**Influence of Sowing Time and Variety on Growth and Yield of Jute (Corchorus capsularis L) at Southern Region of Bangladesh**

**B. C. Saha1, A.S.M. Iqbal Hossen2, M A Hossain3**

1, 2 Department of Agronomy, Patuakhali Science and Technology University

Dumki, Patuakhali-8602

3 Chief Scientific Officer, Bangladesh Jute Research Institute, Manik Mia Avenue,Dhaka

Corresponding Author E-mail: bidhansahapstu07@gmail.com

**Abstract:** An experiment was conducted at the experimental field of Regional Station of BJRI, Kalapara, Patuakhali from March 2013 to August 2013 to find out the optimum date of sowing, suitable variety and interaction between sowing date and variety on the fiber yield of white jute. The experiment was two factor factorial experiment, which consisted of three *Corchorus capsularis* jute varieties and four sowing dates. The varieties were CVL-1, BJC-7370 and BJC-2142 and four sowing dates were *viz.* 15 March, 30 march, 15 April and 30 April. The experiment was conducted in a randomized complete block design with three replications. The results from the analyzed data showed that the growth and fiber yield parameters were varied significantly among varieties, due to on different sowing dates and in their combinations. There was no significant veriation among varieties in terms of plant height. Highest plant height (3.02 m) was found on 30 March sowing, which was statistically identical to 15 March (3.01 m) and 15 April (2.95 m ). Fiber yield per hectare was highest (2.52 t ha-1) in variety CVL-1, which was statistically similar to BJC-7370 (2.39 t ha-1). It was also clear that earlier sowing (15 March) produced highest (2.80 t ha-1) fiber yield per hectare (ton) than late sowing (30 April) (1.74 t ha-1). It can be recommended that CVL-1 is the best variety for fiber yield (2.99 t ha-1) when sown on 15 March in the similar condition of the experiment area.

**Keywords:** Jute, Sowing Time, southern part of Bangladesh

**Introduction**

Jute (*Corchorous* spp.), the golden fiber, belongs to the family Tiliaceae has been the main cash crop Bangladesh and still now playing an important role in our national economy. Two species of jute *viz.* *Corchorus capsularis* L., which is known as white jute and *Corchorus olitorious* L., which is called Tossa jute are widely cultivated in Bangladesh. It is believed that as a cultivated plant white jute (*Corchorus capsularis* L.) came to Indian subcontinent from China or Cochin China (Sen Gupta, 1953).

About 80% of the total world jute is produced in Bangladesh and India. However, the major portion of the raw jute of international trade is still supplied by Bangladesh where the *Capsularis* jute covers about three-fourths of the total area under jute, and the remaining one-fourth is occupied by the *Olitorious* jute .

Bangladesh earns about 6-7% foreign exchange through exporting raw jute and jute goods (BJRI, 2004a). Besides, jute fiber and jute sticks are largely used for different domestic purposes. In addition, jute plants improve soil productivity because of its massive leaf fall and root proliferation in the field.

High yielding short duration variety is one of the effective mean for raising such production is important way to increase the jute yield. Besides, sowing period of jute has important role in growth as well as jute yield. Late sowing of the crop produced poor vegetative growth as well as low yield and also affected by different diseases and insects. Singh *et al.,* (2013).

Late sowing induces early flowering by shortening vegetative growth period. Thereby, fiber yield in late sowing jute is reduced. Choudhuri and Ali (1963) stated that jute crop planted in June or later induce early flowers with short vegetative period and lower fiber yield.

Above facts and findings indicate that photoperiodic effect of jute brings about lower fiber yield if cultivated in late season. Information about late sowing effect on white jute varieties in southern region of Bangladesh, particularly in Patuakhali condition is meager. It can be noted that out of 30210 ha of jute growing area of Patuakhali Sadar about 21,557.7 ha land is suitable and 7591 ha is moderately undertaken based on the following objectives:

To find out the appropriate date of sowing for higher fiber yield and quality of white jute.

