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EFFECT OF SOWING METHOD ON JUTE SEED YIELD AT KISHOREGANJ AND PATUAKHALI DISTRICTS OF BANGLADESH

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ABSTRACT

An experiment was conducted two consecutive locations at Jute Research Regional Station (JRRS), Kishoreganj and Jute Research Sub Station (JRSS), Patuakhali to find out the seed yield at different sowing methods. Three popular varieties e.g., BJRI Tossa Pat-8 (Robi-1), O-9897, JRO-524 and three sowing methods e.g., direct seeding, top cutting and seedling transplanting and methods were used as experimental treatments. The experiment was carried out RCBD with three replications. Results revealed that the highest seed yield was produced (690, 681Kg ha^{-1}) in Robi-1 and (667, 697 Kg ha^{-1}) from direct seeding method in both Kishoreganj and Patuakhali, respectively.

Key words: Sowing method, variety, yield, jute seed

Introduction

Jute is a fibre crop belongs to genus Corchorus of the Tiliaceae family with two cultivated species- *Corchorus capsularis* L. and *C. olitorius* L. Fibre is extracted from the bark of the plants (Alim, 1978; Dempsey, 1975). It is the second most important bast fibre after cotton, in terms of usage, global consumption, production and availability. It is an important cash crop in Bangladesh and India, which together accounts for about 84% of world production of jute fibre (Islam, 2009). Jute is still contributing about 4% GDP to the national economy and earns about 5% of foreign exchange as well (Islam and Rahman, 2008). In Bangladesh around 4 to 5 million small and subsistence farmers derive their livelihood from Jute and Allied Fibre (JAF) crop production while thousands of other workers and employed in its processing, handling, manufacturing (Saha, 2011). Global awareness on 'save the environment` increases the demand of jute. Jute plants improve soil productivity because of its huge leaf defoliation and root proliferation in the field (Islam and Rahman, 2008). Jute and jute products not only retard ecological degradation but also conserve green environment and atmosphere as a whole (Mir et al. 2008). Thus, jute is a crop having a lot of positive benefits in establishment of green economy, soil health and environment (Ghosh *et al*., 2013, Mamun *et al*., 2017). Different jute seed producing techniques such as direct seeding, seedling transplanting and top cutting methods are practiced for breeder seed production at the different regions of Bangladesh for maintaining varietal purity. But farmers do not practice these seed production technique different regions of Bangladesh. Farmers are not interested to grow jute seed with sacrificing T. Aman rice and winter (high value) vegetables. Still now Bangladesh is facing scarcity of quality jute seed for jute cultivation during growing season. More over information is not available about the seed yield performance of the newly released variety BJRI Tossa Pat-8 (Robi-1). Therefore, with the above view of the experiment will be conducted in late jute seed production to find out the comparative seed yield performance at Kishoreganj and Patuakhali research station.

Materials and Methods

The experiment comprising three popular varieties viz. BJRI Tossa Pat-8 (V_1), O-9897 (V_2) and JRO-524 (V_3) were evaluated for seed yield at Kishoreganj and Patuakhali research stations under three techniques namely direct seeding method (S_1), top cutting method (S_2) and seedling transplanting method (S_3). The experiment was carried out RCBD with three replications. Seeds were sown in plot having 3m x 3m sized.

The concern varieties were grown in mentioned research stations of BJRI by following their proper isolation distance and sowing time. The crop was sown on 28 June, 2019. Fertilization and roughing along with other intercultural operations were done in time. A close observation was kept on diseases and pest infestation. All intercultural operations were done properly and timely. After ripening the fruits, plants were harvested on 10th January, 2020. Pods are properly threshed, cleaned, dried and stored accordingly of all varieties. Data recorded on plant population, plant height, branch per plant, pods per plant, seeds per pod, seed yield. Data were analyzed by using statistics-10 software.

Results and Discussion

Plant population: Plant population varied significantly among varieties, sowing methods and different locations. The highest plant population was recorded (30.83) in V_1 variety in Kishoreganj whereas in V_2 (29.39) from Patuakhali. The lowest plant population was recorded (19.86 and 20.04) in V_3 variety both at Kishoreganj and Patuakhali (Table 1). For sowing method, the highest plant population was recorded from S_3 sowing method (36.38 and 37.46) at Kishoreganj and Patuakhali districts. The lowest population was observed from S_2 (17.50 and 16.98) also both of the studied districts (Table 1). The interaction effect explored that, S_3xV_1 interaction ensured the highest plant population (39.99 and 40.53), whereas S_1xV_3 interaction gave the lowest population (12.58 and 13.59) both at Kishoreganj and Patuakhali districts of Bangladesh (Table 2).

