

**YIELD TRAILS CONDUCTED AT DIFFERENT AGRO-ECOLOGICAL ZONES FOR SELECTING THE BEST STRAINS OF DESHI JUTE (*Corchorus capsularis* L.) IN BANGLADESH**

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**ABSTRACT**

The experiment was conducted at five regional stations viz. Jute Agriculture Experiment Station (JAES), Manikgonj; Rangpur; Chandina; Faridpur and Kishoregonj of BJRI in 2017. The quantitative (plant height, base diameter, green weight with and without leaves, fibre weight and stick weight etc.) data were recorded 120 DAS. Analysis of variance revealed that significant differences among the treatments. Plant height, fibre yield and stick yield are relatively higher in Faridpur regional station than other part of the country. Also, out of seven progenies, C-4339 yielded comparatively better than other progenies and check variety and also observed that the fibre and stick yield increased with the increasing of plant height and base diameter.

**Key words:** Deshi jute, progeny, strains, genotype.

**Introduction**

Desi jute (*C. capsularis* L.) jute cultivation needs to be increased in future for its great demand to the jute industries of the country (Khatun *et al.*, 2010). Its fibre is a substitute for non-biodegradable fibres with a large range of commercial applications (Benor *et al.*, 2012; Islam, 2013). Jute accounts for about 5 percent of the foreign currency earnings from export. It appears from the recent record that the area under jute is declining; the crop is being pushed more and more to the marginal lands. There are many constraints to higher and stable yield of quality fibre. In this situation, it is important to develop new and promising deshi jute variety for quality fibre to make the jute cultivation as profitable enterprises around the country. Keeping these objectives in mind seven new promising progenies were derived through nine parent diallel crosses and subsequent selection and tested for assessment of their yield and other attributes under different agro-ecological conditions. An objective of this experiment was to develop breeding lines with distinct character, higher yield and quality fibres of deshi jute in Bangladesh.

**Materials and Methods**

This experiment was carried out with seven progenies of white jute viz. C-1546, C-1548, C-4311, C-4328, C-4330, C-4337 and C-4339 and two check varieties, CVL-1 and CVE-3. Pigmentation of selected deshi jute (*C. capsularis*) progenies along with check variety CVL-1 and CVE-3 are shown in Table -1.

Table 1. Pigmentation of white jute (*Corchorus capsularis*) progenies along with check variety CVL-1 and CVE-3

Acc. No.	SC	LC	VC	PC	St	StC	BC	BH	LS
C-1546	G/R	G	G	G/R	+	G	0	Rudimentary	Ovate
C-1548	G	G	G	G	+	G	0	Non branch	Ovate
C- 4311	G	G	G	G/R	+	G	0	Non branch	Ovate
C-4328	G/R	G	G	G/R	+	G	0	Rudimentary	Ovate-lanceolate
C-4330	G	G	G	G	+	G	0	Non branch	Ovate-lanceolate
C-4337	G/R	G	G	G/R	+	G	0	Sparse	Ovate-lanceolate
C-4339	G	G/R	G	G/R	+	G/R	0	Rudimentary	Ovate-lanceolate
CVL-1	G	G	G	G	+	G	0	Non branch	Ovate-lanceolate
CVE-3	G	G	G	G/R	+	G	0	Non branch	Ovate-lanceolate

G= Green, R= Red, LR= Light Red, "+" = Present, \* Check variety, SC= Stem color; LC= Leaf color; VC= Vein Color; PC= Petiole color; St= Stipule; StC= Stipule color; BC= Bud color; FC= Fruit Color; BH= Branch habit; LS= Leaf shape

The experimental trails were conducted at Jute Agriculture Experiment Station (JAES), Manikganj; Rangpur; Chandina; Faridpur and Kishoreganj regional stations of Bangladesh Jute Research Institute (BJRI) in 2017. The progenies were grown in a randomized complete block design (RCBD) with three replications having unit plot size of 2.1m x 3.0m = 6.30 sq. m. Proper intercultural operations, standard agronomic practices, recommended dose of fertilizer and pesticide were applied for better growth and fibre yield. Data were recorded at the age of 120 days after sowing for plant height, base diameter, green weight with leaves and without leaves, fibre weight and stick weight. Some qualitative parameter as stem color, leaf color, vein color, petiole color, presence or absence of stipule, stipule color, bud color, fruit color, branch habit and leaf shape were observed at harvesting period. The mean differences among the treatments were adjusted as per the Least Significant Difference (LSD) and T-test at 0.05 levels (Gomez and Gomez, 1984).

