source	df	Plant height	Number of leaves	Leaf shoot ratio	Total soluble solids (TSS)	Crude protein	Dry matter production
Replication	2	143.5	0.11	4.61	0.88	4.49	2.14
Hybrids	41	3189.9**	0.88**	290.06**	64.88**	57.59**	5369.72**
Line	2	5890.0**	56.10**	187.10**	175.15**	280.29**	29886.82**
Tester	13	14018.2**	6.15**	583.5**	31.23**	88.94**	5453.76**
Line x tester	26	721.9**	3.46**	151.3**	48.23**	26.47**	3441.78**
Error	116	49.1	0.02	22.3	0.27	1.850	119.2

\*\* Significant at one per cent level.

sorghum. The present study has aimed at to evaluate the forty-two hybrid combinations for genetic worthiness in terms of quality and fodder production traits.

### MATERIALS AND METHODS

The sorghum material chosen for this study consisted of three lines and fourteen testers. Three stages of staggered sowing of male and female parents at weekly intervals were done. Pollination was done on the male sterile parents by dusting the pollen collected from the chosen male parents. A total of forty-two cross combination were made. The hybrids and parents were sown in a line x tester model and observations were recorded on plant height, number of leaves, leaf shoot, ratio total soluble solids, crude protein and dry matter production.

Heterosis was estimated for all the above characters as percentage increase or decrease in F<sub>1</sub> generation over better parent.

### RESULTS AND DISCUSSION

The analysis of variance showed significant differences among the hybrids for all characters studied (Table 1). The percentage of increase in F<sub>1</sub> generation over better parent revealed varying degrees of heterosis for different traits (Table 2). The behaviour of the hybrids for each of the characters are discussed below:

#### Plant Height:

The degree and direction of heterosis of cross combination varied greatly for this trait. Plant height directly contributes more to fodder in sorghum than other related traits (Langote and Vindo devadas Ral, 1983). Twenty five hybrids

showed significant and positive relative heterosis and heterobeltiosis indicating the presence of dominant genes with positive effects in these cross. The hybrid 3660 A x Co 25 (287.13 cm ; 17.53\*\*) showed high *per se* performance and heterobeltiosis. When these two parameters was considered the hybrid (3660 A x Co 25) was the best. It is evident that by pedigree breeding for the plant height could be increased for which Cc 25 and 3660A could be desirable hybrid combination.

#### Number of Leaves:

Leaf portion in the stem is easily palatable part in sorghum. Goud *et al.* (1973) observed high degree of heterosis for this attributes. Eleven hybrids recorded positive and significant heterobeltiosis. The hybrids namely 2077 A x K7(13.90 ; 6.43\*\*) and 2077 A x M 35-1 (14.93 ; 14.31\*\*) also exhibited high *per se* performance and heterosis. Hence these hybrids appear to be worthy of exploitation in varietal improvement programme. The hybrid 3660 A x FS<sub>1</sub> (10.93 ; 8.64\*\*) and 3660 A x Co 11 (14.13 ; 40.45\*\*) exhibits heterosis would throw desirable transgressive segregants in later generation.

#### Leaf : Shoot Ratio :

Significant desirable heterosis and heterobeltiosis was present for many characters like protein content and leaf to stem fodder yield reported by Shekar and Ahluwalia (1981). Five hybrids recorded significant and positive heterobeltiosis. Two hybrids recorded significant and positive heterosis were 2077 A x Co 25 (56.21, 18.88\*\*) and 2219 A x SPV 472 (62.11 ; 21.75\*\*). The leaf to stem ratio exhibit high heterosis denotes additive genetic variance was predominantly present for forage yield. These cross combinations also produced transgressive segregants of the

additive genetic system present in the worthwhile parents and the complementary epistatic effects in the F<sub>1</sub>s act in the same direction.

