Table 4. *Per se* Performance, heterosis, *sca* effects of hybrids and *gca* effects of parents involved in crosses

Cross	*Per se* performance	Heterosis over		*sca* of cross	*gca* of parents
		mid parent	better parent		
IR 64 X IR 54717-C10-94-3-2-3-2	32.37	41.33	38.94	8.11	-0.30
					-0.67*
CNA 4121 X IR 54717-C10-113-1-2-2-2	34.15	31.38	24.44	3.59	1.59**
					3.72**
IR 61457-8-3-3-1 X IR 10198-66-2	34.57	28.73	14.37	6.09	2.54**
					0.70*
CNA 4121 X CSR - 1	29.35	27.11	19.58	3.84	1.59**
					-1.32**
CNA 4206 X IR 10198-66-2	27.64	37.69	17.68	4.39	-2.69**
					0.70*
CNA 4121 X IR 4595-4-1-1-3	27.53	12.58	12.15	2.63	1.59*
					-1.32**

* Significant at five per cent level ** Significant at one per cent level

These crosses would serve as a source population for producing transgressive desirable early segregants in later generations and could be exploited by random mating and selection among the segregants. The cross IR 64 X IR 54717-C10-94- 3-2-3-2 resulted from poor combining parents exhibited high *sca* effects and heterosis. This cross combination would produce transgressive segregants and there is a possibility to obtain desirable segregants if cyclic or biparental breeding programme are adopted.

From the study, it was concluded that the parents CNA 4121, IR 61457-8-3-3-1, IR 10198-66-2 and IR 54717-C10-113-1-2-2-2, and the crosses IR 64 X IR 54717-C10-94-3-2-3-2, CNA 4121 x IR 54717-C10- 113-1-2-2-2, IR 61457-8-3-3-1 x IR 10198-66-2, CNA 4121 x CSR-1, CNA 4206 x IR 10198-66-2 and CNA 4121 x IR 4595-4-1-1-3 which performed better under normal field condition could be used for breeding saline tolerance after further testing under saline condition.

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CORRELATION AND PATH ANALYSIS IN THE F_2 GENERATION OF FINGER MILLET

R.MARIMUTHU

Department of Plant Breeding
College of Agricultural Engineering
Tamil Nadu Agricultural University
Kumulur 621 712

ABSTRACT

Correlation and path analysis were carried out in the F_2 generation of the four crosses of finger millet (*ragi*) (*Eleusine coracana* Gaertn.) namely Co9 x Co13, Co9 x Indaf9, Co9 x Co7 and MS 2863 x MS 2655 for grain yield and its components. Grain yield was found to be positively associated with its component traits in the order of ear weight, number of productive tillers, finger number, finger length, plant height, days to 50 per cent flowering and 100 grain weight. Ear weight, number of productive tillers and finger length showed positive direct effect on grain yield.

KEY WORDS : Finger millet, yield components, correlation coefficients, path analysis

The knowledge of association is useful to the breeders in the improvement of complex characters like yield through selection. The interrelationships among the plant characters considerably affect the methods and response to selection.

Correlation coefficient provides a measure of this association. Phenotypic correlations reflect the observed relationship while genotypic correlations underline the true relationship among characters. Path coefficient analysis facilitates partitioning of the correlation coefficients into direct contribution of each of the component to yield and its indirect effect through other componenets. Path analysis also helps to elucidate the intrinsic nature of the observed associations and imparts confidence in the selection scheme adopted for a given situation. Hence, an attempt was made to understand true association of yield and its components in finger millet in the present study.

MATERIALS AND METHODS

The experiment was conducted at the Regional Research Station, Paiyur, Dharmapuri district. During May 1992, six parents *viz.*, Co7, Co9, Co13, Indaf9, MS2655 and MS2863 and the F_2 progenies of the four crosses *viz.*, Co9 x Co13, Co9 x Indaf9, Co9 x Co7 MS 2863 x MS 2655 were raised in a randomised block design with three replications. Each parent was planted in two rows and each F_2s in six rows of 3m length. Each row had 30 plants adopting a spacing of 22.5 x 10cm.