### Results and Discussion

The mean performance of yield and yield contributing characters of seven progenies along with two check varieties described in Table 2. In respect of mean performance plant height the progeny C-43.39 was (3.21 m), higher than the check variety CVL-1 (3.02 m) and CVE- 3 (3.10 m). The plant hight of C-4339 (3.69 m) observed highest from Check variety CVL-1 and CVE-3 at Faridpur regional station. On the other hand the plant height of CVL-1 (2.35m) observed lowest at Kishoregonj. The mean performance of base diameter of C-4339 (20.97 mm) observed higher from the check variety CVL-1 (20.14 mm) and CVE-3 (20.04 mm). The base diameter of C-4339 (23.19 mm) observed the highest from Check variety CVL-1 (22.15 mm) and CVE-3 (21.56 mm) at Faridpur regional station. On the other hand the base diameter of C-4330 (18.38 mm) observed lowest at Rangpur regional station. Analysis of variance revealed the significant differences among the genotypes in respect of fibre weight at Manikganj, Rangpur, Chandina and Faridpur; stick weight at Manikganj and Rangpur, respectively.

Table 2. Mean performance of seven progenies and two check varieties at different regional stations

Stations	Progenies	PH (m)	BD (mm)	GWL (th <sup>-1</sup> )	GWtL (th <sup>-1</sup> )	FW (th <sup>-1</sup> )	SW (th <sup>-1</sup> )
Manikganj	C-1546	3.02	18.65	30.68	26.35	1.83	4.01
	C-1548	2.95	19.32	34.54	29.96	2.37	5.05
	C-4311	2.98	19.23	26.25	23.07	1.56	3.34
	C-4328	2.93	19.94	33.41	28.60	1.47	3.28
	C-4330	3.11	19.65	34.04	29.28	1.44	3.25
	C-4337	3.12	19.29	21.84	18.25	1.64	3.29
	C-4339	3.13	18.89	22.71	19.35	2.06	5.09
	CVL-1	3.14	18.74	26.98	21.82	2.13	4.59
	CVE-3	3.21	18.64	35.08	30.50	2.45	4.69
	LSD (5%)	0.12	NS	NS	NS	0.436	1.192
LSD (1%)	0.17	NS	NS	NS	0.629	1.318	
Rangpur	C-1546	3.24	19.28	45.82	37.72	2.68	6.12
	C-1548	3.25	19.65	47.26	39.32	2.59	7.21
	C-4311	3.36	18.85	48.96	40.82	2.48	7.03
	C-4328	3.22	18.29	48.05	39.94	2.51	7.01
	C-4330	3.15	18.38	41.85	34.95	2.16	5.23
	C-4337	3.35	18.65	53.78	43.84	3.01	7.11
	C-4339	3.28	18.76	47.96	41.81	2.47	6.21
	CVL-1	3.13	18.97	46.95	38.75	2.59	7.05
	CVE-3	3.31	19.41	49.92	40.60	2.61	7.07
	LSD (5%)	NS	NS	NS	NS	0.442	0.874
LSD (1%)	NS	NS	NS	NS	0.701	1.502	
Chandina	C-1546	3.59	21.45	37.06	32.90	1.71	4.13
	C-1548	3.47	22.28	50.84	46.17	2.59	5.18
	C-4311	3.53	20.65	44.91	40.35	2.51	5.78

Stations	Progenies	PH (m)	BD (mm)	GWL (th <sup>-1</sup> )	GWtL (th <sup>-1</sup> )	FW (th <sup>-1</sup> )	SW (th <sup>-1</sup> )
	C-4328	3.63	20.82	43.37	38.82	2.28	5.18
	C-4330	3.65	23.49	53.87	49.20	2.49	6.65
	C-4337	3.56	20.54	44.24	40.73	2.04	4.640
	C-4339	3.58	19.53	57.34	52.99	2.16	5.19
	CVL-1	3.47	22.28	39.39	35.13	2.38	4.87
	CVE-3	3.56	21.52	42.75	38.27	1.62	4.27
	LSD (5%)	0.17	NS	NS	NS	0.561	NS
	LSD (1%)	0.32	NS	NS	NS	0.872	NS
Faridpur	C-1546	3.41	21.23	39.28	35.27	3.59	8.57
	C-1548	3.37	21.29	52.83	39.86	3.74	8.52
	C-4311	3.17	22.25	54.81	39.93	3.92	8.73
	C-4328	3.23	21.27	53.21	41.94	4.14	9.15
	C-4330	3.43	22.28	63.92	47.45	4.56	9.26
	C-4337	3.54	23.12	55.75	41.54	4.65	9.31
	C-4339	3.69	23.19	61.36	47.95	5.52	9.73
	CVL-1	3.58	22.15	48.93	42.34	4.98	9.51
	CVE-3	2.78	21.56	52.64	39.87	4.41	9.16
	LSD (5%)	0.39	NS	NS	NS	0.513	NS
LSD (1%)	0.61	NS	NS	NS	0.769	NS	
Kishoreganj	C-1546	2.72	20.69	29.17	24.32	1.15	2.51
	C-1548	2.86	21.29	34.31	29.37	1.18	2.78
	C-4311	2.47	20.76	31.25	25.68	1.16	2.58
	C-4328	2.45	19.85	31.12	25.71	1.17	2.64
	C-4330	2.64	18.76	29.89	24.73	1.16	2.57
	C-4337	2.59	19.18	34.74	29.46	1.29	2.79
	C-4339	2.85	20.45	29.96	23.87	1.26	2.64
	CVL-1	2.35	19.11	29.85	21.74	1.31	2.91
	CVE-3	2.53	19.59	28.76	23.58	1.13	2.47
	LSD (5%)	0.19	NS	NS	NS	NS	NS
LSD (1%)	0.28	NS	NS	NS	NS	NS	

