

# DETERMINATION OF APPROPRIATE SOWING DATE ON FIBRE YIELD AND YIELD ATTRIBUTES OF Jute (*Corchorus olitorius* L.) var. BJRI TOSSA PAT-8 (ROBI-1)

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## Abstract

The experiment was conducted at Jute Agriculture Experimental Station (JAES), Manikganj; JRRS, Rangpur and JRSS, Jashore to determine the optimum sowing date of jute var. BJRI Tossa Pat-8. The experiment was laid-out in RCBD with three replications and variety O-9897 used as control. Crops were sown on five different dates i.e., 20 March, 30 March, 10 April, 20 April and 30 April regarded as treatment. Crops were attained recommended cultural practices and harvested at 120 days after sowing. The results showed that BJRI Tossa Pat-8 (Robi-1) sown on 10 April to 20 April gave significantly higher fibre and stick yields at Manikganj (3.37 t ha<sup>-1</sup> and 6.33 t ha<sup>-1</sup> respectively); Rangpur (3.11 t ha<sup>-1</sup> and 5.22 t ha<sup>-1</sup>, respectively) and Jashore (3.96 t ha<sup>-1</sup> and 5.57 t ha<sup>-1</sup>, respectively) with an average 14% higher than control.

## Introduction

The agriculture climate of Bangladesh is very much suitable for quality fibre production (Islam and Uddin, 2019). Jute being the most important cash crop plays a major role in agriculture and economy of Bangladesh. In 1970-80 decades about 15-16 lakh hectare of the total cultivable land was occupied by jute has been reduced to about 7.00 to 8.00 lakh hectare which produced about 16-17 lakh tons of fibre (Ferdous and Islam, 2018). However, national average yield is increased from 11.324 to 11.593 bale per hectare (BBS, 2022). Currently, 85% of Bangladesh's yearly jute fibre output comes from Tossa Jute and the remaining 15% from White Jute. The jute crop also greatly improves the soil fertility status by incorporating organic matter to the soil through decomposition of shaded leaves and plant residues and helps in breaking plough-pans through its long tap roots (Ferdous *et al.*, 2022). Roughly some 5,000 tons of jute seeds are imported to Bangladesh from India a year. However, national average yield is increased from 1.59 to 2.04 tons hectare<sup>-1</sup>. It is happened due to use of high yielding jute varieties and production technologies, which together contributed toward higher yield (BBS, 2015). Bangladesh Jute Research Institute (BJRI) have successfully developed a new variety, which has a 20 % higher yield potential, finer and stronger fibre quality, and can be planted early in the season, thereby freeing up land seasonally for rice cultivation. However, to identify the optimum date of sowing for higher fibre yield for BJRI Tossa Pat-8 at different agro-ecological zones of Bangladesh.

## Materials and Methods

The experiment was conducted at Jute Agriculture Experimental Station (JAES), Manikganj; Jute Research Regional Station (JRRS), Rangpur and JRSS, Jashore. The experiment was laid out in randomized complete block design (RCBD) with three replications. Unit plot size was 4.0m×2.5m. Jute var. BJRI Tossa Pat-8 was used where var. O-9897 as control. Crop was sown on four different dates viz., 30 March, 10 April, 20 April and 30 April as treatment variables. Seeds were sown in line of 30 cm apart. Other cultural and intercultural practices were followed as per BJRI recommendation. Plants were harvested at 120 days after sowing (DAS). Location wise average data on fibre yield and quality attributing characters were analyzed with the help of computer statistical package (Statistix 10). The

mean differences among the treatments were adjusted by Least Significant Difference (LSD) at 0.05 level (Gomez and Gomez, 1984).