In each replication, 20 plants from each parent and 100 plants from each F_2 population were labelled and biometrical observations were collected on single plant basis. The eight quantitative characters chosen for the study were : days to 50 per cent flowering, plant height, number of productive tillers per plant, number of fingers per ear, finger length, ear weight per plant, 100 grain weight and grain yield per plant. The data collected from 60 plants in each parents and 300 plants in each F_2 were statistically analysed by treating as one unit ignoring replications. Genotypic variance is calculated by subtracting the environmental variance from the phenotypic variance. The average of phenotypic variance of the parents involved in that particular cross was

Table 1(a).Direct and indirect contribution of seven characters to yield in the F_2 Population of the finger millet crosses Co9 x Co13 and Co9 x Indaf9

Character	Days to 50% flowering	Plant height	No.of productive tillers/plant	No.of fingers/ear	Finger length	Ear weight/ plant	100 grain weight	Grain yield/plant
Co9 x Co13								
Days to 50% flowering	(0.0501)	-0.0019	-0.0056	-0.0017	- 0.0001	0.0458	0.0035	0.0901
Plant height	-0.0041	(0.0229)	0.0028	-0.0001	-0.0002	0.0704	-0.0018	0.0899
No.of productive tillers/Plant	-0.0051	0.0012	(0.0545)	-0.0006	0.0001	0.5608	0.0041	0.6150
No.of fingers/ear	0.0074	0.0003	0.0029	(-0.0114)	- 0.0002	0.3002	0.0045	0.3037
Finger length	0.0029	0.0043	-0.0041	-0.0024	(-0.0011)	0.0994	-0.0007	0.0983
Ear weight/plant	0.0024	0.0017	0.0318	-0.0036	-0.0001	(0.9621)	0.0007	0.9950
100 grain weight	-0.0044	0.0010	-0.0056	0.0013	-0.00002	-0.0169	(-0.0401)	-0.0647
Co9 x Indaf 9								
Days to 50% flowering	(-0.0138)	0.0019	-0.006	0.0044	- 0.0081	-0.0641	0.0004	-0.0799
Plant height	0.0011	(-0.0233)	-0.0013	0.00004	0.0279	0.0415	-0.0003	0.0456
No.of productive tillers/plant	0.0019	0.0077	(0.0041)	0.0044	-0.0184	0.6788	0.0010	0.6795
No.of fingers/ear	0.0024	0.00004	-0.0007	(-0.0255)	0.0259	0.2858	-0.0007	-0.2872
Finger length	0.0018	-0.0102	-0.0012	-0.0104	(0.0635)	0.1661	0.0002	0.2098
Ear weight/plant	0.0009	-0.0010	0.0027	-0.0073	0.0105	(1.0056)	-0.0002	1.0115
100 grain weight	0.0013	-0.0017	-0.0011	-0.0050	-0.0027	0.0051	(-0.0038)	-0.0079

Co9 x Co13	Co9 x Indaf9
$R^2 = 0.9946$	$R^2 = 0.9867$
Residual = 0.0597	Residual = 0.1153

Figures in parentheses indicate direct effects.

Table 1(b) Direct and indirect contribution of seven characters to yield in the F_2 population of the finger millet crosses Co9 x Co7 and MS 2863 x MS 2655

Character	Days to 50% flowering	Plant height	No.of productive tillers/plant	No.of fingers/ear	Finger length	Ear weight/ plant	100 grain weight	Grain yield/plant
Co9 x Co7								
Days to 50% flowering	(0.0005)	-0.0083	-0.0124	0.0008	0.0087	0.0533	0.0002	0.0428
Plant height	0.00007	(-0.0584)	-0.0026	0.0019	0.0166	0.1698	-0.0002	0.1271
No.of productive tillers/plant	-0.00006	0.0014	(0.1071)	-0.000009	0.0010	0.6556	-0.0001	0.7649
No.of fingers/ear	0.00002	-0.0048	-0.00004	(0.0236)	0.0060	0.3116	-0.0004	0.3360
Finger length	0.0001	-0.0284	0.0032	0.0041	(0.0341)	0.2755	0.0023	0.2909
Ear weight/plant	0.00003	-0.0106	0.0752	0.0079	0.0101	(0.9339)	-0.0004	1.0160
100 grain weight	0.000006	0.0008	-0.0010	-0.0007	0.0053	-0.0280	(0.0144)	-0.0093
MS 2963 x MS 2655								
Days to 50% flowering	(-0.0397)	-0.0004	0.0069	-0.0027	0.0002	0.0504	0.0097	0.0244
Plant height	-0.0008	(-0.0228)	0.0160	0.0050	0.0071	0.3024	0.0160	0.3229
No.of productive tillers/plant	-0.0048	-0.0063	(0.0579)	0.0007	0.0021	0.5808	0.0024	0.6328
No.of fingers/ear	0.0035	-0.0038	0.0013	(0.0305)	0.0051	0.4502	-0.0208	0.4660
Finger length	-0.0004	-0.0088	0.0066	0.0085	(0.0183)	0.3671	0.0031	0.3944
Ear weight/plant	-0.0019	-0.0067	0.0326	0.0133	0.0065	(1.0315)	-0.0143	0.0610
100 grain weight	0.0049	0.0046	-0.0018	0.0081	-0.0007	0.1874	(-0.0785)	0.1240