To find out the varietal performance of white jute at different sowing dates in the southern region of Bangladesh.

To find out the interaction effect between different sowing dates and different white jute varieties.

**Material and Methods**

The experiment was conducted at experimental field of Regional Station of Bangladesh Jute Research Institute ,Kalapara, Patuakhali with geographical location of 21.98610N latitude and 90.24220E longitude.Soil characteristics of the western coastal zone are silty loams or alluvium. Islam (2003) mentioned that mangrove dominated coastal areas have developed on soil formations of recent origin consisting of alluvium washed down from the Himalayas. The experimental area falls under the sub–tropical climate, which is characterized by high temperature and humidity, heavy rainfall with occasional gusty winds in the Kharif season (April–September) and less rainfall associated with moderately low temperature during the rabi season (October–March) (Biswas, 2007). CVL-1, BJC-7370 and BJC-2142 were used as study material in the experiment. The seeds were collected from Capsularis Department, Breeding Division, Bangladesh Jute Research Institute, Dhaka.

The experiment was laid out in a randomized complete block design (RCBD) with three replication**.**The land was first opened on March 1, 2013 with a power tiller. Final land preparation was done on March 13, 2013. Final layout was done on March 14, 2013 according to design adopted. Finally, individual plot was prepared by using spade before sowing of seeds.The plots were fertilized with N, P2O5, K2O, S . Seeds were sown on March 15, 30th March, 15th April and 30th April, 2013 in line sowing method. The seed rate was 4.0 kg ha-1. Each plot was weeded three times on 15, 30 and 45 days after sowing (DAS). Thinning was also done simultaneously. Plants were harvested at maximum plant height stage. Ten sample plants (excluding border plants) were selected at random from each plot and harvested for recording of necessary data. Data on growth and fiber yield components were recorded on the different parameters.

The collected data were analyzed statistically. Analysis of variance (ANOVA) and Least Significant Difference (LSD) test were doneto find out the significant difference among the treatment means (Zaman*et al.* 1982). The experimental data were analyzed by MSTAT-C software. Mean comparisons for treatment parameters were compared using Duncan’s Multiple Range Test at 5% level of significance (Gomez and Gomez, 1984).

**Results and Discussion**

**Effect of variety**

The highest base diameter (20.66 mm) was found in BJC-7370 , the lowest base diameter (19.95 mm) was reported from the variety CVL-1( Table 1). It was found from (table 1) that that significantly the highest green weight (1309 g) was found from CVL-1, BJC-2142 gave the lowest green weight with leaf (1188 g). The highest green weight (1189 g) without leaf was found in CVL-1 and the lowest at BJC-2142 (1126 g). Fiber weight per 10 plants was significantly the highest (123.3 g) in CVL-1 and the lowest BJC-2142 (108.3 g) which was statistically similar to BJC-7370 (115.0 g)(Table 1).Per hectare fiber yield was highest (2.52 t ha-1) in CVL-1, which was statistically similar to BJC-7370 (2.39 t ha-1) and lowest fiber yield obtained from BJC-2142 (1.82 t ha-1). Per plant stick and stick weight per hectare was found significant variation among different white jute varieties (Table 1). Significantly the highest stick weight per plant (337.5 g) was obtained from the variety CVL-1 followed by BJC-7370 (303.3 g) and BJC-2142 (314.2 g), respectively. Per hectare yield of stick was also highest (7.61 t ha-1) in CVL-1, but it was statistically similar to BJC-7370 (7.78 t ha-1). The variety BJC-2142 gave significantly the lowest stick yield than the other two varieties (5.90 t ha-1).

