

EFFECT OF SOWING DATE ON FIBER YIELD AND YIELD ATTRIBUTES OF TOSSA JUTE**M. S. A. Sarker^{1,2*}, M. S. A. M. Khan³, M. N. N. Dewan⁴, S. Basak⁵ and P. C. Dhar⁶**¹Department of Soil Science, BAU, Mymensingh²Jute Agriculture Experimental Station, BJRI, Manikganj³Agro1 Global Limited, Dhaka, Bangladesh⁴Department of Agricultural Extension (DAE), Khamarbari, Dhaka⁵Department of Agroforestry, BAU, Mymensingh⁶Department of Crop Botany, BAU, Mymensingh

*Corresponding author's e-mail: saifulbarj@gmail.com

ABSTRACT

An experiment was conducted at Jute Agricultural Experimental Station, Bangladesh Jute Research Institute, Jagir, Manikganj to find out the fiber yield and yield attributes of some tossa jute varieties at varying sowing dates. Four tossa jute variety i.e., BJRI tossapat9, JRO-524, O-9897 and BJRI tossapat8 were used as treatment under two sowing dates i.e. 5th and 25th March. The experiment followed RCBD design with three replications. Results revealed that, the sowing date of 25th March produced the highest plant height (302.8cm), base diameter (16.71mm) and dry fiber weight per plant (14.84g). Among four tested varieties BJRI tossapat9 produced the highest amount of green plant weight with leaf, green plant weight without leaf and dry fiber weight per plant (224g, 198.5g, 16g, respectively). JRO-524 performed lower in most cases.

Key words: Jute, sowing date, variety, fiber yield

Introduction

Tossa jute (*Corchorus olitorius* L.) is one of the world's most important bast fiber crops, valued for its strong, lustrous, and biodegradable fiber widely used in packaging, textiles, geotextiles, and various eco-friendly industrial applications (Islam *et al.*, 2019). As global interest in natural and sustainable fibers increases, improving jute productivity remains a priority for countries such as Bangladesh and India, where jute cultivation contributes significantly to rural employment and national export earnings (Rahman and Akhter, 2020). Among agronomic factors influencing jute fiber yield, sowing date plays a critical role in determining the crop's exposure to optimal environmental conditions. The timing of sowing governs the plant's interaction with temperature, photoperiod, and rainfall-key determinants of vegetative growth, biomass accumulation, and fiber formation (Hossain and Sarker, 2017). Early or delayed sowing often disrupts these ideal conditions, leading to reduced plant height, thinner stem diameter, and ultimately lower fiber yield due to stress during early growth stages (Karim *et al.*, 2018). Previous research consistently indicates that jute is highly sensitive to seasonal variations, and that slight shifts in sowing time can result in substantial differences in yield attributes such as plant height, base diameter, green fiber weight, and dry fiber weight (Akhter *et al.*, 2020). However, the optimum sowing window may vary between regions and years depending on climatic patterns, highlighting the need for site-specific evaluation. Therefore, this study aims to assess the effect of different sowing dates on the yield and fiber-related attributes to be extended the better opportunities of tossa jute cultivation in Bangladesh.

Materials and Methods

The experiment was conducted at Jute Agriculture Experimental Station (JAES), Bangladesh Jute Research Institute (BJRI), Jagir, Manikganj during the period of March to August, 2023. The research was done on land belonging to the AEZ-8 containing slightly acidic soil (pH 6.5) following the Randomized Complete Block Design (RCBD) with three replications. Four tossa jute varieties viz. BJRI tossapat9, JRO-524, O-9897 and BJRI tossapat8 were used as experimental materials for this study. Land was prepared by

ploughing and cross-ploughing with laddering. Line to line distance was 30cm, plant to plant distance was 5-7cm, number of average plant population per square meter was 40 were maintained. The unit plot size was 2m x 3m and seeds were sown in line. Data were 120 days after sowing. All intercultural operations were done as and when necessary. Land was fertilized as per variety recommendation. Data were subjected to ANOVA using MSTAT-C. Treatment means were separated with LSD (Least significant difference).

Results and Discussion

Effect of sowing date on fiber yield and yield attributes of jute: The data in Table 1 and Figs. 1-2 show that sowing date had a notable effect on the growth and yield attributes of tossa jute (*Corchorus olitorius* L.). Plants sown on 25th March attained significantly greater height and thicker base diameter than those sown on 5th March, likely because late-March sowing coincides with more favorable temperature and soil moisture for early vegetative growth (FAO, 2021). In contrast, the 5th March sowing produced higher green biomass-both with and without leaves-suggesting that early-sown plants benefited from a longer growth duration that enhanced total fresh matter accumulation (Basu and Saha, 2018). Despite this, dry fiber yield was highest in the 25th March sowing, indicating better fiber maturation and quality under late-March environmental conditions, which agree with previous findings that optimal sowing near late March improves fiber development and retting suitability (Rahman et al., 2014). Dry stick weight showed minimal variation between treatments, suggesting it is less sensitive to sowing date. Overall, the table indicates that although early sowing increases green biomass, 25th March sowing is more favorable for achieving higher dry fiber yield in tossa jute.

