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

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

* 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 4595-4-1-3-3 which performed better under normal field condition could be used for breeding saline tolerance after further testing under saline condition.

### REFERENCES


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**CORRELATION AND PATH ANALYSIS IN THE F2 GENERATION OF FINGER MILLET**

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Kumulur 621712.

**ABSTRACT**

Correlation and path analysis were carried out in the F2 generation of the four crosses of finger millet (ragh) (Eleusine coracana Gaertn.) namely Co9 x Co13, Co9 x Indu9, 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 30 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 components. 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, Paipur, Dharmapuri district.

During May 1992, six parents viz., Co7, Co9, Co13, Inda9, MS2655 and MS2863 and the F1 progenies of the four crosses viz., Co9 × Co13, Co9 × Inda9, Co9 × Co7 MS 2863 × MS 2655 were raised in a randomised block design with three replications. Each parent was planted in two rows and each F2s in six rows of 3 m length. Each row had 30 plants adopting a spacing of 22.5 x 10 cm.

In each replication, 20 plants from each parent and 100 plants from each F2 population were labelled and biometrical observations were collected on single plant basis. The eight quantitative characters chosen for the study were: days to 50 percent 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 parent and 300 plants in each F2 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>
<thead>
<tr>
<th>Character</th>
<th>Days to 50% flowering</th>
<th>Plant height</th>
<th>No. of productive Tillers/Plant</th>
<th>No. of fingers/ear</th>
<th>Finger Length</th>
<th>Ear weight/ plant</th>
<th>100 Grain weight</th>
<th>Grain yield/plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co9 × Co13</td>
<td>(0.0501)</td>
<td>-0.0019</td>
<td>-0.0056</td>
<td>-0.0017</td>
<td>+0.0001</td>
<td>0.0438</td>
<td>0.0035</td>
<td>0.0901</td>
</tr>
<tr>
<td>Days to 50% flowering</td>
<td>(-0.0013)</td>
<td>0.0021</td>
<td>0.0056</td>
<td>-0.0006</td>
<td>-0.0007</td>
<td>0.0508</td>
<td>0.0041</td>
<td>0.1125</td>
</tr>
<tr>
<td>Plant height</td>
<td>-0.0041</td>
<td>(0.0229)</td>
<td>0.0028</td>
<td>-0.0001</td>
<td>-0.0002</td>
<td>0.0704</td>
<td>-0.0018</td>
<td>0.0859</td>
</tr>
<tr>
<td>Non-productive Tillers/Plant</td>
<td>-0.0051</td>
<td>0.0012</td>
<td>(0.0545)</td>
<td>-0.0006</td>
<td>0.0001</td>
<td>0.5608</td>
<td>0.0041</td>
<td>0.1125</td>
</tr>
<tr>
<td>No. of fingers/ear</td>
<td>0.0074</td>
<td>0.0033</td>
<td>0.0029</td>
<td>(-0.0114)</td>
<td>-0.0002</td>
<td>0.3002</td>
<td>0.0045</td>
<td>0.3057</td>
</tr>
<tr>
<td>Finger length</td>
<td>0.0029</td>
<td>0.0043</td>
<td>-0.0041</td>
<td>-0.0024</td>
<td>(-0.0011)</td>
<td>0.0994</td>
<td>-0.0007</td>
<td>0.0983</td>
</tr>
<tr>
<td>Ear weight/ plant</td>
<td>0.0024</td>
<td>0.0017</td>
<td>0.0318</td>
<td>-0.0036</td>
<td>0.0003</td>
<td>0.9521</td>
<td>0.0007</td>
<td>0.9550</td>
</tr>
<tr>
<td>100 grain weight</td>
<td>-0.0044</td>
<td>0.0010</td>
<td>-0.0056</td>
<td>0.0013</td>
<td>0.00002</td>
<td>-0.0169</td>
<td>(-0.0401)</td>
<td>-0.0647</td>
</tr>
<tr>
<td>Co9 × Inda9</td>
<td>(-0.0013)</td>
<td>0.0021</td>
<td>0.0056</td>
<td>0.0004</td>
<td>-0.0081</td>
<td>-0.0641</td>
<td>0.0004</td>
<td>-0.0759</td>
</tr>
<tr>
<td>Days to 50% flowering</td>
<td>0.0011</td>
<td>(-0.0023)</td>
<td>0.0013</td>
<td>0.0004</td>
<td>0.0279</td>
<td>0.0415</td>
<td>-0.0003</td>
<td>0.0456</td>
</tr>
<tr>
<td>Plant height</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-productive Tillers/Plant</td>
<td>0.0019</td>
<td>0.0007</td>
<td>(0.0041)</td>
<td>0.0044</td>
<td>-0.0184</td>
<td>0.6783</td>
<td>0.0010</td>
<td>0.6795</td>
</tr>
<tr>
<td>No. of fingers/ear</td>
<td>0.0024</td>
<td>0.0004</td>
<td>-0.0007</td>
<td>(-0.0255)</td>
<td>0.0259</td>
<td>0.2858</td>
<td>-0.0007</td>
<td>-0.2872</td>
</tr>
<tr>
<td>Finger length</td>
<td>0.0018</td>
<td>-0.0102</td>
<td>-0.0012</td>
<td>-0.0104</td>
<td>(0.0635)</td>
<td>0.1661</td>
<td>0.0002</td>
<td>0.2998</td>
</tr>
<tr>
<td>Ear weight/ plant</td>
<td>0.0029</td>
<td>-0.0010</td>
<td>0.0027</td>
<td>-0.0373</td>
<td>0.0105</td>
<td>(1.0585)</td>
<td>-0.0002</td>
<td>1.0115</td>
</tr>
<tr>
<td>100 grain weight</td>
<td>0.0013</td>
<td>-0.0017</td>
<td>-0.0011</td>
<td>-0.0050</td>
<td>-0.0027</td>
<td>0.0051</td>
<td>(-0.0038)</td>
<td>-0.0079</td>
</tr>
</tbody>
</table>