Plant height: Plant height varied significantly among varieties, sowing methods and different locations. The highest plant height was recorded (3.00cm and 2.92cm) from V_3 variety in Kishoreganj and the lowest plant height was recorded (2.70 cm) from V_1 variety in Kishoreganj (Table 1). On the other hand, the highest plant height was recorded in S_3 sowing method (3.41m and 3.67m) at Kishoreganj and Patuakhali. The lowest plant height was observed from S1 (2.93m and 2.55m) also at Kishoreganj and Patuakhali (Table 1). The interaction effect explored that S_3xV_2interaction ensured the highest plant height (4.06 and 3.78) both at Kishoreganj and Patuakhali districts whereas S_2xV_2 interaction gave the lowest (1.86m) plant height in Kishoreganj and S_2 x V_2 interaction gave (2.28m) plant height in Patuakhali district (Table 2).

Number of branches per plant: Branch per plant did not varied significantly among varieties (Table 1), but varied significantly among sowing methods and different locations. The highest number of branch was recorded from S_3 sowing method (1.97 and 1.98) both in Kishoreganj and Patuakhali. The lowest number of branch was observed (1.41) from S_2 sowing method number in Kishoreganj, but from S_1 (1.64) in Patuakhali (Table 1). S_3xV_1 interaction ensured the highest number of branch (2.02 and 2.04) which was statistically identical with S_3xV_2 and S_3xV_3 interactions both in Kishoreganj and Patuakhali districts, whereas S_2xV_3 interaction gave the lowest number of branch (1.30) in Kishoreganj and S_2xV_3 (1.63) in Patuakhali district (Table 2).

Number of Pods per plant: Number of pod varied significantly among varieties, sowing methods and different locations. The highest number of pod was recorded (46.10) in V_1 variety at Kishoreganj and (42.63) in V_3 variety at Patuakhali. The lowest was recorded (28.12 and 35.97) in V_2 variety both in Kishoreganj and Patuakhali (Table 1). In case of sowing method, the highest number of pod was recorded in S_2 sowing method (43.42 and 44.92) and the lowest number of pod was recorded in S_1 sowing method (27.99 and 27.86) both in Kishoreganj and Patuakhali. The interaction effect explored that S_3xV_1 interaction ensured the highest number of pod (52.38) in Kishoreganj whereas S_3xV_2 (53.31) in Patuakhali. S_1 xV_2 provided the lowest number of pod (18.54 and 18.76) both in Kishoreganj and Patuakhai (Table 2).

Number of seed per pod: Number of seed per pod varied significantly among varieties, sowing methods and different locations. The highest number of seed per pod was recorded (185 and 186) in V_1 variety both in Kishoreganj and Patuakhali and the lowest was recorded (176) in V_2 and V_3 varieties, respectively (Table 1). The highest number of seed per pod was recorded fromS_1 sowing method (191 and 192) and the lowest number of seed per pod was recorded from S_3 sowing method (168 and 169) both in Kishoreganj and Patuakhali (Table 1).

Table 1. Effect of variety and sowing method on morpho-physiology and yield attributes of jute

Treatment	Kishoreganj district						Patuakhali district					
	Plant population (m^2)	Plant height (m)	Branches per plant	Pods per plant	Seeds per pod	Yield ($kgha^{-1}$)	Plant population (m^2)	Plant height (m)	Branches per plant	Pods per plant	Seeds per pod	Yield ($kgha^{-1}$)
Varietal performances												
V_1	30.83a	2.70 c	1.71 a	46.10 a	185a	690a	27.75b	3.00 a	1.77 a	37.41b	186 a	681 a
V_2	29.253b	2.89 b	1.67 a	28.12 c	176 b	534 b	29.39a	2.92 a	1.74 a	35.97c	176b	584 b
V_3	19.863c	3.00 a	1.63 a	39.35 b	176 b	474 c	21.04c	2.92 a	1.77 a	42.63a	176b	497 c
LSD	1.4931	0.0817	0.0856	0.7873	4.5194	13.965	1.2316	0.103	0.0723	0.8254	3.5444	3.1353
CV	5.61	2.85	5.14	2.08	2.53	2.47	4.73	3.5	4.11	2.14	1.98	0.53
Effects of sowing method												
S_1	26.073b	2.93 b	1.63 b	27.99c	191a	667 a	23.73b	2.55 b	1.65 b	27.86c	192 a	697 a
S_2	17.50 c	2.25 c	1.41 c	43.42 a	177 b	373 b	16.98c	2.62 b	1.64 b	44.92a	176b	371 c
S_3	36.38 a	3.41 a	1.97 a	42.16 b	168c	657a	37.46a	3.67 a	1.98 a	43.23b	169c	694 b
LSD	1.4931	0.0817	0.0856	0.7873	4.5194	13.965	1.2316	0.103	0.0723	0.8254	3.5444	3.1353
CV	5.61	2.85	5.14	2.08	2.53	2.47	4.73	3.5	4.11	2.14	1.98	0.53

