J. Agrofor. Environ. 3 (2): 179-181, 2010 ISSN 1995-6983

Screening of some cotton varieties on the basis of yield attributing characters

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Abstract: The experiment was conducted at 4 (four) cotton research farms, located in Rangpur, Dinajpur, Jessore and Gazipur district during the season 2007-08 to evaluate the yield contributing parameters and yield of ten cotton variety. The experiment was set up in Randomized Complete Block Design (RCBD) with 3 replications. Cotton varieties were encoded as BC-040, BC -044, BC-0405, BC-0406, BC-037, BC0303 and SR-12 and two crossed materials of CDB encoded JA/2000/054 and JA/2000/526. CB-9 was taken as local control. Significant difference was found among the treatments for different agronomic and yield contributing parameters at different locations. Combination of four location's data showed that seed cotton yield as well as yield contributing parameters like number of vegetative branches per plant, node number of first sympodia, number of primary fruiting branches per plant, number of secondary fruiting branches per plant, days to first boll split, plant height at harvest, number of bolls per plant, single boll weight were affected by different treatments. The highest amount of seed cotton was produced by BC-0406 (2342kg/ha) followed by JA/2000/526 (2121kg/ha) and BC-0303 (2023kg/ha).These three line performed well in all location which indicates their wide adaptability and moderately high GOT%.

Key words: Cotton, seed cotton, boll, yield, GOT%.

Introduction

Cotton, the "White Gold" is one of the most important commercial fibre crops. It plays a prominent role in the national and international economy. Its world current market share is 56 percent for all fibres used for apparel and home furnishing. Another contribution is attributed to nonwoven textiles and personal care items. World textile fibre consumption in 1998 was approximately 45 million tons. Of this total, cotton represented approximately 20 million tons (Shaw, 1998). In spite of severe competition with synthetic fibres, cotton continues to enjoy a place of prime importance in the textile industry. In recent years, cotton apparels are being preferred to the synthetic ones due to increasing health consciousness among the people (Kairon *et al*., 2002). Bangladesh produces 2400 (Mt) seed cotton and 5990 Hectogram/hectare (Hg/ha) yield of seed cotton among the SAARC countries (Statistical Bulletin of SAARC Agricultural Data, 2003). Cotton crop of Bangladesh received impetus in 1977 under comprehensive cotton development program of the Cotton Development Board. At he period of 1994 to 1999 cotton cultivation was popular but after the year 2000 the extension of cotton cultivation showed descending trend due to lack of high yielding and short durated variety (CDB). To improve this situation, this experiment has been designed to find out the high yielding and short durated variety. So assortment of comparative performance (agronomic and ginning) of the selected entries should need to compare with local control CB-9 (hairy leaves with high yield and low GOT%) through yield trial so that the objectives of the trail to test the yield and quality performance of the tested entries through comparing their agronomic and ginning characteristics with the control varieties can be justified.

Materials and Methods

The field trial was conducted at 4 (four) Cotton Research Farm, situated in Rangpur, Dinajpur, Jessore and Gazipur during the season 2007-08. The experiment was laid out in Randomized Complete Block Design (RCBD) with 3 replications. There were ten treatments viz., BC-040, BC-044, BC-0405, BC-0406, BC-037, BC-0303, SR-12, JA/2000/054, JA/2000/526 and CB-9 (control). Unit plot size and plant spacing were 10m × 3.6m and 90cm × 45cm respectively. Seeds were sown at period between 28 July, 2007 and 7 August, 2007 in different locations. Three or four seeds were sown in a hill, but after final thinning one seedling per hill was allowed. The recommended dose of N, P, K, S, and Zn was 92, 32, 91, 18 and 4 kg/ha, respectively. Green manure (sun hemp) was incorporated into soil at the age of 45 days. Decomposed organic matter was applied @ 1.5 ton/ha at the time of final land preparation. The nutrient elements such as Nitrogen (N), Phosphorus (P), Potassium (K), Sulphur (S) and Zinc (Zn) were applied in the row at the rate of 23-32-52-18- and 4kg/ha, respectively as basal dose. The rest 69 kg nitrogen was applied in 3 (three) equal splits (23kg/ha/split) at 25, 42 and 55 days after seed sowing as top dressing. The nutrient was applied at 5-8 cm away from the plant, which was covered up with soil immediately to protect the volatilization loss of nitrogen. The rest 39kg (k) was applied at the time of third split of nitrogen application (after 55 days of seed sowing). The intercultural operations were done as and when required.

