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Short Communications

Character Associations in Bidi Tobacco
(*Nicotiana tabacum* L.)

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Gujarat ranks second in the country in respect of tobacco hectarage but from production and productivity view points it ranks first. Gujarat produces about 80 per cent of the country's total bidi tobacco which is being consumed mainly by the domestic market. But very little information is available on interrelationship among morphological traits of bidi tobacco and their association with yield (Moses, 1971). The present study was therefore, undertaken to study the contribution of various morphological traits to cured leaf yield of bidi tobacco using correlation (Johnson *et al.* 1955) and path anlysis (Wright, 1921).

The experiment was conducted at the Bidi Tobacco Research Station, Gujarat Agricultural University, Anand Campus, Anand during the year 1980-81. For this purpose, 100 bidi tobacco genotypes were studied using simple lattice design; the plot size being two rows each of 10 plants spaced 90 cm × 75 cm apart. The crop cultivation was done as per the practices in vogue. The leaf number/plant, cured leaf yield (g/plant) and spangling score (O, min to 4, max) were recorded for all the plants of the plot, while plant height (cm) of four randomly selected topped plants/plot was measured. The leaf length and width (cm) of every 7th, 8th and 9th leaf from top of each of the plant used for plant height measurement was also recorded.

TABLE 1

The variability for six characters in tobacco.

Character	*Range*	*C.D. 0.05*	H^2
Plant height	50.5 to 148.5	15.6	0.88
No. of leaves per plant	17.5 to 47.5	2.5	0.94
Leaf length	39.4 to 73.0	7.7	0.56
Leaf width	12.4 to 31.3	5.0	0.59
Spangle score	0.00 to 3.63	0.78	0.81
Cured leaf yield	112.06 to 272.84	48.32	0.66

The results (Table 1) revealed that each of the six characters had significant phenotypic variability. The range of variation was wide for cured leaf yield, plant height and leaf length, while it was moderate for the remaining traits. The broadsense heritability estimates revealed high heritability for number of leaves per plant, plant height and spangle scores indicating that environment had relatively low contribution in the expression of these traits. Moderate heritability was observed for leaf length and width as well as cured leaf yield.

TABLE 2

Genotypic (r_g) and phenotypic (r_p) correlation coefficients between pairs of characters.

Character	*Correlation coefficient*	*No. of leaves per plant*	*Leaf length*	*Leaf width*	*Spangle score*	*Cured leaf yield*
Plant height	r_g	0.59**	0.13	–0.19	–0.36**	0.53**
	r_p	0.57**	0.14	–0.09	–0.31**	0.42**
No. of leaves per plant	r_g		–0.33**	–0.47**	–0.36**	0.42**
	r_p		–0.26**	–0.38**	–0.32**	0.32**
Leaf length	r_p			0.26**	–0.09	0.56**
	r_g			0.48**	–0.01	0.49**
Leaf width	r_p				–0.10	0.21*
	r_p				–0.09	0.28**
Spangle score	r_g					0.36**
	r_p					0.25**

Legend: * and** indicate significant at 5 and 1 per cent levels of significance respectively.

In general, the estimates of genotypic correlations were higher than phenotypic correlations. Such observations have been reported by Legg *et al.* (1965) and Moses (1971). Plant height had significant positive genotypic as well as phenotypic association with number of leaves per plant and cured leaf yield indicating that the curedleaf yield could be increased by increasing plant height. The significant negative genotypic and phenotypic associations observed between plant height and spangle score suggested a decrease in spangling with an increase in plant height. Probably the increase in leaf number observed with plant height caused a shedding effect on the leaf, this in turn was responsible for the significant negative association observed between the number of leaves and the spangle score as the spangles are known to be more on the leaf surface subjected to direct sun rays. Like plant height, number of leaves per

plant had also significant positive association with cured leaf yield but its genotypic as well as phenotypic associations with leaf length and width as well as spangle score was negative but significant indicating the reduction in leaf size with an increase in leaf number. This finding is akin to those observed by Legg *et al.* (1965) for leaf width and Moses (1971) for leaf length. The genotypic and phenotypic association of leaf length with leaf width and cured leaf yield was also positive and significant as observed by Moses (1971) for leaf width and Patel (1981) for cured leaf yield. Similarly, genotypic as well as phenotypic associations of leaf width with cured leaf yield was also positive and significant. The spangle score had significant but negative genotypic and phenotypic associations with cured leaf yield. The leaf number is a direct attribute of cured leaf yield. The negative association observed between spangle score and cured leaf yield is understandable as similar negative association was also observed between the number of leaves and spangle score.

TABLE 3

Direct (bold litter) and indirect effects of various characters on cured leaf yield.

Variable	*Plant height*	*No. of leaves per plant*	*Leaf length*	*Leaf width*	*Spangle score*	r_g *and* r_p *with cured leaf yield*
Plant	**0.02**	0.52	0.09	–0.08	–0.02*	0.53
height	(**0.10**)	(0.27)	(0.06)	(–0.02)	(–0.003)	(0.42)
No. of leaves	0.01	**0.89**	–0.24	–0.21	–0.02	0.42
per plant	(0.05)	(**0.48**)	(–0.12)	(–0.09)	(–0.003)	(0.32)
Leaf	0.002	–0.29	**0.74**	0.11	–0.01	0.56
length	(0.01)	(0.12)	(**0.48**)	(0.11)	(–0.001)	(0.49)
Leaf	–0.004	–0.42	0.19	**0.44**	–0.01	0.21
width	(–0.01)	(–0.18)	(0.23)	(**0.24**)	(–0.001)	(0.28)
Spangle	–0.01	–0.32	–0.06	–0.04	**0.08**	0.36
Score	(–0.03)	(–0.15)	(–0.05)	(–0.02)	(0.01)	(0.25)

Legend: Phenotypic correlation coefficients (r_p) in parenthesis.

The data (Table 3) revealed that the number of leaves per plant, leaf length and width in order of their magnitude, based on their genotypic as well as phenotypic associations were of prime importance in increasing cured leaf yield. From indirect effect view point also, these three traits were of prime importance for the improvement of cured leaf yield. It is quite interesting that though the genotypic as well as phenotypic associations of plant height with

cured leaf yield were highly significant and positive, their direct as well as indirect contribution to cured leaf yield were very negligible. Similarly the direct as well as indirect contribution of spangle score to yield was also negligible suggesting that high yielding varieties with good spangling could be developed without any difficulty. The findings revealed that the breeder should give prime emphasis on selecting plants having more number of leaves for breeding high yielding bidi tobacco cultivars. The second and third order of selection pressure should be for leaf length and width respectively.

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