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Research Notes

Transgressive segregation for yield and yield components in some inte and intra specific crosses of desi cotton

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Desi cottons belonging to *G. arboreum* and *G. herbaceum* though have low yield potential, their consistent fibre properties are much valued and liked in the textile industry. However, due to introduction of high yielding long stapled intra hirsutum hybrids, the area under diploid cotton has been reduced drastically throughout the country. Therefore to regain the importance of desi cotton there is an urgent need to develop high yielding desi cotton varieties possesing superior fibre properties. With this view about 70 crosses involving diploid genotypes of *G.arboreum* and *G.herbaceum* species were obtained and their segregating generations studied. However, the present study is confined to F_2 and F_3 bulks from ten inter and eight intra specific crosses that were evaluated for transgressive segregates.

The experimental material consisted of 12 diverse parents, of which Mdl 1874, 1875, 2450, 2452, 2463, 2562 and 2582 were from race indicum of *G.arboreum* and PA 141 and PA 183 from race bengalense. The other three *viz.* Suyog, Jaydhar and Raghavendra belonged to *G. herbaceum* species. The details of 18 crosses included in the study are given in Table 1. Parents and their 18 F_2 populations were sown in 1999 and the parents and F_3 populations were sown in 2000 *kharif* season in a randomized block design with three replications. The parents were grown in two row plots and the F_2's were raised in 8 rows and F_3's in 4 row plots. The row length was 4.5 m. Five competitive plants from each of the parental lines and 30 plants from each of the F_2/F_3 population were randomly selected and observations recorded for five characters. Percentage of transgressive segregation in the F_2 and F_3 generations was obtained by defining the extreme progeny as significantly transgressive segregates (*i.e.* the lines that exceeded their better parent mean and L.S.D. at 0.05 probability). Analysis a comparisons were made based on the val of individual plants. The transgressive segrega were calculated in favourable direction on

Frequency of transgressive segregates different crosses for yield and it's compone in the F_2/F_3 generation of 10 interspecific a 8 intraspecific crosses is presented in Table

The transgressive segregates are the res of accumulation of plus or favourable ge affecting yield and its contributing characte In general, interspecific crosses produced m number of transgressive segregates for numb of bolls/plant and kapas yield in both the generatio Four interspecific crosses involving Mdl 24 and 1875 with Suyog and Jaydhar exhibi higher frequency of transgressants for boll wei in F_3 generation only. For mean halolen majority of the crosses were failed to thr promising segregates except Mdl 2582 x 141 and Mdl 2450 x Raghavendra. On contrary almost all the crosses gave high number for transgressive segregates ranging fr 10 to 93 per cent in F_2 generations for character ginning outturn, while the freque of the same was reduced to almost half F_3 generation.

While four intraspecific crosses involv the parents Mdl 1874 and Mdl 2582 with P 141 and PA-183 and one interspecific cr Mdl 2463 with Suyog had failed to deve transgressive segregates for the character b weight, the remaining crosses had transgress segregates for boll weight from 2 to 5 in F_2 generation. This showed that most the parents had similar constellation of genes for boll weight. In F_3 however, M 2452 and Mdl 1875 with Jaydhar produ the highest frequency of transgressive segrega *i.e.* 44% and 37% respectively.

Table 1. Percentage of significant transgressive segregates for yield and yield components in the F_2 and F_3 generations of inter and intra specific crosses of desi cotton