## Results and Discussion

Results revealed all the yield contributing data like plant height, base diameter, fibre yield and stick yield were not differed significantly due to variety irrespective of sowing dates at JAES Manikganj (Table 1). BJRI Tossa Pat-8 gave numerically higher fibre yield ( $2.98 \text{ t ha}^{-1}$ ) and stick yield ( $6.51 \text{ t ha}^{-1}$ ) over control variety O-9897 at Manikganj. At Rangpur, BJRI Tossa Pat-8 recorded numerically higher fibre yield ( $3.33 \text{ t ha}^{-1}$ ) over control variety O-9897 and comparatively higher stick yield was found in control. At sub-station, Jashore, only plant population of those two varieties were differed significantly. BJRI Tossa Pat-8 showed numerically higher fibre yield ( $3.28 \text{ t ha}^{-1}$ ) and stick yield ( $8.67 \text{ t ha}^{-1}$ ) over control var. O-9897 at Jashore. Hossain *et al.* (2015), Islam and Rahman (2008) were also reported the similar observations.

Table 1. Effect of variety irrespective of date of sowing on fibre yield and yield components of tossa jute at different locations

Locations	Treatments	Plant population ( $\text{m}^{-2}$ )	Plant height (m)	Base diameter (mm)	Fibre yield ( $\text{t ha}^{-1}$ )	Stick yield ( $\text{t ha}^{-1}$ )
Manikganj	BJRI Tossa Pat-8	26.5	3.17	15.01	2.98	6.51
	O-9897	21.9	3.09	14.70	2.70	5.73
	LSD <sub>(0.05)</sub>	0.16	0.12	0.77	0.55	1.25
	CV (%)	6.96	3.71	4.91	8.53	2.91
Rangpur	BJRI Tossa Pat-8	22.0	3.10	16.69	3.33	7.05
	O-9897	18.7	3.03	16.16	3.09	7.34
	LSD <sub>(0.05)</sub>	0.16	0.10	0.70	0.24	0.34
	CV (%)	7.25	4.28	5.57	8.59	6.13
Jashore	BJRI Tossa Pat-8	30.1	3.45	15.95	3.28	8.67
	O-9897	27.4	3.30	16.19	3.02	7.31
	LSD <sub>(0.05)</sub>	0.12	0.11	1.52	0.31	0.55
	CV (%)	7.01	4.29	7.80	2.29	1.27

Results showed that all the yield and yield contributing characters like plant population, base diameter, plant height and fibre yield were not significantly differed due to sowing date irrespective of variety at Manikganj (Table 2). BJRI Tossa Pat-8 sown on 10 April gave the highest fibre and stick yields ( $3.23 \text{ t ha}^{-1}$  and  $6.47 \text{ t ha}^{-1}$ , respectively). Plant height (3.52 m) and base diameter (18.73 mm) were also found the highest at the same date. All the yield and yield contributing characters like plant population, base diameter, fibre yield and stick yield were not significantly affected but only plant population was differed significantly due to sowing date irrespective of variety at Rangpur (Table 2). Crops sown on 10 April gave the highest fibre and stick yield ( $2.67 \text{ t ha}^{-1}$  and  $5.10 \text{ t ha}^{-1}$ , respectively). At Jashore, all the yield and yield contributing characters like plant population, base diameter, fibre yield and stick yield were not significantly differ but, only plant population significant due to sowing date irrespective of variety (Table 2). BJRI Tossa Pat-8 sown on 20 April gave the highest fibre and stick yield ( $3.59 \text{ t ha}^{-1}$  and  $5.15 \text{ t ha}^{-1}$ , respectively). At this sowing date, plant height (3.79 m) and base diameter (18.77 mm) were also found the highest crop sown 10 April. The lowest fibre and stick yield ( $2.81 \text{ t ha}^{-1}$  and  $4.15 \text{ t ha}^{-1}$  respectively) were obtained from the crop sown on 20 March. Ferdous *et al.* (2022) also reported similar result.