Table 2. Interaction effect of variety and sowing method on morpho-physiology and yield attributes of jute

Treatment	Kishoreganj district						Patuakhali district					
	Plant population (m^2)	Plant height (m)	Branches per plant	Pods per plant	Seeds per pod	Yield ($kgha^{-1}$)	Plant population (m^2)	Plant height (m)	Branches per plant	Pods per plant	Seeds per pod	Yield ($kgha^{-1}$)
S_1x V_1	31.19 c	2.71 de	1.66 b	36.73 d	194.88 a	720.32 b	22.42 c	2.00 g	1.64 b	28.43 f	196.43 a	731 b
S_1 x V_2	34.45 b	2.75 d	1.60 bc	18.54 g	188.56ab	550.47d	35.09 b	2.69 e	1.62 b	18.76 g	189.45 b	660 d
S_1 x V_3	12.58 e	3.33 b	1.62 bc	28.69 f	188.22ab	660.47 c	13.69 e	2.95 d	1.70 b	36.40 d	189.06 b	700 c
S_2 x V_1	21.31 d	2.30 f	1.44 de	49.19 b	171.60 d	560.39 d	20.29 cd	3.15 c	1.63 b	49.92 b	171.04 d	561 f
S_2 x V_2	18.80 d	1.86 g	1.49 cd	32.58 e	181.91bc	341 e	18.16 d	2.28 f	1.67 b	35.83 d	179.2.3 c	341 g
S_2 x V_3	12.37 e	2.59 e	1.30 e	48.50 b	177.97cd	220.04f	12.50 e	2.42 f	1.63 b	49.01 b	179.20 c	211 h
S_3x V_1	39.99 a	3.09 c	2.02 a	52.38 a	187.37ab	780a	40.53 a	3.86 a	2.04 a	33.89 e	191.33ab	750 a
S_3 x V_2	34.51 b	4.06 a	1.91 a	33.25 e	156.61 e	710.49 b	34.93 b	3.78 a	1.92 a	53.31 a	158.26 e	750 a
S_3 x V_3	34.64 b	3.08 c	1.97 a	40.85 c	160.33 e	540.48 d	36.93 b	3.38 b	1.97 a	42.49 c	160.36 e	580 e
LSD	2.5861	0.1415	0.1483	1.3637	7.8278	24.189	2.1333	0.1784	0.1251	1.4297	6.1391	5.4304
CV	5.61	2.85	5.14	2.08	2.53	2.47	4.73	3.5	4.11	2.14	1.98	0.53

Note: V_1= BJRI Tossa Pat-8 (Robi-1), V_2= O-9897, V_3= JRO-524; S_1= Direct seeding method, S_2= top cutting method, S_3= Seedling transplanting method

The interaction explored that the S_1xV_1 ensured the highest number of seed per pod (194.88 and 196.43) both in Kishoreganj and Patuakhali whereas S_3xV_2 interaction gave the lowest number of seed per pod (156.61 and 158.26) both in Kishoreganj and Patuakhai (Table 2).

Seed yield (kgha^{-1}): Seed yield is the ultimate goal of the experiment. Seed yield varied significantly among varieties, sowing methods and different locations. The highest seed yield was recorded (690 and 681) in V_1 variety both in Kishoreganj and Patuakhali and the lowest seed yield was recorded (474 and 497) in V_3. The highest seed yield was recorded in S_1 sowing method (667 and 697) and the lowest seed yield was recorded in S_2 sowing method (373and 371), respectively (Table 1). S_3xV_1 ensured the highest seed yield (780 and 750) whereas S_2xV_2 gave the lowest seed yield both in Kishoreganj and Patuakhai (Table 2). The results were supported by BJRI (2018-19) and BJRI (2019-20).

Conclusion

The results concluded that BJRI Tossa pat-8 (Robi-1) cultivated in direct seeding method ensured the better seed yield in the studied Kishoreganj and Patuakhali district of Bangladesh.

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