

Comparative agronomic evaluation of different cotton varieties under desert climate

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Abstract. Different cotton varieties were evaluated on the basis of their agronomic performance at Bahawalpur, a desert region of Pakistan. Significant difference among varieties for plant height, number of leaves, number of opened bolls, boll weight and seed cotton yield was found. Boll weight was maximum for NIAB-111(3.31g), while CIM-496 had higher plant height, number of leaves, number of opened bolls and seed cotton yield as compared to other varieties. Similarly cotton varieties CIM-496, NIAB-111, BH-160 and CIM-534 were statistically better yielder giving 124.50g, 114.8g, 99.62g and 98.63g seed cotton yield per plant respectively as compared to CIM-507 (77.00g/plant) and CIM-506 (67.72g/plant) varieties. Therefore the better yielding varieties are recommended to be grown desert region.

Key Words: agronomic traits, *Gossypium hirsutum*, yield.

Introduction. Cotton (*Gossypium hirsutum* L.) is the most important cash and fiber crop and plays an important role in economy of Pakistan, not only by providing the raw material to the entire textile industry but also earning valuable foreign exchange which is needed for the development of the country (Memon et al 2007). But in Pakistan the yield is low as compared to other major cotton growing countries of the world.

Though a number of new cotton varieties are being introduced for general cultivation, yet their performance need to be evaluated in different cotton growing regions. Muhammad (2001) reported variability among various genotypes of cotton for environmental adaptability for yield, lint percentage and fiber quality. Moser et al (2000) noted variation in lint percentage, boll weight and maturity in different cotton strains. Ji et al (2000) characterized the high yielder varieties as strong boll setting capability (over 40%), medium boll weight (4-4.5g) and high lint percentage (over 40%). Similarly, Kalsy & Grag (1989) observed that yield has direct correlation with boll number. Tuteja et al (2006) in their detailed investigation about the different characters towards the seed cotton yield, revealed that plant height and number of bolls per plant exhibited significant positive association with seed cotton yield.

No study has been reported about comparison of agronomic traits of different cotton varieties in Bahawalpur area that comes under arid and semi arid climate. Keeping in view the importance of high yielding varieties in bridging the gap, the present investigation was undertaken employing six varieties for their agronomic performance. This study will be helpful in future programs for cotton improvement with special reference to agronomic traits.

Material and Method. The study was conducted during cotton season 2008-2009 at the farm area of College of Agriculture & Environmental Sciences, The Islamia University of Bahawalpur. Six cotton varieties i.e., CIM-506, CIM-507, CIM-534, NIAB-111, CIM-496 and BH-160 were tested for their yield. The experiment was Randomized Complete Block with four replications. Sowing was done on May 3rd, 2008. The size of plot was 4.5m x

7.6m for each treatment while row to row and plant to plant spacing was 2.5ft and 1.0ft respectively. All cultural practices were implemented in standard fashion. Data regarding plant height, number of leaves, number of opened bolls and boll weight from ten plants per plot in each replication were recorded and their mean values were calculated. Similarly, average seed cotton yield was recorded for each variety and a software program M Stat-C was used for statistical analysis of the data.

Results and Discussion. Data for yield components of different varieties are given in Table 1.

Table 1

Comparison of different cotton varieties

	Plant height (cm)	Number of leaves	Number of opened bolls	Boll weight (g)	Seed cotton yield
CIM-506	111.1C	51BC	24B	2.78AB	67.72C
CIM-507	98.22BC	42BC	27B	3.07A	77.00C
CIM-534	122.3B	35C	32B	3.03A	98.63ABC
NIAB-111	115.7BC	85A	38AB	3.31A	114.8AB
CIM-496	156.9A	90A	47A	2.59AB	124.50A
BH-160	124.1B	67AB	37AB	2.08B	99.62ABC
*Cd	9.104	29.21	12.41	0.6692	36.96

Means sharing similar letters are non significantly different at 0.05 % level of probability.

*Cd = Critical difference.

1. Plant Height. Variety CIM-496 had highest plant height (156.9cm) followed by statistically different variety BH-160 (124.1cm) and CIM-534 which had non significantly different plant height from each other. NIAB-111 and CIM-507 were next to them in plant height and statistically same heights (Table 1). Our results are in conformity with those of Hassan et al (2006) who studied 24 cotton strains for yield and quality parameters and CIM-506 and NIAB-98 were reported as short stature varieties.

2. Number of Leaves. Average number of leaves was 90 in CIM-496 followed by NIAB-111 having 85 leaves. Both the varieties had non-significantly different number of leaves. The lowest number of leaves was recorded in variety CIM-534. Leaves being the photosynthetic parts have a vital role in yield.

3. Number of Opened Bolls. CIM 496 produced maximum 47 number of opened bolls followed by NIAB-111 (38) and BH-160 (37) which did not have statistically different number of opened bolls. The lowest number of opened bolls was produced by CIM-506 (24). Our results are in accordance with the findings of Afiah & Ghoneim (1999) who concluded that highest yield is directly correlated with the higher number of bolls per plant and boll weight. Earlier Kalsy & Grag (1989) had similar findings. Results are also in accordance with the findings of Hassan et al (2006). They showed that BH-160 found to be second boll bearing variety with 50.97 per plant average bolls.

4. Boll Weight. The average boll weight (g) of NIAB-111 was maximum of 3.31g followed by CIM-507 and CIM-534 which had non significant difference in boll weight. CIM-506 and CIM-496 were statistically similar with average boll weight 2.78g and 2.59g respectively. Earlier, Iqbal et al (2006) revealed that node of first fruiting branch, monopodial branches per plant, boll number and boll weight had maximum direct positive effect on seed cotton yield.

5. Seed Cotton Yield. Variety CIM-496 produced maximum average seed cotton yield (124.50g). It was followed by NIAB-111 with 114.8g seed cotton yield. Varieties BH-160 and CIM-534 had statistically similar but lower yield than that of CIM-496. Lowest seed cotton yield was obtained from CIM-507 and CIM-506 with 77.00g and 67.72g seed cotton yields respectively.

Our results are again in conformity with the findings of Hassan et al (2006) showing that NIAB-111, NIAB-98 and NIAB-999 were significantly high fruit bearing varieties at 90 days completing 59.54, 48.26, 46.00% fruiting respectively. Sharna (2004) found that seed cotton yield had positive correlation with dry matter produced at harvest, boll weight, bolls per plant, boll setting and seed index.

Conclusion. The better yielding cotton varieties i.e., CIM-496, NIAB-111 and BH-160 are strongly recommended to be grown at the desert climate of Bahawalpur, Pakistan.

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