Table 1. Effect of variety on growth and fiber yield of white jute in Patuakhali

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variety | Plant height (cm) | B.D (cm) | Green wt. with leaf (g/ 10 plants) | Green wt. without leaf (g/10 plants) | Fibre wt.(g/10 plants) | Fibre wt. (kg)/Plot | Stick wt. (g/10 plants) | Stick wt. (kg)/plot |
| CVL-1 | 2.969 | 19.95 b | 1309 a | 1189 | 115.0 b | 2.524 a | 303.3 b | 7.610 a |
| BJC-7370 | 2.916 | 20.66 a | 1246 ab | 1135 | 123.3 a | 2.390 a | 337.5 a | 7.376 a |
| BJC-2142 | 2.980 | 20.62 a | 1188 b | 1126 | 108.3 b | 1.815 b | 314.2 b | 5.899 b |
| Level of significance | NS | \* | \*\* | NS | \*\* | \*\* | \*\* | \*\* |
| CV (%) | 3.16 | 3.33 | 6.65 | 7.96 | 8.11 | 8.52 | 7.28 | 7.93 |

**Effect of date of sowing**

Plant height was the highest (3.02 m) during 30 March sowing, the lowest (2.85 m) plant height was observed in 30 April sowing. The highest base diameter ( 21.61 mm) was reported from 15 March sowing and the lowest base diameter (19.79 mm) was from 15 April .The highest green weight with leaf weight (2458 g) was obtained from 15 March sowing and the lowest (1244 g) in 15 April . Sowing at 15 March gave the highest green weight without leaf (2304 g) whereas 30 April produced the lowest (977 g) green weight without leaf. Sowing at 15 March yielded 148.9 g per 10 plants fiber and 2.80 t/ ha fiber and the lowest fiber yield per 10 Plants was recorded from 15 April sowing (93.33 g), which was statistically similar to 30 April sowing (95.56 g). Yield per hectare was the lowest (1.74 t ha-1) at 30 April sowing. Sowing on March 15 gave significantly the highest stick yield per plant (7382.2 g) which was followed by 317.8 g when sown on 30 March. The lowest stick yield per plant (5.72 g) was reported from 30 April sowing, which again statistically similar to 15 April sowing (295.6 g).

Table 2. Effect of sowing time on plant height, BD, green weight (with leaf), green weight (without leaf), fibre weight/plant, fibre weight/plot, stick weight/plant, stick weight/plot and number of plant population of white jute in Patuakhali

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sowing time | Plant height (cm) | B.D (cm) | Green wt. with leaf (g) | Green wt. without leaf (g) | Fibre wt. (g)/plant | Fibre wt. (kg)/Plot | Stick wt. (g)/plant | Stick wt. (kg)/plot |
| S1 (15th March) | 3.007 a | 21.61 a | 2458 a | 2304 a | Fibre wt. (g/10 plants) | Fibre wt. (kg)/Plot | Stick wt. (g/ 10plants) | Stick wt. (kg)/plot |
| S2 (30th March) | 3.022 a | 20.93 b | 1993 b | 1837 b | 148.9 a | 2.797 a | 382.2 a | 7.938 a |
| S3 (15th April) | 2.946 a | 19.30 c | 1244 c | 1098 c | 124.4 b | 2.029 c | 317.8 b | 6.733 b |
| S4 (30th April) | 2.846 b | 19.79 c | 1120 c | 977 c | 93.33 c | 2.402 b | 277.8 c | 7.452 a |
| LSD0.05 | 0.093 | 0.665 | \*\* | \*\* | 95.56 c | 1.744 d | 295.6 bc | 5.723 c |
| Level of significance | \*\* | \*\* | 6.65 | 7.96 | \*\* | \*\* | \*\* | \*\* |
| CV (%) | 3.16 | 3.33 | 2458 a | 2304 a | 8.11 | 8.52 | 7.28 | 7.93 |

\*\* = Significant at 1% level of probability , \* = Significant at 5% level of probability

NS = Not significant

**Interaction effect of sowing date and variety**

The highest plant height (3.22 m) was observed in variety BJC-2142 sown on 30th March and the lowest plant height (2.68 m) was observed from variety BJC-2142 when sown on 30 April. The highest base diameter (22.83 mm) was observed from variety BJC-2142 when sown at 30 March, the lowest base diameter (17.79 mm) was counted from BJC-2142 when sown at 30 April. The highest green weight with leaf (2513 g) was found in variety CVL-1 at 15 sowing March (V1S1), and the lowest green weight (844 g) was found from CVL-1 at 30 April sowing.