Table 3. Pooled mean of eight breeding lines and two check varieties of white jute at different regional stations

Progenies	Parentage	PN	PH (m)	BD (mm)	GWL (th <sup>-1</sup> )	GWtL (th <sup>-1</sup> )	FW (th <sup>-1</sup> )	SW (th <sup>-1</sup> )
C-1546	Accs. 1831 x 1832	9911-1-5018	3.15	20.15	34.24	29.21	2.17	5.13
C-1548	Acc. 1831 x CC-45	9936-3-5030	3.17	20.68	41.17	33.85	2.52	5.67
C-4311	Var.CC-45x Acc.1832	9986-1-5036	3.09	20.26	38.45	30.87	2.32	5.42
C-4328	Var.CC-45x Acc.1833	9987-1-5044	3.12	19.97	39.18	31.97	2.31	5.41
C-4330	Accs. 1831 x 1832	9931-2-5133	3.16	20.46	42.03	33.23	2.39	5.53
C-4337	Accs. 2146 x 4087	9961-1-5136	3.14	20.09	39.38	32.21	2.58	5.48
C-4339	Accs. 2146 x 4087	9961-3-5149	3.21	20.97	42.26	34.01	2.67	5.96
CVL-1	..	..	3.02	20.14	36.75	31.05	2.73	5.99
CVE-3	..	..	3.10	20.04	39.61	31.27	2.38	5.59
LSD (5%)	..	..	0.125	NS	NS	NS	0.432	1.24
LSD (1%)	..	..	0.179	NS	NS	NS	0.615	1.71

PN= Pedigree number; PH= Plant height; BD= Base diameter; GWL= Green weight with leaves; GWtL= Green weight without leaves; FW= Fiber weight; SW= Stick weight

The progeny C-4339 produced significantly the higher fibre yield ( $5.52 \text{ tha}^{-1}$ ) than check variety CVL-1 ( $4.98 \text{ tha}^{-1}$ ) and CVE-3 ( $4.41 \text{ tha}^{-1}$ ) at Faridpur. On the other hand, the check variety CVE-3 was recorded for the lowest fibre yield ( $1.13 \text{ tha}^{-1}$ ) at Kishoregonj. The progeny C-4339 ( $9.73 \text{ tha}^{-1}$ ) followed by the check CVL-1 ( $9.51 \text{ tha}^{-1}$ ) showed the higher yield of stick weight at Faridpur. Conversely, the lowest yield of stick ( $2.47 \text{ tha}^{-1}$ ) was recorded from CVE-3 at Kishoregonj. In respect of mean performance stick yield, the check variety CVL-1 ( $5.99 \text{ tha}^{-1}$ ) over yielded from the progeny of deshi jute C-4339 ( $5.96 \text{ tha}^{-1}$ ), C-1548 ( $5.67 \text{ tha}^{-1}$ ), C-4330 ( $5.53 \text{ tha}^{-1}$ ), C-4337 ( $5.48 \text{ tha}^{-1}$ ), C-4311 ( $5.42 \text{ tha}^{-1}$ ), C-4328 ( $5.41 \text{ tha}^{-1}$ ) and C-1546 ( $5.13 \text{ tha}^{-1}$ ), respectively. The progeny C-4339 ( $9.73 \text{ tha}^{-1}$ ) produced the highest fibre yield from the Check variety CVL-1 ( $9.51 \text{ tha}^{-1}$ ) and CVE-3 ( $9.16 \text{ tha}^{-1}$ ) at Faridpur. On the other hand the variety CVE-3 ( $2.47 \text{ tha}^{-1}$ ) produced lowest fibre yield at kishoregonj. The results of the present study were similar with the findings of Sanjoy and Jiban (2018); Islam *et al.* (2017) and Hossain *et al.* (2015).

As per the above discussion, it observed that the described progenies including check variety of deshi jute has been sited in five regional stations of BJRI in various parts of the country. Plant height, fibre yield and stick yield are relatively high in Faridpur regional station than other part of the country. Also, out of seven progenies, C-4339 yielded comparatively better than other progenies and check variety and also observed that the fibre and stick yield increased with the increasing of plant height and base diameter.

### Conclusion

From the experiment, it is concluded that significant differences were achieved for fibre and stick yield at different agro-ecological zones in Bangladesh. The progeny of deshi jute C-4339 produced higher fibre yield and stick yield from other six progenies and two check varieties. So we recommended that the progeny C-4339 can be used in future to develop high yielding variety of deshi jute in Bangladesh.

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