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Yield Response of Indigineously Evolved Upland Cotton Genotypes for Various Traits in National Coordinated Varietal Trails (NCVT) Under Multan Conditions

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Abstract: Studies were conducted at Central Cotton Research Institute, Multan, to exploit the yield response of five newly evolved cotton genotypes. The highest seed cotton yield was noted in CIM-435 followed by BH-118. The longest staple length was found by genotype CIM-435. MNH-554 was at the top in respect of ginning out turn percentage, followed by CIM-435. The boll weight was highest in CIM-435.The highest numbers of bolls/plant were found in BH-118. DNH-49 had the shortest plant height followed by CIM-435, which is quite desirable. It is suggested that the newly evolved genotype CIM-435 is the best, among all the genotypes tested.

Key words: Yield, response, upland cotton, NCVT, Multan conditions

Introduction

Cotton is one of the most important economic, fibre and oilseed crop in the world. It is a cash crop of Pakistan which adds to the economy with annual production of 136739.60 millions rupees by exporting cotton lint, thread, yarn and waste, (Agricultural Statistics of Pakistan, 1999-00) along with the labor opportunities for the rural and urban population of our country. Cotton is a very sensitive crop, and a genotype which gives highest yield in one climatic condition or year, may become less productive or sub-standard at other location or year. Therefore, it is a challenge for our breeders to evolve such genotypes which could retained its stability in different environments /years for seed cotton yield, number of bolls /plant, boll weight, ginning out turn percentage and staple length.

World wide, many scientists have done a lot of research on the above subject, in which the works of some prominent scientists are discussed below. Shad *et al.* (1996) noted highly significant differences for staple length among the genotypes. Baluch *et al.* (1993) Studied that seed cotton yield and staple length is mostly affected by seasonal factors (years). Soomro (1994) and Geng *et al.* (1987) studied that staple length was mostly influenced by genotypes than years. Soomro *et al.* (1986) reported significant differences in yield, ginning out turn percentage and staple length for varieties, locations and years. Meredith (1984) reported highly significant seasonal effects on staple length, genotypes and years interaction. Ahmad *et al.* (1982) obtained highly significant differences in yield of upland cotton due to varieties, locations and yield components. Gupta and Katiyar (1980) reported significant differences in yield of upland cotton due to genotypes, environment and their interactions. Soomro and Memon (1979) studied the effects of site and season (year) on the yield and GOT percentage in desi cotton. They inferred highly significant variation in yield and GOT due to varieties only. Sharif and Ahmad (1978) studied that there are two major factors for determining the yield of any crop species, (a) genetic makeup (b) environmental factors and their interactions. Singh *et al.* (1973) has reported that significant differences in raw cotton yield for American cotton was due to varieties. Afzal (1971) emphasized that variety, and climatic conditions play a part in determining the yield of cotton crop.

Materials and Methods

Two years research experiments were conducted at Central Cotton Research Institute Multan, during the cotton crop season, 1998-99, and 1999-00. To find out the genotypes having desirable fibre and yield characters in five newly evolved cotton genotypes, viz., CIM-435 of Central Cotton Research Institute (CCRI) Multan, MNH-554 and MNH-552 of Cotton Research Station Multan, BH-118 of Cotton Research Station Bahawalpure, and DNH-49 of Cotton Research Station Dera Ismail Khan. The crops were sown on 31st of May, during both the years 1999-00 (Y_1) and 2000-01 (Y_2), in Randomized Complete Block Design, having row to row and plant to plant Distance of 30 and 12 inches, respectively. Normal agronomic practices, i.e., fertilizer application, weeding, irrigation, and plant protection measures were adopted as and when required. Ten consecutive plants from each repeat of each genotype were selected for recording the data to search out the desirable genotypes. Data were recorded on the following parameters i.e.,

a Plant height ((cm)
b No. of bolls
c Boll weights (g)
d Ginning out turn (%)
e Staple length (mm)
f Seed cotton yield (kg/ha)

The data thus obtained were statistically analyzed using MSTATC software package, a microcomputer program for design management and Analysis of agronomic research experiments.