#### Total soluble solid (TSS) at maturity stage:

The estimates of total soluble solids is useful in that it reflects on the percentage of total sugars that is useful in nutrition ingredient in the fodder for cattle. Selvi (1984) observed high heterosis for total soluble solids upto 14.82 per cent in one hybrid. Twentyfive hybrids exhibited significant and positive heterosis over better parent. The hybrids with the combination except M 35-1, K7 and FS<sub>1</sub>(14.53 to 18.86 ; 2.95 to 25.73<sup>\*\*</sup>) showed significant heterosis indicated presence of substantial non-additive component for total soluble solids content. These hybrids could be exploited for obtaining desirable segregants with high total soluble solids content. The hybrid 3660 A x Co 25 (18.17 ; 12.99<sup>\*\*</sup>) produced high heterosis may be due to contribution of advance genes from both the parents and also produced transgressive segregants.

#### Crude protein yield per plant :

Among the forty two hybrids, twenty exhibited heterobeltiosis which may be attributed to the present of genes with favourable dominance. The hybrid namely 2077 A x Co 11 (16.91 ; 85.41<sup>\*\*</sup>) showed high *per se* and 3660 Ax M 35-1 (20.81 ; 99.01<sup>\*\*</sup>) recorded highest *per se* performance and heterosis could be utilized in the varietal improvement Programme. Other important hybrids

Madras Agric. J., 81(7): 364-367 July, 1994

namely 2219 A x Fs<sub>1</sub> (8.10; 60.71<sup>\*\*</sup>) and 3660 A x Co 25 (10.78 ; 6.31<sup>\*\*</sup>) has HETEROISIS could be expected to yield promising material in segregating generations.

#### Dry matter yield per plant :

The highest positive and significant heterosis was exhibited by hybrid 2077 A x M 35-1 (201.669 ; 45.07<sup>\*\*</sup>) Seven cross combinations recorded significant heterobeltiosis except 2219 Ax SPV 472. This revealed the positive effect of dominant genes of the parents. The parent Combination 2077 A and M 35-1 could be the most advantageous for the dry matter production. Hence, based on their *per se* performance and heterobeltiosis, the hybrid 2077 A x M 35-1 may serve as a source population for realising superior segregants for this trait. This could be achieved through simple pedigree method of plant breeding.

Note: The figure given in the parenthesis are *per se* performance and Heterobeltiosis.

#### REFERENCE

- GOUND, J.V., M.D.KACHAPUR and M.J.VASUDAVARAO. 1973. Combining ability in Kharif sorghum. *Mysore J. agric. Sci.*, 7:369-376.
- LANGOTE and VINODEVADAS RAO, 1983. Correlation and path-co-efficient study in sorghum. (*Sorghum bicolor* (L) Moench). *Thesis Abstract* 11 : 4.
- SELVI, B. 1984. Heterosis and combining ability in sweet sorghum (*Sorghum bicolor* (L) Moench) M.Sc.(Ag.) Thesis. Tamil Nadu Agricultural University, Coimbatore.
- SHEKAR, V.B. and M.AHLUWALIA, 1981, Heterosis and combining ability analysis for forage yield and quality in Eu-Sorghum species. *Forage Res.*, 7: 105-107.

## EFFECT OF DIFFERENT PICKINGS ON THE QUALITY OF UPLAND COTTONS

J.S.V.SAMBAMOORTHY, N.GOPINATH, and S.MUKUNDAN

R A R S, Lam, Guntur.

#### ABSTRACT

Overall, in all the varieties studied, higher mean fibre length values were recorded in second picking with desirable bundle tenacity and micronaire value over other pickings. The extent of variation in fibre properties differed between boll maturation periods. Pickings had significant effect on quality of fibre suggesting picking-wise marketing of the produce to get premium price in the market.

Variations in fibre quality due to pickings are largely dependent on varieties used corresponding to their respective boll maturation periods. Other factors like colour, accumulation of trash particles

etc., lead to deterioration in kapas or lint grade. In India, cotton is hand picked and harvested in several pickings by mostly engaging labour on contract basis at Rs.1/- per Kg. of (approx) Kapas