Green weight without leaf was observed the highest (2353 g) in CVL-1 in combination with 15 March (V1S1) sowing date and the lowest green weight without leaf (688 g) was observed in CVL-1 at 30 April sowing (V1S4). Fiber yield per 10 plants was the highest (166.7 g) in CVL-1 at 15 March sowing (V1S1) and the lowest fiber yield per 10 Plants (66.67 g) was found from BJC-2142 sown on 30 April (V3S4) which was statistically similar to CVL-1 sown on 30 April (V1S4) (80.00 g). The highest stick yield was found in variety CVL-1 (413.3 g) when sown on 15 March (V1S1) and tThe lowest stick weight (220.0 g) was found in BJC-2142 when sown on 30 April (V3S4), which was statistically similar to V2S4 (240 g) and V1S4 (260.0 g), respectively.

Table 3. Combined effect of variety and sowing time on plant height, BD, green weight (with leaf), green weight (without leaf), fibre weight/plant, fibre weight/plot, stick weight/plant, stick weight/plot and number of plant population of white jute in Patuakhali

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variety | Plant height (cm) | B.D (cm) | Green wt. with leaf (g) | Green wt. without leaf (g) | Fibre wt. (g)/plant | Fibre wt. (kg)/Plot | Stick wt. (g)/plant | Stick wt. (kg)/plot | No. of plant population |
| V1S1 | 3.067 ab | 22.77 a | 2513 a | 2353 a | 166.7 a | 166.7 a | 2.847 ab | 386.7 a | 8.270 ab |
| V1S2 | 2.900 bc | 18.63 e | 2220 b | 1967 c | 106.7 bc | 106.7 bc | 2.250 cd | 260.0 ef | 7.667 abc |
| V1S3 | 2.977 bc | 18.53 e | 1122 e | 927 e | 80.00 de | 80.00 de | 2.920 a | 240.0 f | 8.520 a |
| V1S4 | 2.933 bc | 19.85 cd | 844 f | 688 f | 106.7 bc | 106.7 bc | 2.080 de | 326.7 bcd | 5.983 e |
| V2S1 | 2.920 bc | 20.74 bc | 2473 a | 2127 b | 160.0 a | 160.0 a | 2.993 a | 413.3 a | 8.263 ab |
| V2S2 | 2.943 bc | 21.33 b | 2027 c | 2003 bc | 113.3 b | 113.3 b | 2.467 c | 296.7 de | 7.817 abc |
| V2S3 | 2.880 c | 18.83 de | 1135 e | 943 e | 106.7 bc | 106.7 bc | 2.233 cd | 300.0 cde | 6.957 cde |
| V2S4 | 2.920 bc | 21.72 ab | 917 f | 709 f | 113.3 b | 113.3 b | 1.867 e | 340.0 bc | 6.467 de |
| V3S1 | 3.033 bc | 21.34 b | 2487 a | 2213 a | 120.0 b | 120.0 b | 2.550 bc | 346.7 b | 7.280 bcd |
| V3S2 | 3.223 a | 22.83 a | 1733 d | 1540 d | 153.3 a | 153.3 a | 1.370 f | 396.7 a | 4.717 f |
| V3S3 | 2.980 bc | 20.53 bc | 1158 e | 965 e | 93.33 cd | 93.33 cd | 2.053 de | 293.3 de | 6.880 cde |
| V3S4 | 2.683 d | 17.79 e | 860 f | 697 f | 66.67 e | 66.67 e | 1.287 f | 220.0 f | 4.720 f |
| Level of significance | \*\* | \*\* | \*\* | \*\* | \*\* | \*\* | \*\* | \*\* | \*\* |
| CV (%) | 3.16 | 3.33 | 6.65 | 7.96 | 8.11 | 8.11 | 8.52 | 7.28 | 7.93 |

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