

METROGLYPH AND INDEX SCORE ANALYSIS OF MORPHOLOGICAL VARIATION IN *Gossypium arboreum* L.

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Metroglyph and index score analyses of 25 germplasm lines and 5 cultivated varieties of *Gossypium arboreum* cotton were carried out. There was a wide morphological variation followed by germplasm lines and cultivated varieties. However, seven distinct morphological groups could be distinguished, particularly on the basis of plant height and yielding ability. Within group, morphological variations were of high order. Majority of the lines were included in the group characterised by medium stature plants and medium yield. The variability pattern of the lines in fifth and sixth groups resembled that of cultivars.

Cotton is one of the most important commercial fibre crops playing a key role in the economic affairs of many countries. Several hybrids/varieties have been evolved exploiting the genetic variability in the available germplasm. The information on the nature and extent of genetic variability present in the germplasm is a prerequisite for any plant improvement programme. In the present investigation, an attempt has been made to classify a collection of 25 germplasm lines and 5 cultivars (*Gossypium arboreum* L.) into morphologically distinct complexes.

MATERIALS AND METHODS

Material for this study comprised of 25 germplasm lines and cultivated varieties of cotton. All these were grown in a randomized block design with three replications. Soil of the experimental field was medium black (vertisol). The experiment was cond-

ucted at Agricultural Research Station Mudhol during *kharif* 1985. Observations were recorded on competitive plants in each replica for yield and some of its components. Metroglyph and index score analysis were carried out as per the method suggested by Anderson (1957).

The index scores were given wherein each of the test lines were represented by open circle while cultivars CJ-73, G-6, 1875, Saraswa and PKV by solid circle. X-Coordinate for each circle represented yield per plant (g.) and Y-Coordinate for plant height (cm.). The other eight characters have represented by rays, the rays for any one character having the same position on each glyph. The class intervals for various morphological characters and the range of the characters were represented by different lengths of the ray (Tables 1 and 2):

Table 1. Index Scores

Character	Range of means	Score-1	Score-2	Score-3
		Value less than	Value from To	Value above
Plant height (cm)	55 to 112	65	65 to 80	80
Days to 50% flowering	63 to 73	65	65 to 68	68
Days to 50% boll bursting	114 to 131	120	120 to 125	125
No. of bolls/plant	5 to 11	6	6 to 10	10
No. of seeds / boll	19 to 29	21	21 to 25	25
Boll weight (g)	1.68 to 2.61	1.75	1.75 to 2.00	2.00
Yield/plant (g)	7.45 to 20.5	10.00	10.00 to 15.00	15.00
Boll length (mm)	15.4 to 27.7	20.00	20.00 to 25.00	25.00
Linting (%)	29.20 to 45.90	35.00	35.00 to 40.00	40.00
Seed index	4.45 to 7.00	5.00	5.00 to 6.00	6.00

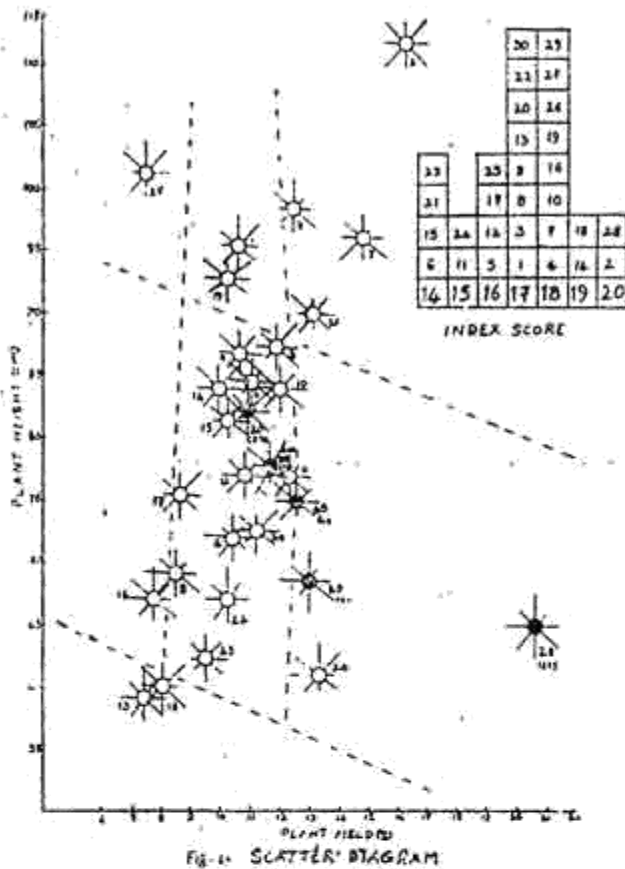
Table 2. Mean data and the score (in brackets) for different characters