Data on plant characters were recorded from the middle two rows (10m × 1.8m) from every unit plot to avoid border effects. The crop was harvested at maturity and the data on agronomic parameters were recorded from 10 randomly selected plants of each plot. Days to 1st boll split recorded when 50% plants have an open boll. Yield data were converted from the plot area (10m × 1.8m) to kg/ha.

The combined data of four locations were analyzed statistically by F-test (Gomez and Gomez, 1984) and the analysis of variance was done by using MSTAT computer package developed by Russell (1986). The mean differences of the treatment were analyzed by LSD.

Results and Discussion

Seed cotton yield and yield contributing parameters like number of vegetative branches per plant, node number of first sympodia, number of primary fruiting branches per plant, number of secondary fruiting branches per plant, days to first boll split, plant height at harvest (cm), number of bolls per plant, single boll weight (g) were influenced significantly by different treatments and the GOT% remained unaffected by the treatments (Table. 1).

Number of vegetative branches per plant: The lowest number of vegetative branches was produced by BC-037

(2.04) which was statistically similar to JA/2000/054 (2.19). The highest number of vegetative branches was produced by the control variety CB-9 (2.95) that was followed by BC-0406 (2.55).

Table 1. Combined mean performance of yield contributing characters of tested strains at different locations

Variety/ Treatments	No. of vegetative branches/ plant	Node no. of 1st fruiting branch (N.F.B)	No. of primary fruiting branches /plant	No. of Secondary fruiting branches /plant	Days to 1st boll split	Plant height at harvest (cm)	No. of bolls /plant	Single boll wt. (g)	Seed cotton yield (Kg/ha)	Yield as % of CB-9	GOT %
1.BC-040	2.27cd	6.53bc	15.74ab	10.82f	135.4ab	115.0a	26.20abc	5.02abc	1740.0g	95.64g	33.22
2.BC-044	2.45bc	6.71b	14.85b	13.59ab	135.0ab	113.5a	23.47c	4.86bcd	1602.0h	88.04h	34.65
3.BC -0405	2.49bc	6.72b	15.22ab	13.03bc	136.0ab	114.5a	25.51abc	5.05ab	1890.0ef	103.8ef	36.95
4.BC-0406	2.55b	7.24a	16.56a	13.88a	132.5b	116.0a	28.54a	4.68d	2342.0a	128.7a	35.09
5.JA/2000/054	2.19de	5.50bc	15.90ab	12.05de	136.3ab	113.0a	27.37ab	5.25a	1818.0f	99.90f	35.96
6.JA/2000/526	2.38bcd	6.57bc	15.57ab	12.51cd	132.0b	106.9b	27.89a	5.07ab	2121.0b	116.5b	36.53
7.BC-037	2.04e	6.67b	15.33ab	9.50g	125.3c	105.8b	24.23bc	5.04ab	1941.0de	106.7d	35.98
8.BC-0303	2.49bc	6.80b	15.37ab	12.98bc	135.7ab	108.5b	26.51abc	4.80cd	2023.0c	111.1c	37.73
9.SR-12	2.54b	6.75b	26.20ab	12.50cd	136.2ab	106.4b	26.00abc	5.02abc	1974.0cd	108.5cd	37.47
10.CB-9	2.90a	6.22c	15.28ab	11.46ef	138.2a	105.4b	23.46c	5.14a	1819.0f	100.0f	34.74
LSD (.05)	0.23	0.41	1.47	0.74	4.31	3.98	3.17	0.24	76.44	4.23	NS
CV (%)	5.61	3.60	5.50	3.55	2.39	2.03	7.14	2.86	2.31	2.33	7.54

Means followed by the same letter in a column are not statistically significant at 5% level of probability by LSD. NS= Not significant.

Node number of 1st fruiting branch: The lowest and the highest node number were recorded in CB-9 (6.22) and BC-0406 (7.24) respectively.

Number of primary fruiting branches per plant: The highest number of primary fruiting branches (16.56) was observed in BC-0406 which was statistically identical with all other treatments except BC-044 where lowest number of primary fruiting branches (14.85) was observed. The degree of relationship between seed cotton yield and the number of primary fruiting branches per plant was studied (Fig. 1). The correlation (r =0.66) and the regression line of Y (seed cotton yield) on X (number of primary fruiting branches per plant) have the Y=270.23x – 2288.6. The positive slope indicated a positive relationship.