Table 2. Effect of date of sowing irrespective of variety on fibre yield and yield components of tossa jute at different locations

Locations	Treatments	Plant population (m <sup>-2</sup> )	Plant height (m)	Base diameter (mm)	Fibre yield (t ha <sup>-1</sup> )	Stick yield (t ha <sup>-1</sup> )
Manikganj	30 March	19.32	3.16	14.76	2.48	5.29
	10 April	25.40	2.97	16.56	2.62	5.86
	20 April	24.90	3.52	18.73	3.23	6.47
	30 April	22.15	3.18	15.88	2.29	4.98
	LSD <sub>(0.05)</sub>	2.14	0.16	1.11	0.38	0.54
	CV (%)	7.25	4.28	5.57	8.59	6.13
Rangpur	30 March	17.03	3.05	15.59	2.25	3.98
	10 April	21.07	3.33	16.74	2.60	4.59
	20 April	24.35	3.72	20.44	2.67	5.10
	30 April	19.70	3.39	17.44	2.10	4.85
	LSD <sub>(0.05)</sub>	0.23	0.15	0.94	0.68	1.53
	CV (%)	6.96	3.71	4.91	8.53	9.91
Jashore	30 March	22.93	3.72	17.90	2.81	5.15
	10 April	27.05	3.65	17.90	3.01	5.14
	20 April	32.67	3.79	18.77	3.59	6.55
	30 April	32.20	3.77	18.15	3.16	5.30
	LSD <sub>(0.05)</sub>	1.71	0.18	1.52	0.50	0.86
	CV (%)	7.01	4.29	7.80	2.29	1.27

It was observed that yield and yield contributing characters like plant population, base diameter and plant height were not differed significantly due to interaction of variety and sowing date at Manikganj (Table 3). Plant height (3.53 m) and base diameter (18.86 mm) were found the highest at var. BJRI Tossa Pat-8 on 10 April sowing. The lowest result was recorded from O-9897 sown on 30 March at Manikganj. Similar result was reported in Ferdous *et al.* (2022) and Hossain *et al.* (2015).

Table 3. Interaction effect of variety and date of sowing on fibre yield and yield components of tossa jute at Manikganj

Treatments	Plant population (m <sup>-2</sup> )	Plant height (m)	Base diameter (mm)
V <sub>1</sub> × S <sub>1</sub>	19.53	3.27	15.84
V <sub>1</sub> × S <sub>2</sub>	21.93	3.18	15.22
V <sub>1</sub> × S <sub>3</sub>	23.03	3.53	18.86
V <sub>1</sub> × S <sub>4</sub>	20.70	3.24	15.63
V <sub>2</sub> × S <sub>1</sub>	19.10	3.05	13.69
V <sub>2</sub> × S <sub>2</sub>	28.87	2.76	17.90
V <sub>2</sub> × S <sub>3</sub>	26.77	3.51	18.60
V <sub>2</sub> × S <sub>4</sub>	23.60	3.13	16.13
LSD <sub>(0.05)</sub>	0.92	0.21	1.33
CV (%)	6.96	3.71	4.91

V<sub>1</sub>= BJRI Tossa Pat-8 (Robi-1), V<sub>2</sub>= O-9897, S<sub>1</sub>= 30 March, S<sub>2</sub>= 10 April, S<sub>3</sub>= 20 April, S<sub>4</sub>= 30 April

It was observed that fibre yield and stick yield were differed significantly due to interaction of variety and sowing date at Manikganj (Fig. 1). BJRI Tossa Pat-8 sown on 10 April gave the highest fibre and stick yield (3.37 t ha<sup>-1</sup> and 6.33 t ha<sup>-1</sup> respectively) at Manikganj. The lowest fibre yield and stick yield (2.45 t ha<sup>-1</sup> and 5.18 t ha<sup>-1</sup> respectively) were recorded from O-9897 sown on 30 March at Manikganj.

