

Effect of sowing dates and fertility levels on growth and fibre yield of jute (*Corchorus* species) varieties

S.R. PATEL¹ AND D.S. THAKUR²

Regional Agricultural Research Station, Indira Gandhi Agricultural University, Raigarh, Chhattisgarh 496 001

Received: July 2002

ABSTRACT

A field experiment with jute (*Corchorus* sp.) varieties was conducted during the rainy season of 1997 and 1998 at Raigarh, with 4 sowing dates and 2 fertility levels. Significantly higher values of growth, yield attributes and fibre yield were recorded with earlier sowing than delayed sowing. Maximum fibre yield of 2,412 kg/ha was obtained when the crop was sown on 10 June, which drastically decreased with delay in sowing on 20, 30 June and 10 July (1,995, 1,492 and 1,240 kg/ha respectively). Tossa jute (*Corchorus olitorius* L.) variety 'JRO 524' (1,844 kg/ha) gave higher fibre yield than to white jute (*C. capsularis* L.) 'JRC 212' (1,726 kg/ha). The white jute 'JRC 212' gave higher fibre yield when sown on 10 June with fertility level of 60 : 40 : 30 kg N : P₂O₅ : K₂O/ha, whereas the sowing of 'JRO 524' can be extended up to 20 June with fertility level of 60 : 45 : 45 kg N : P₂O₅ : K₂O/ha.

Key words: Sowing date, Jute, Fibre yield, Fertility level

In eastern part of Chhattisgarh early-duration rice is grown under upland situation in light-textured soils. The productivity of rice under this situation is quite low (<1 tonne/ha) besides abundant rainfall, solar radiation and man-power availability. Rice suffers due to moisture stress during different physiological stages due to vagaries of monsoon in addition to low moisture-holding capacity of the soil. Under this situation, jute can be successfully grown as a best alternate crop to minimize the risk of crop failure and for sustained economic return. Apart from this, a jute mill is situated in the eastern Chhattisgarh, which is exclusively dependent on traditional jute-growing areas like West Bengal and Orissa for the supply of raw material. No systematic research work has been done in eastern part of Chhattisgarh on jute. To provide best alternative crop under upland situation and to supply raw material to the jute industry an attempt was made to explore the possibility of growing jute in non-traditional area of Chhattisgarh, the present experiment was undertaken.

MATERIALS AND METHODS

A field experiment with 2 jute (*Corchorus* sp.) varieties was conducted during the rainy seasons of 1997 and 1998 at Regional Agricultural Research Station, IGAU, Raigarh. The soil was sandy loam, neutral in reaction with pH 7.2, having 185.6, 14.8 and 335 kg available N, P₂O₅

and K₂O/ha, respectively, in 1997 and the same were 7.1, 198.4, 13.4 and 328 kg/ha in 1998. The treatments consisting of 4 sowing dates (10, 20, 30 June and 10 July) in main plot, while 2 varieties of jute, one white jute 'JRC 212' and another tossa jute 'JRO 524' with 2 fertility levels (100% and 150% of recommended dose of N: P₂O₅ : K₂O/ha) in subplot were laid out in split-plot design with 3 replications. Fertilizer dose of 60:40:30 and 40:30:30 kg N: P₂O₅ : K₂O/ha were considered as recommended dose for 'JRC 212' and 'JRO 524' respectively. Entire quantity of phosphorus and potash and one-third of N were applied basal through single superphosphate, muriate of potash and urea respectively. Remaining N was applied in 2 equal splits, at 21 and 35 days after sowing. The jute seed obtained from Central Research Institute for Jute and Allied Fibres, Barrackpore, was sown as per treatments. The extra plants were thinned at 20 days after sowing to maintain about 5 cm plant-to-plant spacing. The crop was harvested at pod-formation stage and retted in a tank for fibre extraction. A total rainfall of 1,401.7 mm in 1997 and 1,069.6 mm in 1998 was received during the crop period.

RESULTS AND DISCUSSION

Sowing dates

The yield attributes and fibre yield of jute were significantly influenced with different sowing dates. Higher

Present address : ¹Department of Agrometeorology, IGAU, Raipur 492 006; ²College of Agriculture and Research Station, Jagdalpur, Chhattisgarh 494 005

plant height, fibre length, basal diameter, fibre weight/plants and fibre yield were obtained when the crop was sown on 10 June as compared to delayed sowing during both the years. However, earlier sowing on 10 June was found statistically at par to sowing on 20 June with respect to plant height and fibre yield during 1998 and fibre length during 1997. The yield attributes and yield gradually decreased with delay in sowing from 10 June to 10 July. Thakuria and Sarma (1991) and Guha and Das (1997) also obtained significantly higher plant height when jute sowing was done during 1 to 15 June and 1 to 16 June respectively. The pooled data showed that maximum fibre yield of jute (2,412 kg/ha) was harvested with earlier sowing of 10 June, which was 20.9, 61.6 and 94.5%

higher than sowing on 20, 30 June and 10 July respectively.