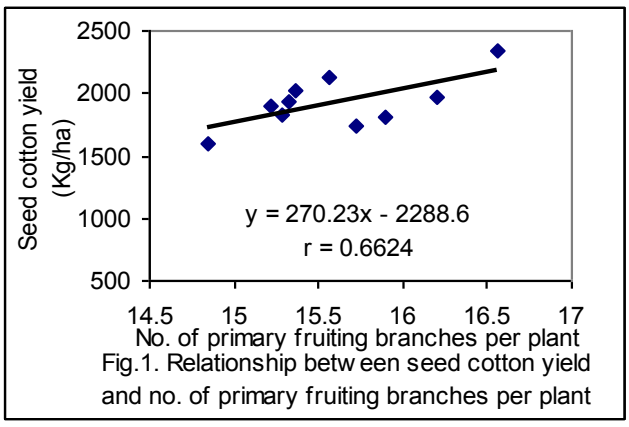

Fig.1. Relationship betw een seed cotton yield and no. of primary fruiting branches per plant

Alfaqeih *et al*. (2002) showed that the number of fruiting branches per plant exhibited a positive and significant relationship with seed cotton yield.

Number of secondary fruiting branches per plant: The highest number of secondary fruiting branches (13.88) was produced by BC-0406 and second highest (13.03) was produced by BC-0406 which was identical with BC-0303 (12.98). The lowest was produced by BC-040 (10.82) which was statistically similar to CB-9 (11.46).

Days to first boll split: Minimum days required in case of BC-037 (125.3days) for first boll split and maximum days required in case of BC-0406 (132.5days) for first boll split. The medium number of days required in case of BC-0406 (132.5days) for first boll split. This result was supported by Alam *et al*. (1996) who reported that lower number of days to boll split is desirable in cotton.

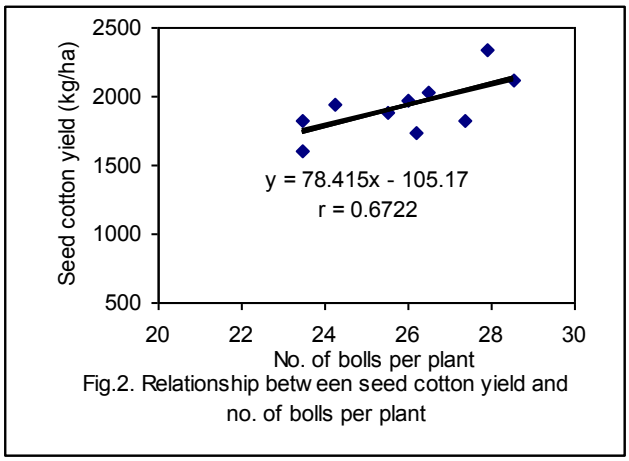

Fig.2. Relationship betw een seed cotton yield and no. of bolls per plant

Number of bolls per plant: The highest number of bolls per plant was produced by BC-0406 (28.54) whereas the lowest was in CB-9 923.46). Fig. 2 represents the degree of relationship between seed cotton yield and number of bolls per plant. The correlation (r=0.67) and the regression line of Y (seed cotton yield) on X (number of bolls per

plant) have the Y= 78.41x- 105.17. The positive slope indicated a positive relationship. This result was supported by Zeng *et al*. (2009) who reported that number bolls per plant had the largest direct effect on seed cotton yield.

Single boll weight: The highest single boll weight was recorded in JA/2000/054 (5.25g) and the lowest boll weight was found in BC-0406 (4.68)

Seed cotton yield: In case of seed cotton yield BC-0406 exhibited the best performance (2342 kg/ha), which was 28.7% more than control CB-9. The second highest (JA/2000/526: 2121kg/ha) and third highest (BC-0303: 2023kg/ha) were 16.5% and 11.1% respectively more than that of control CB-9. This result is supported by Begum *et al*. (2006).

It may be concluded that BC-0406 is the best in respect of seed cotton production. The line JA/2000/526 and BC-0303 were also better among other treatments. The above three lines proved their wide adaptability and high yield potentiality in different locations.

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