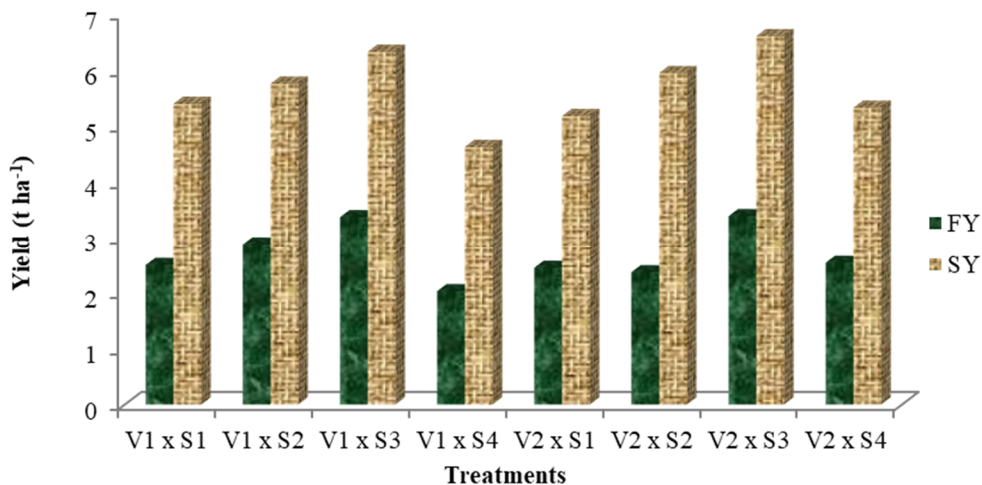


Fig. 1. Interaction effect of variety and sowing date on yield of BJRI Tossa Pat-8 (Robi-1) at Manikganj. Here, V<sub>1</sub>= Robi-1, V<sub>2</sub>= O-9897; S<sub>1</sub>= 30 March, S<sub>2</sub>= 10 April, S<sub>3</sub>= 20 April, S<sub>4</sub>= 30 April; FY = Fibre yield, SY = Stick yield.

From the interaction table it was observed that yield and yield contributing characters like plant population, base diameter were not varied significantly due to interaction of variety and sowing date at Rangpur (Table 4). BJRI Tossa Pat-8 sown on 10 April gave the highest plant height (3.58 m) and base diameter (20.41 mm) at Rangpur which was followed by 20 April. The lowest data were recorded from the O-9897 sown on 20 March. Similar observations were reported by Alam *et al.* (1994), Ferdous and Islam (2018) and Islam and Alam (2019).

Table 4: Interaction effect of variety and date of sowing on fibre yield and yield components of tossa jute at Rangpur

Treatments	Plant population (m <sup>-2</sup> )	Plant height (m)	Base diameter (mm)
V <sub>1</sub> × S <sub>1</sub>	18.03	3.36	15.51
V <sub>1</sub> × S <sub>2</sub>	23.33	2.95	16.37
V <sub>1</sub> × S <sub>3</sub>	28.23	3.85	20.46
V <sub>1</sub> × S <sub>4</sub>	20.93	3.82	17.84
V <sub>2</sub> × S <sub>1</sub>	16.03	2.74	15.67
V <sub>2</sub> × S <sub>2</sub>	18.80	3.70	17.11
V <sub>2</sub> × S <sub>3</sub>	20.47	3.58	20.41
V <sub>2</sub> × S <sub>4</sub>	18.47	2.96	17.04
LSD <sub>(0.05)</sub>	0.54	0.23	1.57
CV (%)	7.25	4.28	5.57

V<sub>1</sub>= BJRI Tossa Pat-8 (Robi-1), V<sub>2</sub>= O-9897; S<sub>1</sub>= 30 March, S<sub>2</sub>= 10 April, S<sub>3</sub>= 20 April, S<sub>4</sub>= 30 April

