

## Performance of Different Upland Cotton Varieties under the Climatic Condition of Central Zone of Sindh

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**Abstract:** Cotton is the backbone of agro-based Pakistan's economy. Mostly foreign exchange linked with cotton production. An experiment was conducted in the Central Cotton Research Institute Sakrand Sindh to determine the best suited cultivar in its climatic zone. Analysis of Variance showed that commercial cultivars were significantly varied from each other for seedcotton yield and other recorded characters. The cultivar CRIS-342 produced highest (3134.7 Kg) seed cotton yield per hectare. The maximum ginning out turn (40.26%) was observed for the cultivar CIM-534 and the highest boll weight (3.63g) was observed for the cultivar BH-160.

**Key words:** *Gossypium hirsutum* • Climatic Zone • Production • Cotton • GOT%

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### INTRODUCTION

Pakistan is a basically an agro-based country therefore the importance of its agricultural development and achievement can hardly be over emphasized. More over Pakistan's agricultural economy is highly dependent upon the cotton crop both has source of cash for the rural masses and has a foreign exchange earner and contributes 60% of the exports earning to the national exchange efforts therefore needed to rise per hectare yield through the adoption of modern production technologies and high yielding varieties. In Pakistan during 2013-14, it was cultivated on an area of 2806 thousand hectares with the production of 12.8 million bales [1]. Punjab and Sindh are the leading province in cotton production, where. To find out the best performance of a cultivar, a test for its adoptability and various growth characteristics is imperative [2]. Selection based on yield components may help to identify and develop lines having improved and more stable yield [3].

Sindh province basically divided into three zone according to the climate condition i.e. lower zone, central zone and upper zone. Sakrand district Benzirabad situated in the central zone and climatic condition very much favorable for the cotton cultivation

The main objective of the study was to determine the best commercial upland cotton cultivar which produce highest seedcotton yield under this climatic condition. Such study can be instrumental in producing the genotypes those are favorable in seed cotton yield enhancement and other characters.

### MATERIALS AND METHODS

An experiment was conducted in randomized complete block design at the Central Cotton Research Institute Sakrand Sindh Pakistan during 2014 using ten commercial upland cotton cultivars (Table 1) (CRIS-342, Sadori, Hari dost, Shahbaz, CIM-499, CIM-506, MNH-786, CIM-534, BH-160 and BH-167) for assessing the yield potential and other parameters in the agro-climatic condition of the central zone of Sindh. The seeds were planted on the ridges 75 cm apart with 30 cm plant to plant distance. Thinning, irrigation, weedicide, insecticide fertilizers and other agronomic practices were done uniformly for all the replications. The data on five quantitative traits were recorded using ten randomly selected competitive plants from each replication. The characters under studies were plant height, number of bolls per plant, boll weight, ginning outturn (GOT%),

Table 1: Details of the cultivars used in the experiment during 2014

Cultivars	Source (Cultivar Evolved)
CRIS-342	Central Cotton Research Institute Sakrand, Sindh
Sadori	Agricultural Research Institute, Tandojam, Sindh
Hari Dost	Agricultural Research Institute, Tandojam, Sindh
Shahbaz	Agricultural Research Institute, Tandojam, Sindh
CIM-499	Central Cotton Research Institute Multan, Punjab
CIM-506	Central Cotton Research Institute Multan, Punjab
MNH-786	Cotton Research Station Multan, Punjab
CIM-534	Central Cotton Research Institute Sakrand, Sindh
BH-160	Cotton Research Station Bahawalpur, Punjab
BH-167	Cotton Research Station Bahawalpur, Punjab

seed cotton yield per hectare. The significance of the genotypes was tested by using method derived by the Steel and Torrie [4] and the comparison of means was tested by Duncun Multiple Range Test at 5% using computer soft ware.

## RESULTS AND DISCUSSION

Analysis of variance of different traits viz, plant height, number of bolls per plant, boll weight, ginning out turn (GOT %) and seed cotton yield per hectare is presented in Tables 2 and 3 all traits showed highly significant ( $P \leq 0.01$ ) differences among the genotypes.

**Plant Height:** The response of the cultivars to the plant height was found highly significant (Table 3). Short stature cultivar is a desirable character due to lodging

problem and easy to picking. The lowest plant height was observed in BH-160 (122.67cm) followed by the Shahbaz (124.0cm) and CIM-499 (124.33cm). However, the highest plant height was attained by the MNH-786 (147.67cm) followed the BH-167 (146.0cm) and Hari Dost (144.0cm). The range of the plant height was observed from 122.67cm (BH-160) to the 147.67cm (MNH-786) and it is statistically at par from each other. These results of variation are confirmed by the Sharma and Sharma [5], who also found significant differences among the cotton genotypes for the plant height.

