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INDUCED CHANGES IN THE GENETIC ARCHITECTURE OF SOME MACROMUTANTS OF JUTE (*CORCHORUS OLITORIUS* L.)

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ABSTRACT

From a nine-parent diallel cross the nature of induced changes in the genetic architecture of five established macromutants were studied in *olitorius* jute for fibre yield, days to flower and average leaf area. The combining ability analysis revealed that each of the five mutants, although originated from the same mother cultivar, JRO-632, had different induced genetic background. Since these induced changes were not unidirectional, it may be concluded that these induced macromutants can provide a wide array of new genetic variability for breeding in a self- pollinated crop like jute.

Key words: Genetic architecture, macromutants, *Corchorus olitorius*, combining ability, graphical analysis.

A large number of induced macromutants are available in jute, most of which show lower agronomic performance and carry deleterious pleiotropic effects. These are often ignored as byproduct of induced mutation in breeding programmes [1]. Rejection of these macromutants on the basis of per se performance does not take into account their breeding potential in relation to the genetic background induced simultaneously and sometimes independently of the mutated locus [2, 3]. Genetic architecture of the five established macromutants for fibre yield, days to flower, and average leaf area have been studied in the present investigation.

MATERIALS AND METHODS

The five established macromutants, i.e., Dwarf, Ornamental, Irregularis [4], Palmate, Crinkle [5], two cultivated varieties, JRO-632 and JRO-620, one old introduction, Sudan Green, and one wild type of *Corchorus olitorius* were used in 9 x 9 diallel cross, without reciprocals. The nine parents and 36 F_1 were grown in randomized block design with three

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replications. Each treatment was sown in a 3-m long single- row plot. Observations on fibre yield and days to flower were recorded on 10 competitive plants of each treatment per replication. Average leaf area of each treatment was measured from three specific leaves of five plants per replication. The combining ability analysis was done by Griffing's Model 1, Method 2 [6].

RESULTS AND DISCUSSION

Analysis of variance for combining ability (Table 1) showed highly significant variances in general combining ability (gca) and specific combining ability (sca), indicating that both additive and nonadditive effects were important in the determination of all the three characters. The gca effects of individual parents are presented in Table 2. In the case of fibre yield, two of the four normal strains were good combiners (JRO-632 and Sudan green) and two induced mutants, Palmate and Irregularis, showed lower magnitude of positive gca effects in comparison to their parent cultivar, JRO-632. The other three mutants, i.e. Dwarf, Ornamental and Crinkle, showed negative gca effects for fibre yield. For days to flower, the mutants Dwarf, Ornamental and Palmate showed higher positive gca effects than their mother cultivar, the other two mutants, Crinkle and Irregularis, gave negative gca effects. Average leaf area of the mutants Dwarf and Crinkle had high positive gca effects in comparison to their mother cultivar JRO-632, while Ornamental, Palmate and Irregularis showed high negative values of gca effects for the same character.

Table 1. Analysis of variance of combining ability for three characters in jute

Source	d.f.	Fibre yield	Average leaf area	Days to flower
Gca	8	9.51**	244.4**	480.9**
Sca	36	4.50**	86.8**	62.0**
Error	88	1.45	33.3	10.8

**Significant at 1% level.

Table 2. Estimates of general combining ability effects for three characters in jute

Parent	Fibre yield	Average leaf area	Days to flower
JRO-632	0.71*	0.25	2.09*
JRO-620	0.33	–0.11	1.31
Dwarf	–0.27	10.50**	4.10**
Ornamental	–0.38	–2.73	5.53**
Palmate	0.02	–1.00	4.07**
Crinkle	–0.28	1.24	–3.19**
Irregularis	0.14	–6.30**	–0.37
Wild olitorius	1.86**	–3.76*	–16.20**
Sudan Green	1.59**	1.90	2.65**
SE (gi) ±	0.34	1.64	0.93

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

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