From the interaction table it was found that fibre yield and stick yield were varied significantly due to interaction of variety and sowing date at Rangpur (Fig. 2). BJRI Tossa Pat-8 sown on 10 April gave the highest fibre and stick yield (3.11 t ha<sup>-1</sup> and 5.22 t ha<sup>-1</sup>, respectively) than control variety (2.23 t ha<sup>-1</sup> and 4.97 t ha<sup>-1</sup> respectively) at Rangpur which was followed by 20 April. The lowest fibre yield and stick yield (2.26 t ha<sup>-1</sup> and 3.95 t ha<sup>-1</sup>, respectively) were recorded from the O-9897 sown on 20 March. Similar observations were reported by Ferdous *et al.* (2022), Alam *et al.* (1994), Islam and Rahman (2008) and Islam and Alam (2019).

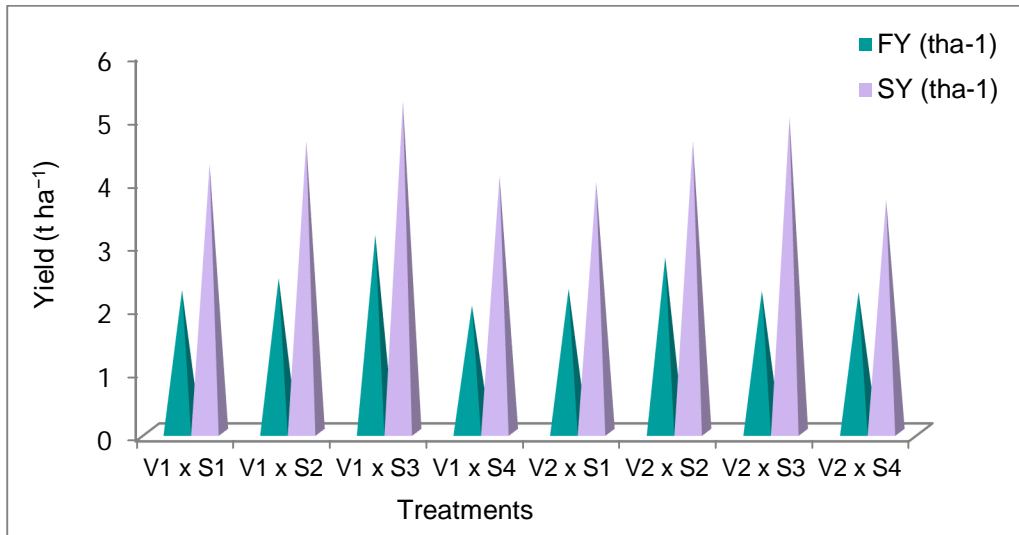


Fig. 2. Interaction effect of variety and sowing date on fibre yield of BJRI Tossa Pat-8 (Robi-1) at Rangpur. Here, V<sub>1</sub>= BJRI Tossa Pat-8 (Robi-1), V<sub>2</sub>= O-9897; S<sub>1</sub>= 30 March, S<sub>2</sub>= 10 April, S<sub>3</sub>= 20 April, S<sub>4</sub>= 30 April; FY = Fibre yield, SY = Stick yield.

At Jashore, results showed that all the yield and yield contributing characters like plant population, base diameter significant at Jashore (Table 5).

Table 5: Interaction effect of variety and date of sowing on fibre yield and yield components of tossa jute at Jashore

Treatments	Plant population (m <sup>-2</sup> )	Plant height (m)	Base diameter (mm)
V <sub>1</sub> × S <sub>1</sub>	23.83	3.73	18.73
V <sub>1</sub> × S <sub>2</sub>	28.77	3.71	18.47
V <sub>1</sub> × S <sub>3</sub>	33.23	3.85	19.30
V <sub>1</sub> × S <sub>4</sub>	32.43	3.82	18.90
V <sub>2</sub> × S <sub>1</sub>	22.03	3.70	17.07
V <sub>2</sub> × S <sub>2</sub>	25.33	3.58	17.33
V <sub>2</sub> × S <sub>3</sub>	32.10	3.72	18.23
V <sub>2</sub> × S <sub>4</sub>	31.97	3.72	17.40
LSD <sub>(0.05)</sub>	0.90	0.25	2.15
CV (%)	7.01	4.29	7.80