Strain	Character s									
	1	2	3	4	5	6	7	8	9	10
	Days to flowering	Days to 50% flowering	Days to 50% boll bursting	No. of bolls/ plant	No. of seeds/ boll	Boll weight (g)	Halo length (mm)	Ginning (%)	Seed index	Total
AC-627	69(3)	130(3)	9(2)	21(2)	1.76(2)	21.40(2)	32(1)	5.83(2)	17	
AC-656	67(2)	129(3)	10(2)	25(2)	2.32(3)	25.60(3)	35(2)	6.38(3)	20	
AC-710	68(2)	127(3)	9(2)	25(2)	2.36(3)	19.90(1)	39(2)	6.00(2)	17	
H-3	68(2)	121(2)	9(2)	21(2)	2.08(3)	21.80(2)	38(2)	6.46(3)	18	
H-4	68(2)	118(1)	8(2)	25(2)	2.32(3)	19.45(1)	39(2)	6.11(3)	16	
H-47	66(2)	116(1)	9(2)	22(2)	1.68(1)	22.50(2)	45(3)	4.57(1)	14	
H-86	67(2)	116(1)	7(2)	22(2)	2.28(3)	25.70(3)	37(2)	6.78(3)	18	
H-122	67(2)	117(1)	7(2)	23(2)	2.20(3)	24.70(2)	43(3)	5.55(2)	17	
H-174	70(3)	119(1)	10(2)	21(2)	2.20(3)	22.40(2)	34(1)	6.55(3)	17	
H-200	68(2)	120(2)	8(2)	21(2)	2.08(3)	21.30(2)	38(2)	6.31(3)	18	
H-211	68(2)	115(1)	8(2)	23(2)	1.96(2)	21.40(2)	39(2)	5.41(2)	15	
H-260	68(2)	116(1)	8(2)	23(2)	2.32(3)	23.50(2)	36(2)	5.54(2)	16	
H-368	69(3)	121(2)	7(2)	23(2)	1.84(2)	22.10(2)	39(2)	5.10(2)	17	
H-428	68(2)	129(3)	7(2)	22(2)	2.32(3)	22.40(2)	35(2)	6.75(3)	19	
H-431	68(2)	124(2)	9(2)	20(1)	1.96(2)	23.60(2)	30(1)	5.98(2)	14	

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1	2	3	4	5	6	7	8	9	10
H-445	69(3)	124(2)	5(1)	24(2)	2.20(3)	23.80(2)	36(2)	6.04(3)	18
H-453	67(2)	130(3)	7(2)	22(2)	1.96(2)	20.00(2)	33(1)	5.70(2)	16
H-473	65(2)	128(3)	5(1)	26(3)	2.42(3)	22.50(2)	36(2)	6.19(3)	19
G-4	68(2)	127(3)	8(2)	22(2)	2.00(2)	21.30(2)	36(2)	6.04(3)	18
CJ-73	70(3)	130(3)	7(2)	24(2)	2.04(3)	19.80(1)	34(1)	5.70(2)	17
G-2	63(1)	124(2)	9(2)	19(1)	1.88(2)	22.75(2)	29(1)	6.89(3)	14
Ghost spot	69(3)	124(2)	8(2)	21(2)	2.00(2)	20.50(2)	38(2)	5.85(2)	17
B-10-24-A84	68(2)	121(2)	7(2)	25(2)	2.00(2)	19.10(1)	34(1)	5.40(2)	14
JL-60	63(1)	126(3)	7(2)	23(2)	1.84(2)	19.90(1)	36(2)	5.05(2)	15
G-6	68(2)	124(2)	8(2)	20(1)	1.80(2)	24.20(2)	36(2)	6.01(3)	16
4631 NL	70(3)	129(3)	5(1)	19(1)	1.96(2)	20.70(2)	42(3)	6.11(3)	18
Chinese spotless	70(3)	131(3)	7(2)	23(2)	1.76(2)	21.00(2)	34(1)	6.80(3)	18
1875	72(3)	116(1)	10(2)	28(3)	2.52(3)	26.60(3)	42(3)	5.55(2)	20
PKV	73(3)	115(1)	9(2)	29(3)	2.68(3)	18.05(1)	42(3)	5.65(2)	18
Saraswathi	68(2)	130(3)	7(2)	20(1)	1.92(2)	27.70(3)	33(1)	6.85(3)	17



RESULTS AND DISCUSSION

Examination of the scatter diagram (Fig. 2) revealed that seven groups could be distinguished on the basis of morphological variation. The first group was represented by dwarf and low yielding lines (13 and 18). The second and third groups consisted of only one line each (16 and 27) characterised by low yield, and medium and tall growth habit respectively. The fourth group consisted of two lines (1 and 19) of tall habit with medium yielding ability. The fifth group consisted of more than half of the total lines inclusive of two cultivars (CJ-73 and Saraswathi) which were characterised by medium growth and medium yielding potential. The sixth and

group six were medium in height, while in group seven taller lines were observed. Of the 4 lines in group six there were three cultivars. It was further noticed that with respect to plant height and plant yield, within group differences were quite high except in the groups 1 and 5. The pattern of morphological variation in the germplasm lines and the cultivars was quite different except for one or two traits.