Varieties

Tossa jute variety 'JRO 524' produced significantly higher fibre length and fibre weight/plant than white jute variety 'JRC 212' during both the years. However, both the varieties exhibited similar plant height during 1997 and fibre yield during 1998. However, on the mean basis tossa jute variety 'JRO 524' (1,844 kg/ha) gave higher fibre yield by 118 kg/ha than white jute variety 'JRC 212' (1,726 kg/ha). Basal diameter of white jute variety 'JRC 212' was higher than tossa jute variety 'JRO 524' in 1997, while it was at par in 1998. Higher values of plant height, fibre length and fibre weight/plant mainly contributed to

Table 1. Growth, yield attributes and fibre yield of jute varieties as influenced by sowing dates and fertility levels

Treatment	Plant height (cm)			Fibre length (cm)			Basal diameter (cm)			Fibre weight/plant (g)			Fibre yield (kg/ha)		
	1997	1998	Mean	1997	1998	Mean	1997	1998	Mean	1997	1998	Mean	1997	1998	Pooled
Sowing date															
D ₁ , 10 June	277	266	272	242	230	236	2.45	2.26	2.36	5.82	4.78	5.30	2,531	2,292	2,412
D ₂ , 20 June	235	234	235	207	197	202	1.95	1.82	1.89	4.00	3.96	3.98	1,987	2,002	1,995
D ₃ , 30 June	208	194	201	187	160	174	1.75	1.58	1.67	3.70	2.92	3.31	1,590	1,393	1,492
D ₄ , 10 July	204	190	197	184	152	168	1.65	1.56	1.61	3.28	2.11	2.70	1,464	1,015	1,240
CD (P=0.05)	32	38		39	21		0.35	0.35		0.52	0.79		426	322	356
Variety															
V ₁ , 'JRC 212'	229	214	222	199	174	187	2.10	1.84	1.97	3.65	3.24	3.95	1,811	1,640	1,726
V ₂ , 'JRO 524'	233	228	231	211	196	204	1.80	1.77	2.79	3.75	3.64	3.70	1,975	1,712	1,844
CD (P=0.05)	NS	6		6	6		0.12	NS		0.32	0.15		134	NS	105
Fertility levels															
F ₁ , 100%	218	206	212	190	170	180	0.78	1.53	1.16	3.90	3.14	3.52	1,706	1,484	1,595
F ₂ , 150%	244	236	240	220	199	210	2.12	2.08	2.10	4.50	3.74	4.12	2,081	1,868	1,975
CD (P=0.05)	6	6		6	6		0.12	0.09		0.32	0.15		134	181	105

Table 2. Interaction effect of sowing dates and fertility levels on fibre yield (kg/ha) of jute varieties (pooled mean of 2 years)

Sowing date	‘JRC 212’		‘JRO 524’		Mean		
	Fertility level		Fertility level				
	100 (60 : 40 : 30 kg/ha)	150% (90 : 60 : 45 kg/ha)	100% (40 : 30 : 30 kg/ha)	150% (60 : 45 : 45 kg/ha)			
D ₁ , 10 June	2,657	2,754	1,833	2,403	2,412		
D ₂ , 20 June	1,878	1,948	1,640	2,515	1,995		
D ₃ , 30 June	1,169	1,435	1,353	2,012	1,492		
D ₄ , 10 July	903	1,066	1,329	1,667	1,241		
Mean	1,652	1,801	1,539	2,149			
Mean	Varieties		Fertility level				
	‘JRC 212’	1,726	100%	1,595			
	‘JRO 524’	1,844	150%	1,975			
CD (P=0.05)	Sowing dates (D)	Varieties (V)	Fertility level (F)	D × V	D × F	V × F	D×F×F
	356	105	105	210	210	149	298

the higher fibre yield of tossa jute variety 'JRO 524' compared to white jute variety 'JRC 212'.

Fertility levels

Significantly higher values of plant height, fibre length, basal diameter of plant, fibre weight/plant and dry fibre yield (1,975 kg/ha) were obtained with the 50 % higher fertility level compared to recommended level of fertilizer application. The higher fibre yield at higher fertility level may be due to the overall poor fertility status of the soil.

The interaction effect on fibre yield between sowing dates, varieties and fertility levels was found significant. Significantly higher fibre yield of white jute variety 'JRC 212' was obtained with recommended level of fertilizer application, i.e. 60:40:30 kg N:P₂O₅:K₂O/ha which was at par with 50% higher fertility level when the crop was sown on 10 June-compared to delayed sowing (Table 2). The results confirm the findings of Mishra and Misra (1996). The results also confirm the findings of Mandal *et al.* (1983). The tossa jute variety 'JRO 524' gave significantly higher fibre yield with 50% higher fertility level (60: 45:45 kg N:P₂O₅:K₂O/ha) than the recommended fertility level (40:30:30 kg N:P₂O₅:K₂O/ha) when the crop

was sown up to 20 June. Thereafter the fibre yield decreased sharply in delayed sowing.

It can be concluded that sowing of 'JRC 212' white jute with recommended level of fertilizer (60:40:30 kg N:P₂O₅:K₂O/ha) should be done before 10 June, whereas the sowing of tossa jute variety 'JRO 524' tossa jute can be extended up to 20 June with 50% higher fertility level of 60:45:45kg N:P₂O₅:K₂O/ha.

REFERENCES

- Guha, B. and Das, K. 1997. Effect of spacing and planting date on seed production of jute (*Corchorus capsularis*) propagated by vegetative means. *Indian Journal of Agronomy* 42(2) : 385-387.
- Mandal, B.C., Saha, M.N. and Roy, A.B. 1983. Effect of continuous use of fertilizers on yield of tossa jute in a jute-rice-mustard sequence. *Indian Journal of Agricultural Sciences* 53(7) : 593-594.
- Mishra, M. and Misra, A. 1996. Effect of fertilizer, weed control methods and row spacing in white jute (*Corchorus capsularis*). *Indian Journal of Agronomy* 41(3) : 462-464.
- Thakuria, K. and Sarma, K.K. 1991. Effect of sowing date and spacing on seed yield of *capsularis* jute. *Indian Journal of Agronomy* 36(1) : 36-39.