Results and Discussions

Significant variations were observed in years (Table 1) for plant height, and seed cotton yield, and the present research finding are in agreement with the research work of Baluch *et al.*, 1993, Geng *et al.*, 1987, Soomoro *et al.*, 1986, Meredith, 1984 ; Afzal, 1971. While non-significant differences were noted for Ginning out turn percentage staple length boll weight and number of bolls, which are in conformity with the research work of Soomro and Memon, 1979. There also existed significant variations among the genotypes (Table 1) for all the characters i.e. plant height, number of bolls per plant, boll weight, ginning out turn percentage staple length and seed cotton yield (Table 2). The research work is in agreement with the research finding of Shad *et al.*, 1996; Soomro *et al.*, 1986; Ahmad *et al.*, 1982; Soomro and Memen 1979; Sharif and Ahmad 1978; Singh *et al.*, 1973; Afzal, 1971. Significant genotype x year interaction was observed (Table 1) in boll weight ginning out turn percentage, staple length and seed cotton yield. Whereas non-significant interactions were noted in plant height and number of bolls/plant. The significance of genotypes x years interaction indicates the genotypes performed differently over the years. The present research work is in agreement with the experimental research of Soomro *et al.* (1984) and Sharif and Ahmad (1978).

The mean performance of genotypes are presented in Table 2, suggesting that the genotype CIM-435 gave significantly the higher seed cotton yield (3470.75 kg/ ha) against the other testing genotypes. Whereas genotype BH-118 ranked next in order by giving 3227.88 kg/ha and the lowest yielded was DNH-49 (1958.00 kg/ha). The longest staple length was recorded for genotype CIM-435 (27.50 mm) and the shortest was noted for genotype

Table 1: Mean squares from combined analysis of variances for various characters in cotton genotypes tested over two years at CCRI, Multan during 1998-99 to 1999-2000.

Source of Variation	d.f.	Mean Squares					
		Plant height	No. of bolls	Boll weight	GOT	Staple length	Seed cotton yield
Location (year)	1	11115.63**	275.63	0.002	0.34	0.01	016137155.60**
Error-1	6	85.53	99.16	0.01	0.24	0.32	6307.45
Factor A	4	2413.75**	619.73**	1.90**	48.07**	6.87**	2740818.59**
(variety) LA	4	4149.00	98.75	0.05*	0.66**	1.66**	76167.16**
Error-2	24	124.53	40.72	0.01	0.16	0.31	6832.49

Significant at 1 and 5 % levels of probability, respectively.

Table 2: Average performance of newly evolved cotton genotypes tested over two years at Central Cotton Research Institute Multan, during 1998-99 to 1999-2000.

Varieties	Characters					
	Plant height	No. of bolls	Boll weight	GOT	Staple length	Seed cotton yield
CIM-435	143.50	24.75	4.21	39.00	27.50	3470.75
MNH-554	160.00	32.00	3.53	39.41	25.90	2750.75
BH-118	144.25	42.00	3.08	35.89	25.63	3273.88
MNH-552	149.50	41.63	3.09	38.08	25.10	2890.88
DNH-49	113.38	23.75	3.14	33.54	25.50	1958.00
LSD. (0.05%)	11.52%	6.59%	0.12%	0.41%	0.57%	85.30%

MNH-552 (25.10 mm). While incase of ginning out turn percentage the highest ginning out turn percentage was recorded for genotype MNH-554 (39.41 %), followed by CIM-435 (39.00 %) and the bottom position was again retained by DNH-49 (33.54 %). The maximum boll weight was noted or genotype CIM-435 (4.21g) and the lowest were recorded for BH-118 (3.08 g). In respect of number of bolls/plant the highest number of bolls/plant were found in genotype BH-118 i.e. 42.00 and the lowest number of bolls/plant were recorded in genotype DNH-49 (23.75). The desirable plant height was noted for genotype DNH-49 (113.8 cm) followed by genotype CIM-435 i.e., 143.50 cm. In light of the above discussion genotype CIM-435 surpass all the four genotypes in various parameters, and it is proved that the genotype CIM-435 is the best among all the genotypes tested.

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