The frequency diagram (Fig. 1 top right) shows the index score values of all the characters under study. The range of index score was from 14 to 20. Both of the extreme scores were obtained by test lines and one cultivar (1875). Maximum frequency occurred around an index score of 17 and 18.

Growth habit, flowering time, seed index and yielding potential can be used in classifying and grouping the varieties. These characters also offer valuable criteria for a systematic cataloguing of the germplasm. It was in this context that the metroglyph and index score analyses were earlier used by Kalsy *et al.* (1979), Venkat Rao *et al.* (1973), Bhargava *et al.* (1966) and Ramajam and Kumar (1964).

The results of the analysis in cotton have shown that seven distinct germplasm complexes could be recognized into which the test lines sort out themselves. This information can be utilised in hybridization pro-

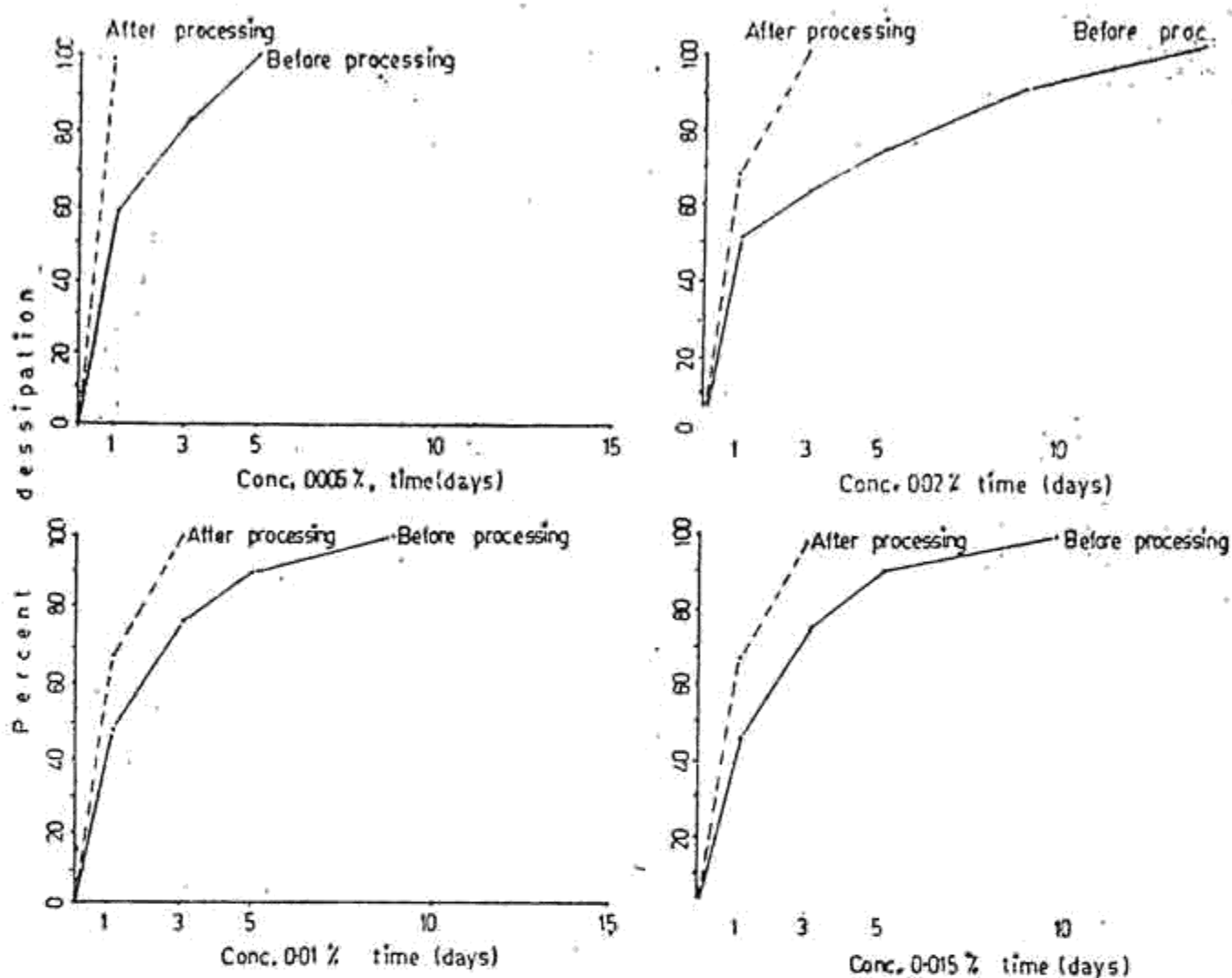


FIG. 1. RESIDUE DISSIPATION PATTERN OF FENVALERATE IN/ON BRINJAL FRUITS AT DIFFERENT CONCENTRATIONS

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