**Number of Bolls per Plant:** Different cultivars response to the number of bolls per plant was observed highly significant (Table 2). The lowest number of bolls per plant was observed for Sadori (22.23) and BH-167 (23.36). The highest number of bolls per plant was observed for the cultivar CRIS-342 (35.30) followed by the MNH-786 (29.96) and Haridost (29.36). The range of number of bolls per plant was from 22.23 (Sadori) to the 35.30 (CRIS-342) and statistical analysis showed that this range is statistical at par from each other. These results were according to the observation of the Masood *et al.* [6], who also observed the variation in cotton cultivars for the number of bolls per plant.

**Boll Weight:** The analysis of variance (Table 2) indicated that all cultivars were highly significant ( $P \leq 0.01$ ) for the trait boll weight. Cultivar BH-160 showed highest boll weight (3.63g) followed by the BH-167 (3.34g) and lowest

Table 2: Comparison of Means for the performance of the cultivars for yield and other characters:

Cultivars	Plant height	Number of bolls per plant	Boll weight	GOT%	Seed yield per hectare
CRIS-342	126.00 e	35.30 a	2.83 g	37.63 bc	3134.7 a
Sadori	132.00 d	22.23 i	3.24 c	37.43 bc	1930.3 f
Hari Dost	144.00 b	29.36 c	3.15 d	38.30 ab	2469.7 c
Shahbaz	124.00 ef	26.46 e	2.88 fg	36.60 bcd	2326.0 d
CIM-499	124.33 ef	28.13 d	2.74 h	35.60 cd	2486.7 b
CIM-506	139.00 c	25.23 g	3.15 cd	36.63 bcd	2170.3 e
MNH-786	147.67 a	29.96 b	2.98 e	37.73 bc	2494.3 b
CIM-534	125.33 e	28.13 d	2.96 ef	40.26 a	2461.3 c
BH-160	122.67 f	26.10 g	3.63 a	36.46 bcd	2185.0 e
BH-167	146.00 ab	23.36 h	3.34 b	34.93 d	1924.0 f

Table 3: ANOVA results for the seed cotton yield per hectares and other Traits

Source of Variation	Degree of freedom	Plant height	Number of bolls per plant	Boll weight	GOT%	Seed Yield per hectare
Replications	2	0.700	0.091	0.002	1.450	60.00
Genotypes	9**	304.26**	41.38**	0.21**	6.68**	36.62**
Error	18	1.404	0.019	0.002	1.574	80.0

boll weight was observed for CIM-499 (2.74g) followed by the CRIS-342 (2.83g) and Shahbaz (2.88 g). The range of the boll weight was in between from 2.74g (CIM-499) to 3.63g (BH-160). The statistical analysis showed that these cultivars were statistically at par from each other for this trait. These results were totally according to the observation of the Khan *et al.*, [7] and Larik *et al.*, [8].

**Ginning Out Turn (GOT %):** The Analysis of variance (Table 3) indicated that all cultivars were highly significant ( $P \leq 0.01$ ) for the trait ginning out turn. Cultivar CIM-534 showed highest ginning out turn (40.26%) followed by the Hari Dost (38.30%) and lowest ginning out turn was observed for BH-167 (34.93%) followed by the CIM-499 (35.60%) and BH-160 (36.46%). The range of the ginning out turn was in between from 34.93% (BH-167) to 40.26% (CIM-534). The statistical analysis showed that these cultivars were statistically at par from each other for this trait. These results were totally according to the observation of the Iqbal *et al.* [9].

**Seed Cotton Yield per Hectare:** All cultivars showed the highly significant ( $P \leq 0.01$ ) differences for the seed cotton yield per hectare (Tables 2 and 3). The maximum seed cotton yield per hectare was observed for the cultivar CRIS-342 (3134.7 Kg) followed by the MNH-786 (2494.3 Kg), while the lowest seed cotton yield per hectare was observed for the MNH-167 (1924.0 Kg) and Sadori (1930.3 Kg) and these cultivar statistically at par from CRIS-342. Similar results were also reported by the Latif *et al.* [10].

## CONCLUSION AND RECOMMENDATIONS

From the results it is concluded that the cultivar CRIS-342 and MNH-786 has a best genetic potential to perform better and hence it is recommended that these cultivars are best suited to cultivate in the central cotton zone of Sindh, Pakistan.

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