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PERFORMANCE OF CAPSULARIS JUTE (*Corchorus capsularis*) VARIETIES IN RELATION TO SEED YIELD AND DISEASE INCIDENCE GROWN IN LATE SEASON

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ABSTRACT

An investigation was conducted to find out the performance of deshi jute (*Corchorus capsularis* L) varieties in late season seed production method and incidence of diseases in late season seed crop. Five varieties of commonly cultivated in Bangladesh were used. They were CVL-1, CVE-3, BJC-2142, BJC-7370 and BJC-45. Five fungal diseases viz. stem rot (*Macrophomina phaseolina*), black band (*Botryodiplodia theobrome*), anthracnose (*Colletotrichum corchori*), die back (*Gloeosporium sp.*) and wilt (*Rhizoctnia solani*) were identified in capsularis jute varieties in late season seed crop. Variation among varieties was observed in terms of disease incidence and seed production. The most prevalent disease was stem rot followed by anthracnose and wilt. Disease incidence was lower in varieties CVE-3 and CVL-1 and they gave higher seed yield compared to other varieties. The seed yield was 608.3 kg/ha in CVE-3 and 582.22 kg/ha in CVL-1.

Keywords: Jute, Late season, Jute seed crop, Seed yield, Disease incidence

INTRODUCTION

Jute (*Corchorus capsularis* L and *C. olitorius* L) is an important cash crop of Bangladesh. It covers about 2.65% of total cropped area and accounts for about 5% of total foreign exchange through export of raw jute and jute products. In the country, annually 0.42 millions hectare of land is cultivated for the production of 0.86 million tons of fibre (BBS, 2008). For jute cultivation the farmers require about 4,000 tons of seeds annually. For successful jute production, quality seeds are prerequisite. Quality seeds of improved varieties itself can increase 20% yield of the crop (Hossain *et al.*, 1994a).

In late season jute seed production technology, seeds are sown during August through first week of September and seeds are harvested in December (Ali *et al.*, 2003). As a result seed crop remain standing in the field for short period about four months instead of seven to eight months during regular season. This technique is adopted to increase seed yield by checking vegetative growth of fibre plants (Chowdhury and Ali, 1962).

Hossain and Iqbal (1992) conducted an experiment using four varieties viz. CVL-1, D-154, O-4 and O-9897 during 1992 to assess the feasibility of growing late jute seed crop through transplanting on three different dates viz. September 1, mid and end and found that the crop transplanted on September 1 gave significantly higher seed yield than that of other transplanting dates.

Hossain *et al.* (1994b) conducted a research experiment on crop and seed health in Late Planting Technique at Central station and JAES, Manikgonj, of BJRI with var. CVL-1, D-154, CC–45 and CVE-3. In this experiment, 6.89% plants of CC–45, 2.44% of CVE-3 and only 1.15% plants of D-154 were infected with leaf mosaic disease. Besides, 2.08% plants of D-154 carried soft-rot disease. At central station variety D-154 carried only 0.5% stem-rot disease. Although O-9897 was found free from diseases at central station but at JAES, Manikgonj, as much as 8.03% plants showed the symptom of *Cercospora* leaf spot. In Bangladesh, report on disease incidence is not also available at late sowing seed crop of jute. However, stem rot (*Macrophomina phaseolina*), black band (*Botryodiplodia theobromae*), anthracnose (*Colletotrichum* sp.) and wilting (*Rhizoctonia solani*) are common diseases

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of jute grown for fibre production in regular season (Islam, 2011). The present piece of work was undertaken to find out the performance of *Corchorus capsularis* jute varieties in respect of disease incidence, seed yield and yield contributing characters in late sowing seed crop.