No.	Crosses	Generations	No. of bolls/ plant	Kapas yield/ plant (g)	Boll weight (g)	Halo length (mm)	Ginning outturn (%)
	Mdl 1874 x PA 141	F_2	83	33	0	0	53
		F_3	64	85	9	0	0
	Mdl 1874 x PA 183	F_2	30	7	0	0	80
		F_3	72	66	2	0	40
	Mdl 1874 x Suyog	F_2	77	37	7	0	93
		F_3	75	42	0	0	82
	Mdl 2452 x PA 183	F_2	47	40	3	7	73
		F_3	73	46	3	15	27
	Mdl 2452 x Suyog	F_2	73	43	3	17	73
		F_3	66	45	26	31	50
	Mdl 2452 x Jaydhar	F_2	60	40	16	20	64
		F_3	56	58	44	27	33
	Mdl 2582 x PA 141	F_2	70	10	0	7	10
		F_3	72	46	4	76	4
	Mdl 2582 x PA 183	F_2	20	10	0	0	73
		F_3	52	48	6	3	63
	Mdl 2582 x Suyog	F_2	71	48	7	7	65
		F_3	66	68	0	36	18
10.	Mdl 2450 x PA 141	F_2	68	49	24	15	73
		F_3	62	70	4	21	11
11.	Mdl 2450 x PA 183	F_2	23	43	10	0	90
		F_3	65	58	10	26	48
12.	Mdl 2450 x Raghavendra	F_2	71	41	4	37	61
		F_3	98	97	9	83	20
13.	Mdl 2463 x PA 141	F_2	31	35	10	0	62
		F_3	65	72	3	15	30
14.	Mdl 2463 x Suyog	F_2	59	41	0	0	88
		F_3	75	68	5	7	66
15.	Mdl 1875 x Suyog	F_2	83	67	10	0	23
		F_3	89	96	36	10	5
16.	Mdl 1875 x Raghavendra	F_2	75	50	5	15	15
		F_3	90	63	5	0	0
17.	Mdl 1875 x Jaydhar	F_2	72	50	2	7	22
		F_3	58	79	37	22	0
18.	Mdl 2562 x Suyog	F_2	52	29	52	0	93
		F_3	71	21	7	0	0

Breeding for yield generally aims at recovery of transgressive segregates. All the interspecific crosses had thrown a good number of transgressive segregates for kapas yield per plant ranging from 29 to 67% in the F_2 generation. Similar trend has been repeated in F_3 generation also for this character along with number of bolls per plant.

Highest number of transgressive segregates in the F_3 generation for yield per plant was observed in the intraspecific crosses of Mdl 1874 and Mdl 2450 with the testers PA - 141 and PA-183. Amongst intraspecific crosses Mdl 2452 x PA-183 and Mdl 2450 x PA-141 were promising because in addition to yield per plant these crosses expressed transgressive segregates for important yield associated with fibre components in both the generations.

Transgressive segregates in the F_2 may arise due to dominance and dominance interactions in addition to additive x additive interaction which is fixable, due to recombination of genes with positive effects and responsible for the production of transgressive segregates in the F_3 generation. The findings, therefore, also revealed that the parents differed for many genes and introgression of genes from herbaceum germplasm lines created large amount of genetic variability for yield and fibre components in most of the crosses suggesting the scope to use this material and the crosses in future breeding programme. Similar results were also reported in lentil by Kant and Singh (1998).

The crosses which gave high frequency of transgressive segregates for yield per plant accompanied with desirable fibre properties in both the generations may be preferred over the other crosses in on-going breeding programme

Reference

Kant, L. and Singh, D.P. (1998). Transgressive segregation of yield and yield componen in lentil. *Indian J. Genet.* 58: 343-347.

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Heterosis for rooting characters in maize (*Zea mays* L.)

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Maize occupies a pride of place among coarse cereals in India. About 80 per cent of the maize belt being rain dependent, experience vagaries of weather interms of either water logging or drought. Several researchers have suggested that breeding for improved root systems in annual crops such as cereals and grain legumes could significantly improved their yield under drougth (Hurd, 1976 and Blum, 1982). Turner *et al.* (1978) stated that the variation in root growth between species determines differences in drought tolerance. Utilisation of genetic variation in improving crop varieties requires knowledge of the heritability, heterosis and genetic control of root system traits. Present study involves the estimation of heterosis for number of roots, root length and root dry weight in 15 crosses of maize hybrids.

Six outstanding maize inbreds viz. UMI 112, UMI 285, UMI 130, UMI 467, UMI 810 and UMI 90 were chosen as parents, based on grain yield with good agronomic characteristics but differing in genetic background. These lines were crossed in all possible combinations, excluding reciprocals, resulting in deriving of 15 hybrids. The root potential of the six parents and fifteen F_1 progenies were evaluated in the greenhouse