Co9 x Co7 — MS 2863 x MS 2655
$R^2 = 0.9785$ — $R^2 = 0.9976$
Residual = 0.1466 — Residual = 0.0491
Figures in parentheses indicate direct effects

taken as the environmental variance. The Genotypic covariance was also estimated similarly by the above method for partitioning the variance. Phenotypic and genotypic correlations were computed by using the formula given by Webber and Moorthy (1952). The significance of correlations coefficients was tested by referring to the table given by Snedecor (1961). Genotypic correlations between grain yield and its seven component traits were used for path analysis (Dewey and Lu, 1959) and Do little method for solving simultaneous equations (Goulden, 1959)

RESULTS AND DISCUSSION

Correlation studies

Grain yield per plant was found to be strongly and positively associated with ear weight followed by number of productive tillers, number of fingers and finger length in all the four crosses studied *viz.*, Co9 x Co13, Co9 x Indaf9, Co9 x Co7 and MS2863 x MS 2655. Plant height had positive relationship with grain yield in all the crosses with significance in MS2863 x MS 2655 and Co9 x Co7. A low positive non-significant relationship of days to flowering with yield was observed in the three crosses Co9 x Co13, Co9 x Co7 and MS 2863 x MS 2655 and in the fourth cross Co9 x Indaf9, the association was negative but not significant. With regard to 100 grain weight, positive and significant association with yield was observed in te cross MS 2863 x MS 2655 while in the other crosses negative correlation was recorded.

In finger millet, Jayaprakash (1991) observed that most of the yield components were positively associated with grain yield. Abraham *et al.*, (1989) reported positive relationship of days to flowering, productive tillers and 100 grain weight with grain yield. Cauvery (1993) observed that grain yield was found to be positively and significantly correlated with productive tillers.

Path analysis

The results of path analysis in the F_2 generation of the four crosses showed that ear weight, number of productive tillers and finger

length were the major components contributing for the grain yield in finger millet. Number of fingers and finger length indirectly through ear weight had contributed to grain yield. (Tables 1a,1b). The present study also brought out the positive direct contribution of days to flowering in Co9 x Co13 and Co9 x Co7, plant height in Co9 x Co13, number of fingers in MS 2863 x MS 2655 and 100 grain weigt in Co9 x Indaf 9 towards grain yield.

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K 11 - A HIGH YIELDING KARUNGANNI COTTON VARIETY FOR TAMIL NADU

C.R.ANANDA KUMAR., A.RAJAMANI, S.SEVUGAPERUMAL and P.MUTHUSWAMY

Agricultural Research Station
Tamil Nadu Agricultural University
Kovilpatti 627 701

ABSTRACT

A new high yielding Karunganni cotton culture, TKA 188 was released as K 11 variety by the Tamil Nadu Agricultural University during the year 1993. It is a double cross hybrid derivative, matures in 130 - 135 days and suitable for low fertile vertisols of Tamil Nadu. It is highly suitable for rainfed cultivation and also for black gram intercrop cultivation. It has recorded an average seed cotton yield of 1208 kg/ha as compared to 937 kg/ha by K 10 with an increase of 28.9 per cent. Since it is one week earlier possessing better pest resistance and higher yield than K 10, it has been released for general cultivation to replace K 10.

KEY WORDS : Karunganni cotton, new variety, K 11

Karunganni cotton *Gossypium arboreum* is a diploid desi cotton which is cultivated generally as rainfed in the tracts of low fertile vertisols of southern Tamil Nadu. The variety K 10 released during 1985 was the ruling variety and has occupied more than 99 per cent the *desi* cotton area. To further improve the qualitative and quantitative characters, the breeding work has been initiated.

MATERIALS AND METHODS

Hybridisation work was initiated at the Agricultural Research Station, Kovilpatti with the genotypes selected from the germplasm. During the year 1982, different F_1s were crossed to get double cross hybrids. In the F_4 population, a promising line TKA 188 was isolated from the double cross hybrid derivatives *viz.*, 0794-1-D/11876/0794-1-D/H450. This culture was tested in station trials (ST), multi

Table 1. Summary of yield trials (1985 - 92)

	No.of Trials	TKA. 188	K.10 (Kg/ha)	Increase Over K.10(%)
Station Trials (1985 - 92)	16	1208	937	28.9
MLT (1988 - 90)	4	1600	1368	17.0
ART (1990 - 91)	10	638	595	7.0
ART (1991 - 92)	18	391	323	21.1
AICCIPT (1985 - 92)	16	1127	836	34.8
	64	993	812	22.3

MLT : Multilocation trials ; ART : Adaptive research trial
AICCIP : All India Co-ordinated Cotton Improvement Project trials