Table 1. Effect of sowing dates on yield attributes of tossa jute

Sowing date	Green weight with leaf plant ⁻¹ (g)	Green weight without leaf plant ⁻¹ (g) (g)	Dry fiber weight. plant ⁻¹ (g)	Dry stick weight. plant ⁻¹ (g)
5 th March	226.25a	201.25a	13.45b	34.700a
25 th March	180.00b	166.25b	14.84a	34.488a
CV (%)	3.58	4.45	3.07	5.20
LSD (0.05)	6.3734	3.9437	0.1322	0.9692

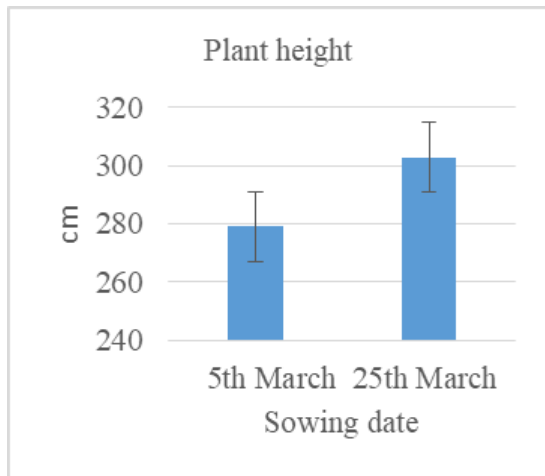


Fig 1. Effect of different sowing dates on plant height of tossa jute

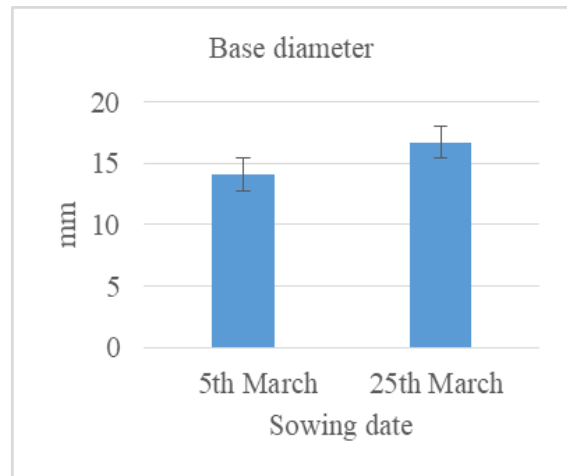


Fig 2. Effect of different sowing dates on base diameter of tossa jute

Effect of variety on fiber yield and yield attributes of jute: The results in Table 2 and Figs. 3-4 show that varietal differences significantly influenced the growth and yield attributes of tossa jute. Among the tested varieties, BJRI tossa pat9 produced the tallest plants (299.50 cm) and the highest green weight with leaves (224.00 g) and without leaves (198.50 g), indicating strong vegetative vigor. In contrast, JRO-524 exhibited the lowest green biomass and comparatively smaller plant dimensions, suggesting weaker growth potential under the given conditions. O-9897 performed favorably, showing high green weight without leaves (200.00 g) and one of the highest dry fiber yields (14.05g), aligning with previous reports that improved jute varieties differ widely in biomass accumulation and fiber productivity due to their genetic potential (Basu & Saha, 2018; Rahman *et al.*, 2014). Although BJRI tossa pat8 showed slightly higher height and base diameter than the other varieties, its dry fiber yield remained moderate (13.225g). The superior dry fiber yield in BJRI tossa pat9 (16.00g) demonstrates that varietal traits strongly determine fiber formation and retting efficiency, consistent with established findings that high-yielding tossa jute lines bred by BJRI tend to outperform traditional varieties in both biomass and fiber quality (FAO, 2021). Overall, the table highlights clear genetic variability among varieties, with BJRI tossa pat9 emerging as the most productive in terms of fiber yield.

Table 2. Effect of varieties on yield attributes of tossa jute

Varieties	Green weight with leaf plant ⁻¹ (g)	Green weight without leaf plant ⁻¹ (g) (g)	Dry fiber weight. plant ⁻¹ (g)	Dry stick weight. plant ⁻¹ (g)
BJRI tossapat9	224.00a	198.50a	16.000a	34.250b
JRO-524	180.00c	164.00c	13.300c	35.600ab
O-9897	219.00a	200.00a	14.050b	35.875a
BJRI tossapat8	189.50b	172.50b	13.225c	32.650c
CV (%)	3.58	4.45	3.07	5.20
LSD (0.05)	9.0134	5.5772	0.1869	1.3707

