



RESEARCH PAPER

Seed yield and economics of jute (*Corchorus olitorius*) as influenced by different dates of sowing, spacing and topping management

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Abstract : A field experiment was conducted at Farm of Jute and Allied Fibre Crops, MPKV, Rahuri to optimize the suitable sowing date, spacing along with topping management practice in seed yield and economics of jute (*Corchorus olitorius*). The three dates of sowing viz., 24th MW (11-17th June), 26th MW (25th June-1st July) and 28th MW (8-15th July), four spacings like 45cm x 10 cm, 45cm x 15 cm, 60 cm x 15 cm and 60 cm x 15 cm and three topping management techniques viz., No topping, 30 DAS and 45 DAS were laid out in split-split design and replicated thrice. Sowing date of 24th MW recorded significantly higher growth and yield attributes and jute seed yield (17.94 q ha⁻¹) as compared to 26th MW (15.02 q ha⁻¹) and 28th MW (13.08 q ha⁻¹) and it was 19.44 per cent higher than 26th MW and 37.15 per cent higher than 28th MW during the *Kharif* season of 2015. Similarly, It significantly recorded highest gross return (Rs.107674 ha⁻¹), net return (Rs. 65036 ha⁻¹) and B:C ratio (2.52) due to more seed yield achieved during this year. Spacing of 60 cm x 15 cm recorded significantly growth, yield attributes and seed yield (17.29 q ha⁻¹). Similarly, It also recorded higher gross return (Rs. 102013 ha⁻¹), net return (Rs. 59352 ha⁻¹) and B:C ratio (2.17). Topping at 45 DAS registered significantly higher seed yield (17.88 q ha⁻¹) than over no topping and topping at 30 DAS. Similarly, It was also noted that the significantly higher gross return (Rs.107297 ha⁻¹), net return (Rs. 63658 ha⁻¹) and B:C ratio (2.26) were achieved by topping at 45 DAS. Sowing of jute (*C. olitorius*) during 24th MW week (11-17th June) with optimum spacing of 60 cm x 15 cm and topping at 45 DAS is recommended for higher seed yield and maximum returns of jute in irrigated conditions.

Key Words : Date of sowing, Seed yield, Spacing, Topping, Economics

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INTRODUCTION

Jute is one of the most important commercial crops of eastern Indian states of West Bengal, Assam, Bihar, Orissa and eastern Uttar Pradesh, being an important foreign exchange earner and supporting nearly 7 million

small and marginal families, industrial employees and trade (Kumar *et al.*, 2010).

Seed is the critical input in any agricultural system and high yield of quality seed can be obtained only with improved agro-techniques. Abundant research has been done aiming at standardization of different factors for

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seed production in many crops but most of the agronomic practices have still not been standardized for seed crop of jute crops. At present jute seed crop particularly of *C. olitorius* varieties are grown mainly in drier area of Andhra Pradesh, Maharashtra and Gujarat. Non-availability of quality jute seed to the farmers at a lower price and at proper time is one of the major constraints faced by jute farmers. To minimize the hindrances towards getting higher jute fibre production with uniform productivity across the growing zones the issues those are to be readily addressed include standardization of quality jute seed production technology. Date of sowing is one of the factors affecting seed yield of different crops. Spacing influences growth rate and crop yield as a result of inter-plant competition for different inputs needed for growth and development (Tripathi *et al.*, 2013). Spacing is one of the factors affecting seed yield of different crops. It influences growth rate and crop yield as a result of inter plant competition for different inputs needed for growth and development. Thus, investigation on spacing arrangements becomes mandatory for understanding the mechanism of yield enhancement. Apical topping breaks the apical dominance and induces development of lateral branches thereby increase the site for pod and capsule development. The practice of topping has proved to be effective in increasing the yield levels of different crops (Sajjan *et al.*, 2002 and Singh *et al.*, 2011). Very meagre information is available on interactive effect of different sowing dates, spacings along with topping management practices in seed production of jute and allied fibre crops. Keeping these points in view, the present investigation was carried out to study the effect of sowing dates, spacing and topping management practices on growth and seed yield of jute (*Corchorus olitorius*).

