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Performances of Newly Developed Cotton Strains For Economic and Fibre Traits in National Coordinated Varietal Trials

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To find out the responses of new cotton, strains were conducted at Central Cotton Research Institute, Multan along with a commercial variety NIAB - 78. The highest seed cotton yield was noted in CIM - 443 followed by CIM - 435. The longest staple length was noted in strain CIM - 435 followed by CIM - 443. The strain CIM - 443 was significantly better in ginning outturn percentage and number of bolls/plant followed by CIM - 435. The boll weight was the highest in CIM - 435. The newly developed strain CIM - 443 showed the best characteristics, among all the tested strains.

Key words: Genotypes, Response, *Gossypium hirsutum* L. NCVT.

Introduction

Cotton, which is called as 6F plant, i.e. utilized as food, feed, fibre, fuel, fodder and fertilizer, worldwidely. In Pakistan, cotton adds to our economy with annual production of worth 136739.60 millions rupees by exporting various products and byproducts of cotton, (Agricultural Statistics of Pakistan 1999 - 2000) along with the labour opportunities for the rural and urban population of our country.

Cotton is a very sensitive crop, and a strain, which is high yielder in one location or year, may become poor yielder at other location or year. Therefore, it is a challenge for breeders to evolve such strains which could retain stability in different environment/years for seed cotton yield, number of bolls, boll weight, ginning outturn percentage and staple length.

A lot of research works were conducted on the above parameters, from which the works of some prominent scientists are shown below. Afzal *et al* (2002) searched out significant differences in years for plant height and seedcotton yield, while non-significant differences in number of bolls per plant and boll weight. For genotypes, the variations were significant in all the characters studied i.e. number of bolls per plant, boll weight, plant height and seedcotton yield. The environment x genotype interactions were also significant for boll weight and seedcotton yield. Afzal *et al* (2001) concluded highly significant variations among years, genotypes and year x genotypes interaction for plant height, number of bolls/plant, and seedcotton yield. Hanif *et al* (2001) searched out significant differences among years (environment), varieties (genotypes) and their interaction in four newly developed genotypes and one commercial variety i.e. Karishma. Baluch (2001) studied that there are significant differences among various genotypes/strains for boll weight, ginning outturn percentage, staple length and seed cotton yield. Shad *et al* (1996) noted highly significant differences for staple length among the strains. Ahmad *et al* (1993) studied that seed cotton yield and staple length are mostly affected by environmental factors (years). Geng *et al* (1987) and Soomro (1994) studied that staple length was mostly influenced by strains than years. Soomro *et al* (1986) reported significant differences in yield, ginning outturn percentage (GOT) and staple length for varieties, locations and years. Meredith (1984) reported highly significant seasonal effects on staple length, strains 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 strains, environment and their interactions. Soomro and Memon (1979) reported that the effect of site and season (year) on the yield and GOT percentage in desi cotton were 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) reported that significant differences in raw cotton yield for American cotton was due to varieties.

Thus the present research is conducted to find out the strains having desirable fibre characters among the tested strains.

Materials and Methods

The experiments were conducted for two years at Central Cotton Research Institute Multan, during the cotton growing season, 1997 - 1998 and 1998 - 1999. In order to find out the strains, having desirable yield and fibre characters in five newly

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Table 1

Mean squares from combined analysis of variances for various characters in cotton strains tested over two years at CCRI, Multan during 1997-1998 to 1998-1999

Source of variation	D.F.	Mean squares				
		No. of bolls	Boll weight (g)	GOT (%)	Staple length (mm)	Seed cotton yield (kg/ha)
year	1	1.67	3.22**	0.17	44.55**	148603.00
Factor A (variety)	4	308.43**	3.78**	41.76**	33.19**	2677377.00**
LA	4	36.55**	0.24**	6.53**	0.67**	650727.00**
Error	24	3.48	0.02	0.19	0.17	22001.00

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

Table 2

Average economic and fibre traits performance of newly evolved cotton strains tested over two years at Central Cotton Research Institute Multan, during 1997 - 1998 to 1998 - 1999