Co9 × Co13 : Co9 × Inda9

R² = 0.9986

Residual = 0.0597

R²: 0.9867

Residual = 0.1153

Figures in parentheses indicate direct effects.
Table 1(b) Direct and indirect contribution of seven characters to yield in the F2 population of the finger millet crosses Co9 x Co7 and MS 2863 x MS 2655

<table>
<thead>
<tr>
<th>Character</th>
<th>Days to 50% flowering of</th>
<th>Plant height</th>
<th>No of productive tillers/plant</th>
<th>No of fingers/ear</th>
<th>Finger length</th>
<th>Ear weight/plant</th>
<th>100 grain weight</th>
<th>Grain yield/plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co9 x Co7</td>
<td>(0.0005)</td>
<td>-0.0063</td>
<td>-0.0124</td>
<td>0.0008</td>
<td>0.0087</td>
<td>0.0533</td>
<td>0.0002</td>
<td>0.0428</td>
</tr>
<tr>
<td>Plant height</td>
<td>0.00007</td>
<td>(-0.0584)</td>
<td>-0.0026</td>
<td>0.0019</td>
<td>0.0166</td>
<td>0.1698</td>
<td>-0.0022</td>
<td>0.1271</td>
</tr>
<tr>
<td>No of productive tillers/plant</td>
<td>-0.00006</td>
<td>0.0114</td>
<td>(0.1671)</td>
<td>0.00009</td>
<td>0.0101</td>
<td>0.6556</td>
<td>-0.0001</td>
<td>0.7649</td>
</tr>
<tr>
<td>No of fingers/ear</td>
<td>0.00002</td>
<td>-0.0048</td>
<td>-0.00004</td>
<td>0.0236</td>
<td>0.0605</td>
<td>0.3116</td>
<td>-0.0004</td>
<td>0.3360</td>
</tr>
<tr>
<td>Finger length</td>
<td>0.00011</td>
<td>-0.0284</td>
<td>0.0032</td>
<td>0.0011</td>
<td>(0.0341)</td>
<td>0.2785</td>
<td>0.0023</td>
<td>0.2090</td>
</tr>
<tr>
<td>Ear weight/plant</td>
<td>0.00003</td>
<td>-0.0106</td>
<td>0.0752</td>
<td>0.0079</td>
<td>0.0101</td>
<td>(0.9339)</td>
<td>-0.0004</td>
<td>1.0160</td>
</tr>
<tr>
<td>100 grain weight</td>
<td>0.000005</td>
<td>0.0008</td>
<td>0.0010</td>
<td>-0.0007</td>
<td>0.0053</td>
<td>-0.0020</td>
<td>(0.0144)</td>
<td>-0.0903</td>
</tr>
<tr>
<td>MS 2863 x MS 2655</td>
<td>(-0.0397)</td>
<td>-0.0004</td>
<td>0.0009</td>
<td>-0.0027</td>
<td>0.0002</td>
<td>0.0504</td>
<td>0.0097</td>
<td>0.0244</td>
</tr>
<tr>
<td>Plant height</td>
<td>-0.0008</td>
<td>(-0.0228)</td>
<td>0.0160</td>
<td>0.0050</td>
<td>0.0071</td>
<td>0.3024</td>
<td>0.0160</td>
<td>0.3229</td>
</tr>
<tr>
<td>No of productive tillers/plant</td>
<td>-0.0048</td>
<td>-0.0063</td>
<td>(0.0579)</td>
<td>0.0007</td>
<td>0.0021</td>
<td>0.2808</td>
<td>0.0024</td>
<td>0.6328</td>
</tr>
<tr>
<td>No of fingers/ear</td>