MATERIAL AND METHODS

The experimental site was located in the farm of Jute and Allied Fibre crops, Mahatma Phule Krishi Vidyapeeth, Rahuri, Maharashtra (situated at lies between 19° 48' N and 19° 57' N latitude and 74° 32' E and 74° 19' E longitude). The altitude varies from 495 to 569 meter above mean sea level). The soil was medium black, having pH, medium in organic C (0.54 %), low in available N (172.30 kg ha⁻¹) and medium in available P (16.40 kg ha⁻¹) and available K (530.0 kg ha⁻¹). Climatologically, this area falls in the semi-arid tract with an annual rainfall varying from 307 to 619 mm. The

average annual rainfall at Rahuri is 520 mm. The maximum rainfall *i.e.* about 80 per cent of the total is received from south-west monsoon during the rainy months of June to September. The mean annual maximum and minimum temperature ranges from 33° to 43°C and 6° to 18°C, respectively. The relative humidity during morning and evening hours are 59 and 35 per cent, respectively. The field experiment was conducted during June to December 2015. The four dates of sowing {(D₁-24th MW, (11-17th June), D₂-26th MW (25th June-1st July) and D₃-28 MW (8-15th July)}, four spacings (S₁-45 x 10 cm, S₂-45 x 15 cm, S₃-60 cm x 15 cm and S₄-60 cm x 15 cm) and three topping management practices (T₁- No topping, T₂- 30 DAS and T₃- 45 DAS) were laid out in split-split plot design and replicated thrice. Date of sowing was assigned to the main plots, spacing to the sub-plots and topping to the sub-sub-plots having total 36 combinations. Fertilizer doses of 60, 30 and 30 kg ha⁻¹ N, P₂O₅ and K₂O were applied, respectively. N was applied in two equal split doses one as basal dose and another top dressed at 30 DAS, when hand weeding was done.

For data collection on growth (plant height and number of branches plant⁻¹) and other yield attributing characters (basal diameter and number of pods/plant at harvest) five plants were picked at random from each plot. Harvesting was done in month of November as per treatment of sowing dates and maturity of crop, respectively. The crop was threshed plot wise and seed yield obtained from net plot was converted into q ha⁻¹. While calculating gross return prevalent market price for sale of jute seed was taken as Rs. 60.00 kg⁻¹. Net return was calculated by deducting cost of cultivation from gross income and benefit/cost ratio was calculated by dividing total cost of cultivation (Rs.ha⁻¹) to gross return (Rs.ha⁻¹).

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Effect of date of sowing :

The pooled mean revealed that sowing dates influenced different growth parameters significantly (Table 1). The crop sown in 24th MW (D₁-11-17th June) was significantly recorded highest plant height (247.28 cm) as well as number of branches (21.58) plant⁻¹.

Table 1 : Effect of sowing dates, spacings and topping managements on growth and seed yield of jute

Treatments	Plant height (cm)	No. of branches per plant	Basal diameter (mm)	No. of pods per plant	Seed yield (q ha ⁻¹)
Sowing date					
24 th MW	247.28	21.58	23.21	130.50	17.94
26 th MW	194.23	16.06	16.32	101.38	15.02
28 th MW	201.40	14.81	17.34	87.42	13.08
S.E.±	2.31	0.44	0.20	3.03	0.38
C.D. (P=0.05)	9.09	1.72	0.78	11.91	1.49
Spacing					
45cm x15cm	219.81	14.41	18.83	94.04	15.86
45cm x 30cm	219.33	18.67	19.62	126.06	15.78
60cm x 15cm	223.98	21.83	18.64	131.26	17.29
60cm x 30cm	221.09	20.37	21.96	112.41	17.01
S.E.±	2.74	0.35	0.27	2.27	0.30
C.D. (P=0.05)	NS	1.03	0.82	6.74	0.89
Topping					
No topping	240.40	17.43	19.01	106.31	15.18
30 DAS	202.15	18.75	20.36	117.58	16.38
45 DAS	220.61	20.28	19.83	123.93	17.88
S.E.±	1.74	0.39	0.19	1.43	0.34
C.D. (P=0.05)	4.76	1.10	0.55	4.07	0.97