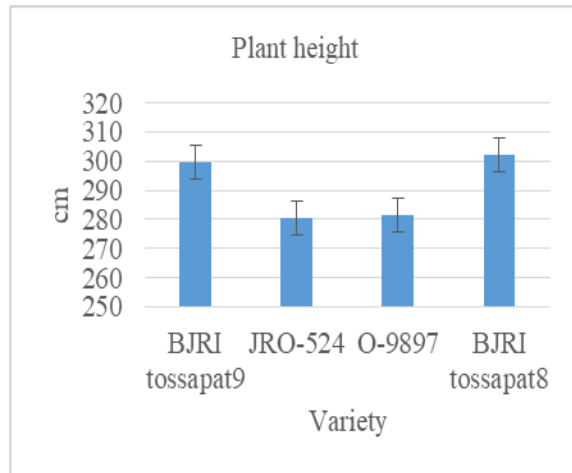


Fig 3. Effect of different varieties on plant height of tossa jute

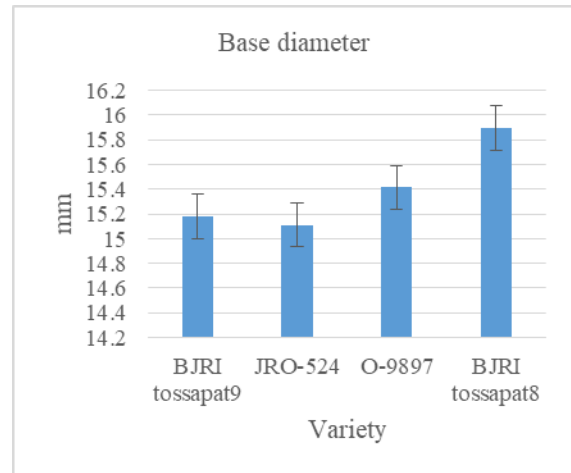


Fig 4. Effect of different varieties on base diameter of tossa jute

Effect of sowing date x variety interaction on fiber yield and yield attributes of jute: Table 3 shows the interaction effect between sowing time and variety on the yield attributes of tossa jute, highlighting that both factors jointly influenced growth and fiber performance. The combination S₂ × V₄ (25th March × BJRI

tossa pat8) produced the tallest plants (327.00 cm) and one of the thickest base diameters (18.74 mm), indicating that this variety responded strongly to late-March sowing conditions. In contrast, S₁ × V₂ (5th March × JRO-524) showed the lowest plant height and comparatively thinner stems, consistent with the known low vigour of this variety.

Table 3. Effect of sowing time x variety interaction on yield attributes of tossa jute

Sowing date X Variety	Plant Height (cm)	Base diameter (mm)	Green weight with leaf plant ⁻¹ (g)	Green weight without leaf plant ⁻¹ (g)	Dry fiber weight plant ⁻¹ (g)	Dry stick weight plant ⁻¹ (g)
S ₁ ×V ₁	296.00b	15.380bcd	290.00a	255.00a	16.150a	40.350a
S ₁ ×V ₂	264.00d	13.430ef	215.00c	190.00c	11.750f	33.150cd
S ₁ ×V ₃	279.00c	14.520def	200.00d	180.00d	14.200d	34.000c
S ₁ ×V ₄	277.00c	13.050f	200.00d	180.00d	11.700f	31.300d
S ₂ ×V ₁	303.00b	14.980cde	158.00f	142.00f	15.850b	28.150e
S ₂ ×V ₂	297.00b	16.790b	145.00g	138.00f	14.850c	38.050b
S ₂ ×V ₃	284.00c	16.310bc	238.00b	220.00b	13.900e	37.750b
S ₂ ×V ₄	327.00a	18.740a	179.00e	165.00e	14.750c	34.000c
CV (%)	4.61	6.13	3.58	4.45	3.07	5.20
LSD (0.05)	8.1839	1.6540	12.747	7.8874	0.2643	1.9384

For green biomass, S₁ × V₁ (5th March × BJRI tossa pat9) produced the highest green weight both with leaves (290.00g) and without leaves (255.00g), confirming that early sowing enhances vegetative biomass accumulation in high-performing genotypes (Basu and Saha, 2018). However, dry fiber yield was greatest in S₁ × V₁ (16.15g) and S₂ × V₁ (15.85g), followed closely by S₂ × V₃ (14.85g), indicating that BJRI tossa pat9 maintained superior fiber productivity across both sowing dates. These results align with earlier findings that improved BJRI varieties show strong genotype × environment interaction, maintaining stability in fiber yield under varied sowing conditions (Rahman *et al.*, 2014). Overall, the table demonstrates that BJRI tossa pat9 performs consistently well, while late-March sowing enhances plant height and stem diameter, supporting agronomic recommendations that optimal sowing around late March maximizes jute growth and fiber development (FAO, 2021).

Conclusion

Results revealed that, considering fiber producing variety BJRI tossa pat9 is the best, performed well both whole March of the year.

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