MATERIALS AND METHODS

The experiment was conducted during 2009-10 late jute seed crop season at research farm of Bangabandhu Sheikh Mujibur Ralmian Agricultural University (BSMRAU), Gazipur. The land was prepared for well tilth using a tractor driven disk plough, rotavator and harrow. After final harrowing, the land was leveled properly. Well decomposed cow dung at the rate of 10 t/ha was applied and mixed thoroughly with the soil. The soil was fertilized with Urea, Triple Supper Phosphate (TSP), Muriate of Potash (MP), Zinc oxide and Zypsum for N, P, K, Zn and S, respectively at the rate of 90, 20, 20, 20, 8 and 2 kg/ha. The entire amount of TSP, MP, Zinc oxide, Gypsum and two-third of urea were applied as basal and the rest one-third of urea was used as top dress at 20 days of seedlings age. Five varieties of *C. capsularis* jute species were used as planting materials. The varieties were CVL-1, BJC-2142, CVE-3, BJC-45 and BJC-7370. Three gram seeds for *Capsularis* were sown in 3 m x 2 m unit plots at the rate of 5kg/ha at first week of August. Seeds were placed in line sowing at 3 cm depth, maintaining 20 cm seed to seed and 30 cm row to row distances. The unit plots were 1m apart from each others. Adequate distances (5 m) were maintained for proper isolation. The experiment was laid out in a randomized complete block design with three replications. Hand weeding was done twice during the growing period of the crop at 20 and 35 days of sowing. Thinning was done after first weeding (3rd week after sowing) and maintaining at least 30 plants per m^2 for each variety.

The ripening pods (65 – 75 %) were harvested separately from the jute plants grown in different plots on 25 December 2010. The harvested crop was sun dried for 2 days and threshed manually by beating with the help of stick. Seeds were sun dried, cleaned and stored for further study.

Disease incidence in each plot was recorded for all varieties. Seedling infections due to soft rot (*Sclerotium rolfsii*) and wilt (*Rhizoctonia solani*) were recorded after two weeks of sowing. The total plant populations at final thinning and at harvest were counted and incidences of fungal diseases were recorded. Numbers of plants infected with stem rot, blackband, anthracnose and dieback diseases were recorded at 15 weeks after sowing of seeds. Disese incidence was expressed in percentage based on total number plants checked.

From each plot 10 plants were selected randomly and data on number of branch per plant, number of pod per plant, number of seed per pod, and pod diameter were recorded. Data on 1000-seed weight, yield per plot were recorded and yield per hectare was also computed. Analysis of variance was done according to Gomez and Gomez (1984) using standard ANOVA generated by MSTAT–C. Differences among means were calculated for significance using the t- tests.

RESULTS AND DISCUSSION

Five fungal diseases were recorded in capsularis (*Corchorus capsularis*) jute seed crop grown in season. They were stem rot (*Macrophomina phaseolina*), blackband (*Botryodiplodia theobromae*), anthracnose (*Colletotrichum corchori*), die back (*Gloeosporium sp.*) and wilt (*Rhizoctonia solani*). Stem rot was the most predominant disease of jute seed crop grown in late season. The highest incidence of the disease was observed in variety BJC-2142 which was followed by BJC-7370 and they were significantly different from other. The lowest stem rot disease was observed in variety CVL-1 which was statistically similar to CVE -3 and BJC-45. The highest incidence of black band was recorded in variety BJC-2142 followed by BJC-7370 and BJC-45. They were significantly different from each other. Significantly the lowest black band incidence was observed in variety CVL-1. The incidence of anthracnose disease on BJC-2142 and was statistically similar to variety BJC-7370 but statistically higher compared to other varieties. Significantly the lowest incidence of anthracnose was recorded in variety CVE-3. The highest wilt incidence was observed in variety BJC-7370, which was

followed by variety BJC-45. Their difference was significant. The lowest incidence of the disease was recorded on variety CVL-1 followed by CVE-3 and BJC-2142. Incidence of die back ranged 1.02 to 3.02 %. The highest incidence was observed in variety BJC-2142 followed by variety BJC-7370. The lowest incidence was found in CVL-1 which was statistically similar to CVE-3 and BJC-45 (Table 1).