NS= Non-significant

Table 2 : Effect of sowing dates, spacings and topping managements on economics of jute

Treatments	Gross return (Rs.ha ⁻¹)	Cost of cultivation (Rs.ha ⁻¹)	Net return (Rs.ha ⁻¹)	B:C ratio
Sowing date				
24 th MW	107674	42638	65036	2.52
26 th MW	90155	42638	47516	2.11
28 th MW	78472	42638	35833	1.76
S.E.±	2132	-	2146	-
C.D. (P=0.05)	8374	-	8427	-
Spacing				
45cm x15cm	95181	42721	52460	2.06
45cm x 30cm	94710	42601	52109	2.14
60cm x15cm	102013	42661	59352	2.17
60cm x 30cm	103754	42571	61183	2.15
S.E.±	1764	-	1762	-
C.D. (P=0.05)	NS	-	NS	-
Topping				
No topping	91124	40638	50486	2.03
30 DAS	98323	42638	54684	2.09
45 DAS	107297	43638	63658	2.26
S.E.±	2062	-	2065	-
C.D. (P=0.05)	5865	-	5871	-

NS= Non-significant

Similarly, the higher growth attributes reflected in higher yield attributes *viz.*, basal diameter of plant⁻¹ (23.21mm) and number of pods plant⁻¹ (130.50) during this year. These results are in line with the findings of Guha and Das (1997). Similar sowing date recorded significantly higher jute seed yield (17.94 q ha⁻¹) as compared to 26th MW (15.02 q ha⁻¹) and 28th MW (13.08 q ha⁻¹) during *Kharif* season of 2015. The sowing date of 24th MW received maximum rainfall during the entire vegetative growth period and it also converted into reproductive parts (pods) as compared to 26th MW and 28th MW. The sowing date of 28th MW recorded significantly lowest values of all the growth and yield attributes and ultimately resulted into lowest seed yield of jute. Date of sowing recorded significant differences in seed yield was also reported by Guha and Das (1997) and Mishra and Nayak (1997). Effect of sowing date of jute in 24th MW significantly recorded the highest gross return (Rs.107674 ha⁻¹), net return (Rs. 65036 ha⁻¹) and B:C ratio (2.52) due to more seed yield achieved than rest of all treatments (Table 2). Similarly Das *et al.* (2014) and Roy and Mazumdar (1995) reported significant effect of date of sowing.

Effect of spacing :

Spacing influenced significantly at all growth parameters except plant height (cm) in Table 1. The sowing of jute crop for spacing of 60 cm x 15 cm significantly increased the growth and yield attributes *viz.*, number of branches plant⁻¹ (21.83), basal diameter (18.64 mm) and number of pods plant⁻¹ (131.26) than spacing of 45 cm x 15 cm, 45 x 30 cm and 60 cm x 30 cm but plant height had no significant effect during *Kharif* season of 2015 (Table 1). Achievement of more vigour by an individual plant in case of wider spacing might explain the result of all the above mentioned growth parameters were taken, calculated and quantified for individual plant. Similar observations were recorded by Madakadze *et al.* (2007). Spacing of 60 cm x 15 cm recorded significantly higher seed yield (17.29 q/ha) than spacing of 45 cm x 15 cm, 45 x 30 cm and 60 cm x 30 cm. The widest spacing recorded less seed yield (17.01 q/ha) probably due to less plant population per unit area (Mishra and Nayak, 1997). Similarly highest seed yield is converted into highest gross return (Rs.102013 ha⁻¹) and net return (Rs.59352 ha⁻¹) were manifested by S₃ *i.e.* 60 cm x 15 cm and it was achieved higher B:C ratio (2.17) than rest of all treatments during this year (Table

2). It is also clearly stated by Das *et al.* (2014) and Mishra and Nayak (1997).