<td>0.0035</td>
<td>-0.0038</td>
<td>0.0013</td>
<td>(0.0365)</td>
<td>0.0051</td>
<td>0.4502</td>
<td>-0.0208</td>
<td>0.4660</td>
</tr>
<tr>
<td>Finger length</td>
<td>-0.0004</td>
<td>-0.0088</td>
<td>0.0066</td>
<td>0.0018</td>
<td>(0.0183)</td>
<td>0.3671</td>
<td>0.0031</td>
<td>0.3944</td>
</tr>
<tr>
<td>Ear weight/plant</td>
<td>-0.0019</td>
<td>-0.0067</td>
<td>0.0326</td>
<td>0.0133</td>
<td>0.0065</td>
<td>(0.0315)</td>
<td>-0.0143</td>
<td>0.0610</td>
</tr>
<tr>
<td>100 grain weight</td>
<td>0.0049</td>
<td>0.0046</td>
<td>-0.0018</td>
<td>-0.0081</td>
<td>-0.0007</td>
<td>0.1874</td>
<td>(-0.0785)</td>
<td>0.1240</td>
</tr>
</tbody>
</table>

Co9 x Co7                | MS 2863 x MS 2655          | R² = 0.9785   | R² = 0.9976                    | Residual = 0.1466 | Residual = 0.0491 |

Figures in parentheses indicate indirect effects

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, 1939) 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 Inda9, 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 Inda9, 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 F2 generation of the four crosses showed that ear weight, number of productive tillers and finger
K 11 - A HIGH YIELDING KARUNGANNI COTTON VARIETY FOR TAMIL NADU

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ABSTRACT

A new high yielding Karunganni cotton variety, 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 varieties of Tamil Nadu. It is highly suitable for rained cultivation and also for black gram intercrop cultivation. It has recorded an average seed cotton yield of 121.8 kg/ha as compared to 93.7 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 herbaceum is a diploid desi cotton which is cultivated generally as rained in the tracts of low fertile varieties of southern Tamil Nadu. The variety K 10 released during 1985 was the ruling variety and has occupied more than 99 per cent of 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 F1s were crossed to get double cross hybrids. In the F4 population, a promising line TKA 188 was isolated from the double cross hybrid derivatives viz., 0794-1-D/118756/0794-1-D/H450. This culture was tested in station trials (ST), multilocation trials (MLT), Adaptive research trials (ART), and All India Co-ordinated Cotton Improvement Project trials (AICCIP).