V<sub>1</sub>= BJRI Tossa Pat-8 (Robi-1), V<sub>2</sub>= O-9897; S<sub>1</sub>= 30 March, S<sub>2</sub>= 10 April, S<sub>3</sub>= 20 April, S<sub>4</sub>= 30 April

BJRI Tossa Pat-8 sown on 10 April gave the maximum plant height (3.85 m) and base diameter (19.30 mm) which was followed by 20 April. Highest plant population was observed (33.23) in 20 April sowing and lowest from the O-9897 sown on 20 March. Ferdous *et al.* (2022) and Ferdous and Islam (2018) reported similar findings on jute. At Jashore, results showed that fibre yield and stick yield were not significantly changed at Jashore (Fig. 3.).

BJRI Tossa Pat-8 sown on 10 April gave the highest fibre and stick yield (3.96 t ha<sup>-1</sup> and 5.57 t ha<sup>-1</sup>, respectively) than control variety (3.23 t ha<sup>-1</sup> and 4.73 t ha<sup>-1</sup> respectively) at Jashore which was followed by 20 April.

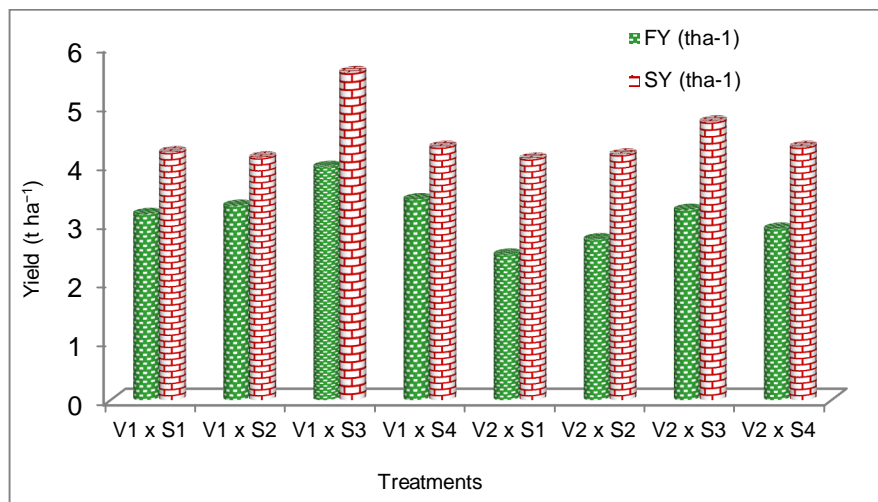


Fig. 3. Interaction effect of variety and sowing date on fibre yield of BJRI Tossa Pat-8 (Robi-1) at Jashore. Here, V<sub>1</sub>=BJRI Tossa Pat-8 (Robi-1), V<sub>2</sub>= O-9897; S<sub>1</sub>= 30 March, S<sub>2</sub>= 10 April, S<sub>3</sub>= 20 April, S<sub>4</sub>= 30 April; FY = Fibre yield, SY = Stick yield.

The lowest fibre yield and stick yield (2.47 t ha<sup>-1</sup> and 4.10 t ha<sup>-1</sup> respectively) were recorded from the O-9897 sown on 20 March. Ferdous *et al.* (2022) and Ferdous and Islam (2018) reported similar findings on jute.

## Conclusion

Yield and yield contributing characters like plant population and plant height, base diameter, fibre yield and stick yield were affected significantly due to sowing at different time. From the study, it can be concluded that the jute var. BJRI Tossa Pat-8 (Robi-1) gave fibre yield and stick yield, 14% higher than control when sown on 10 April to 20 April.

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