Effect of topping management:

It was observed that different topping management practices had significant effects on the growth and yield parameters (Table 1). Earlier topping *i.e.* topping at 30 DAS had harmful effect on plant height but rendered beneficial effect in terms of other growth parameters like basal diameter per plant. This could be because of the fact that in 30 DAS early removal of apical portion of the plant checked the vertical growth from early growing stage. Topping at 45 DAS (T₃) exhibited superior performance with regard to all the growth and yield parameters *viz.*, number of branches per plant (20.28), number of pods per plant (123.93). This might due to be topping at 30 DAS promoted much vegetative growth but better reproductive growth was obtained with topping at 45 DAS. Topping at 45 DAS registered significantly higher seed yield (17.88 q ha⁻¹) than over no topping and topping at 30 DAS during *Kharif* season of 2015. It also recorded 17.01 and 8.38 per cent higher seed yield of jute over no topping and topping at 30 DAS. This line of research work was done by Mishra and Naik (1997); Sajjan *et al.* (2002) and Singh *et al.* (2011). Similarly, it was also noted that significantly higher gross return (Rs.107297 ha⁻¹), net return (Rs. 63658 ha⁻¹) and B:C ratio (2.26) were achieved by topping at 45 DAS in (Table 2). Similar results were registered by Das *et al.* (2014); Saha *et al.* (2011) and Tripathi *et al.* (2013).

Conclusion :

Sowing of jute (*C. olitorius*) during 24th MW week (11-17th June) with optimum spacing of 60 cm x 15 cm and topping at 45 DAS is recommended for higher seed yield and maximum profitability of jute in irrigated conditions.

REFERENCES

- Das, H., Poddar, P., Haque, S., Pati, S., Poddar, R. and Kundu, C. K. (2014). Seed yield and economics of white jute as influenced by different dates of sowing, spacing and topping schedule in Terai region of West Bengal. *Internat. J. Farm Sci.*, 4(4): 51-58.
- Guha, B. and Das, K. (1997). Effect of spacing and planting date on seed production of jute (*Corchorus capsularis*) propagated by vegetative means. *Indian J. Agron.*, 42: 385-387.

- Kumar, D., Saha, A., Begum, T. and Choudhury, H. (2010).** Possibility of jute seed production in jute growing states of India. In: *Jute and allied fibres production, utilization and marketing*. Indian Fibre Society, Eastern Region, pp 230-234.
- Madakadze, R.M., Kodzanayi, T. and Mugumwa, R. (2007).** Effect of plant spacing and harvesting frequency on *Corchorus olitorius* leaf and seed yield. Proceedings, African Crop Science Conference, *African Crop Science Society*, **8** : 279-282.
- Mishra, G.C. and Nayak, S.C. (1997).** Effect of sowing date and row spacing on seed production of jute (*Corchorus species*) genotypes with and without clipping. *Indian J. Agron.*, **42**: 531-534.
- Roy, B. and Majumdar, T. K. (1995).** Effect of sowing date and nitrogen level on seed yield of white jute (*Corchorus capsularis*) and tossa jute (*C. olitorius*). *Indian J. Agric. Sci.*, **65** : 891-893.
- Saha, Debasree, Zaman, A., Devi, T.H. Gangarani and Gunri, S.K. (2011).** Effect of irrigation regimes and different levels of nitrogen on seed yield of jute (*Corchorus olitorius*), *Internat. J. Forestry & Crop Improv.*, **2** (1) : 19-21.
- Sajjan, A.S., Shekaragouda, M. and Badanu, V. P. (2002).** Influence of apical pinching and pod picking on growth and seed yield of okra. *Karnataka J. Agric. Sci.*, **15**: 367-372.
- Singh, F., Kumar, R., Kumar, P. and Pal, S. (2011).** Effect of irrigation, fertility and topping on Indian mustard (*Brassica juncea*). *Prog. Agric.*, **11**: 477-478.
- Tripathi, M.K., Chaudhary, B., Singh, S.R. and Bhandari, H.R. (2013).** Growth and yield of sunhemp (*Crotalaria juncea* L.) as influenced by spacing and topping practices. *African J. Agric. Res.*, **8** : 3744-3749.

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