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Studies on transgressive segregation in F_2 and backcross F_2 for grain yield and its components in *rabi* sorghum [*Sorghum blcolor* (L.) Moench]

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ABSTRACT

Sorghum \ [*Sorghum bicolor* (L) Moench] is an important crop in semi-arid tropics (SAT) region because of it's ability to survive and give yield under moisture stress. India is the second largest grain producer and ranks seventh in productivity. The present study was undertaken to generate the transgressants possessing more number of desirable attributes. Experimental material consisted of four crosses *viz* SPV 1359 x SPV 1452 (Cross I), SPV 1452 x RSE 907-11 (Cross II), SPV 1359 x RSE 90-7-11 (Cross III) and RSLG 1072 x RSE 90-7-11 (Cross IV) involving four diverse parents of *rabi* sorghum. These parents and their F_2's and backcross F_2's were grown in Randomized Block Design with three replications. Parents were grown in two rows and F_2 and backcross F_2 population were grown on in twenty rows. The studies revealed that transgressive segregants were recorded in each of the four crosses for all the seven characters expect earhead breadth in F_2's and B_2 F_2 generation of cross III and cross IV, respectively. In case of grain yield per plant, the highest proportion of individuals (8.0 to 34.99 %) transgressed beyond the increasing parent, consistently in all the four crosses.

Key words : Sorghum, Backcross, Trangressive, Segregation.

INTRODUCTION

Sorghum \ (*Sorghum bicolor* (L) Moench) is an important crop in semi-arid tropics (SAT) region because of it's ability to survive and give yield under moisture stress. India is the second largest grain producer and ranks seventh in productivity. The difference between productivities of India and the first ranking country is about five times. Major reasons for this low yield are that nearly 60% of the crop area falls under submarginal agroclimatic and edaphic conditions, which is characterized by low soil fertility and recurring moisture stress.

In India *rabi* sorghum is grown in Maharashtra, Karnataka, Gujarat, Rajasthan Madhya Pradesh and Andhra Pradesh. In Maharashtra *rabi* sorghum is grown on light and medium soils where the productivity is 450 kg/ha. Which is very low as compared to national and international average.

Much needs to be done for improvement of *rabi* Sorghum. In spite of new biotechnological methods for improvement, the conventional breeding methods are still proving better. Transgressive breeding aims at isolating gene combinations (recombinants) which possesses new characters or a higher intensity of a trait. These genotypes are superior to either parents. Transgressive segregants are produced by crossing parents possessing desired traits in the required intensity, but controlled by different set of genes, tends to ensure release of transgressive segregants. A character absent in the original parents may appear in the segregating generations (Gardner, 1968). In recombination breeding contribution of desirable plus genes by each parent gives rise to transgressive segregants. It can be used as a positive tool in sorghum breeding, Hence, the present study was undertaken to generate the transgressants possessing more number of desirable attributes.

MATERIALS AND METHODS

Experimental material consisted of four crosses *viz* SPV 1359 x SPV 1452 (Cross I), SPV 1452 x RSE 907-11 (Cross II), SPV 1359 x RSE 90-7-11 (Cross III) and RSLG 1072 x RSE 90-7-11 (Cross IV) involving four diverse parents of *rabi* sorghum. These parents and their F_2's and backcross F_2's were grown in Randomized Block Design with three replications. Parents were grown in two rows and F_2 and backcross F_2 population were grown on in twenty rows. The ten competitive plants from each of the parental lines and 100 plants from each of the F_2 and backcross F_2 randomly selected and observations were recorded for 7 quantitative traits. Data collected an individual plant for seven characters were used for studying transgressive segregation. The means, standard deviations, standard error and standard variate were calculated as per the procedure given by Panse and Sukhatme (1965), while normal deviation (N.D.) value / limiting value corresponding to range of parental means at 5% probability level was calculated by following formula:

$$\text{N.D. value} = \frac{P^{-(+)} + 1.966\ P^{(+)} - x}{6}$$

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