S. No.	Strain/ variety	Characters				
		No. of bolls	Boll weight (g)	GOT (%)	Staple length (mm)	Seed cotton yield (kg/ha)
1	CIM - 435	26.70	4.34	37.55	28.13	2896
2	CIM - 443	36.00	3.28	37.98	26.43	3036
3	BH - 95	26.10	3.85	36.43	25.72	2491
4	CRIS - 19	23.10	2.98	32.84	24.05	2144
5	CRIS - 82	21.80	2.70	33.92	22.94	1912
6	NIAB - 78	20.70	3.04	35.06	25.08	1784
	LSD. (0.05%)	1.69	0.13	0.39	0.37	134

developed cotton strains, i. e. CIM - 435 and CIM - 443 of Central Cotton Research Institute (CCRI) Multan, BH - 95 of Cotton Research Station Bahawalpure, CRIS - 19 and CRIS - 82 of Cotton Research Institute Sakrand against a commercial variety NIAB - 78 of National Institute for Agriculture and Biology Faisalabad. The crops were sown on 1st June, during 1997 - 1998 (Y_1), and 31st May during 1998 -1999 (Y_2), with five replications, in randomized complete block design, having row to row and plant to plant distances of 75 and 30cm, respectively. Normal agronomic practices, i.e. fertilizer application, weeding, irrigation, and plant protection measures were adopted as and when required. Ten randomly selected plants from each replication of each strain were selected for recording the data. Data were recorded on the following parameters. Number of bolls/plant, boll weights (g), ginning outturn (%), staple length (mm), and seed cotton yield (kg/ha).

The data obtained were statistically analyzed by using MSTATC, a computer software package Bricker (1991).

Results and Discussion

Significant variations were observed in years (Table 1) for boll weight, and staple length, which showed that different years affected boll weight and staple length of the cotton crop differently. Thus the present research findings are in agreement with the research work of Ahmad *et al* (1993), Hanif *et al* (2001), Meredith (1984), Soomro *et al* (1986) and in contrast with the results of Afzal *et al* (2002), Geng *et al* (1987) and Soomro (1994). While non-significant differences were noted for number of bolls per plant, ginning outturn percentage and seed cotton yield, which are in conformity with the result of Afzal *et al* (2001), Singh *et al* (1973), Soomro and Memon (1979).

There also existed significant variations among the strains (Table 1) for all the characters i.e. number of bolls per plant, boll weight, ginning outturn percentage, staple length and seed cotton yield (Table 2). The research work is in agreement with the research finding of Afzal *et al* (2001), Afzal *et al* (2002), Ahmad *et al* (1982), Baluch *et al* (2001), Geng *et al* (1987), Hanif *et al* (2001), Shad *et al* (1996), Sharif and Ahmad (1978), Singh *et al* (1973), Soomro and Memon (1979), Soomro *et al* (1986) and Soomro (1994).

Significant strain x year interactions were observed (Table 1) in all the characteristics i.e. number of bolls/plant, boll weight, ginning outturn percentage, staple length and seed cotton

yield. The significance of strains x years interaction indicated that the strains performed differently over the years. The present research work is in agreement with the experimental research of Afzal *et al* (2001), Afzal *et al* (2002), Hanif *et al* (2001), Sharif and Ahmad (1978) and Soomro *et al* (1984).

The average performance of strains are presented in Table 2, suggesting that the strain CIM - 443 gave significantly higher seed cotton yield (3036 kg/ha) against the other testing strains. Where strain CIM - 435 ranked next in order by giving 2896 kg/ha and the lowest yielder was NIAB - 78 (1784 kg/ha). The longest staple length was recorded for strain CIM - 435 (28.1mm) followed by CIM - 443 (26.4mm) and the shortest was noted for strain CRIS - 82 (22.9mm). While in case of ginning outturn percentage, the highest ginning outturn percentage was recorded for strain CIM - 443 (37.98%), followed by CIM - 435 (37.55%) and the bottom position was again retained by CRIS - 19 (32.84%). In respect of boll weight, the heaviest boll weight was noted for strain CIM - 435 (4.3g) and the lesser boll weight, were recorded for CRIS - 82 (2.7g). The highest number of bolls/plant were found in strain CIM-443 i.e. 36.0 followed by CIM - 435 (26.7) and the lowest number of bolls/plant were recorded in strain NIAB - 78 (20.7).

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