Table 1. Incidence of diseases in different deshi (*Corchorus capsularis*) jute seed varieties grown in late season

	% Disease Incidence				
Variety	**Stem rot**	**Black band**	**Anthracnose**	**Die back**	**Wilt**
CVL-1	9.43 c	1.13 d	6.09 b	1.04 c	2.48 d
BJC-2142	17.30 a	5.86 a	8.63 a	3.02 a	4.52 bc
CVE-3	10.68 c	2.72 c	3.54 c	1.02 c	3.89 c
BJC-45	10.99 c	2.86 c	5.05 b	1.14 c	5.23 b
BJC-7370	14.06 b	5.01 b	8.54 a	2.37 b	6.85 a
CV (%)	11.02	10.87	13.11	9.63	13.31

Varietal Effect on Yield and Yield Contributing Characters of *Corchorus capsularis*

The number of branch per plant was the highest in variety CVE-3) which was statistically similar to CVL-1. The lowest number of branch per plant was observed in variety BJC-45 followed by BJC-2142. The number of pod per plant was the highest in variety BJC-45 which was followed by CVE-3 and CVL-1. The lowest number of pod per plant was observed in variety BJC-7370 which was statistically similar to variety BJC-2142. Number of seeds per pod was the maximum in variety CVE-3 which was statistically similar to BJC-7370 and CVL-1. The lowest number of seeds per pod was recorded in variety BJC-2142 which was statistically similar to BJC-45. Pod diameter varied from 10.63 to 11.33 mm but the variation was statistically insignificant.

The highest 1000-seed weight 3.85 g was found in variety CVL-1, which was followed by CVE-3 and BJC-45 and they were statistically similar. The seed yield per plot as well as per hectare in CVE-3 and CVL-1 was statistically similar but significantly higher compared to other varieties. The lowest seed yield was found in BJC-7370 which was followed by BJC-2142 (Table 2).

Table 2. Varietal effect of *Corchorus capsularis* on yield and yield contributing characters of late sowing jute seed crop

Variety	Number of branches per plant	Number of pods per plant	Number of seeds per pod	Pod diameter (mm)	1000 seeds weight (g)	Seed yield per plot (g)	Seed yield per hectare (kg)
CVL-1	4.50 ab	37.06 b	43.80 a	10.63 a	3.85 a	349.33ab	582.22ab
BJC-2142	3.70 cd	31.67 c	33.77 b	11.12 a	3.17 c	321.33 c	535.57 c
CVE-3	4.67 a	38.57 ab	46.17 a	11.17 a	3.65 b	365.00 a	608.33 a
BJC-45	3.56 d	39.57 a	33.10 b	10.80 a	3.18 c	332.00 bc	554.44 bc
BJC-7370	4.13 bc	31.16 c	44.17 a	11.33 a	3.06 d	318.67 c	531.11 c
CV (%)	6.09	3.20	3.83	-	0.55	3.00	3.00

Results of the present investigation reveal that stem rot (*Macrophomina phaseolina*), blackband (*Botryodiplodia theobromae*), anthracnose (*Colletotrichum corchori*), die back (*Gloesporium sp*), wilt (*Rhizoctonia solani*) are important diseases of jute seed crop grown in late planting method. These diseses are also common in jute grown for fibre production in usual season (Islam, 2011). The most prevalent disease was stem rot followed by anthracnose and wilt. Their incidence was comparatively higher in BJC-2142 and BJC7370 and the two varieties gave lower seed yield compared to other

varieties. The disease incidence was comparatively lower in CVE -3 and CVL-1, which produce higher seed yield compare to other varieties. Based on the findings of the present study it may be concluded that CVL-1 and CVE-3 are most suitable to grow as seed crops in late planting methods. Similar findings have also been reported by other investigators (Hossain, 1995; Islam, 2005). They reported that CVL-1 and CVE-3 are suitable varieties of *C. capsularis* jute varieties for seed production in late season.

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