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VARIETAL PERFORMANCE OF JUTE (*Corchorus olitorius* L.) AGAINST DISEASES SEVERITY

I. Jahan[1], M. M. Billah[2], A. Ghosh[3], M. W. Islam[2] and S. Mitra[4]
[1]Genome Research Centre, [4]Dept. of Physiology
Bangladesh Jute Research Institute (BJRI), Dhaka-1207
[2]Jute Seed Production and Research Centre, BJRI Nashipur, Dinajpur
[3]Jute Research Sub-station, BJRI, Monirumpur, Jashore

ABSTRACT

The experiment was conducted at Jute Agriculture Experimental Station, Jagir, Manikganj to study the diseases severity (die back, seedling blight) of tossa jute. Four tossa jute varieties (O-9897, O-72, O-795 and OM-1) and three harvesting time (15, 45, 75 days after sowing (DAS)) were considered as experimental treatments. The experiment was designed RCBD with three replications. Diseases severity was calculated by manually counting of seedling blight and die back diseases infected plants per unit area. Diseases severity found maximum in O-9897 and O-795 varieties and seedling blight found maximum at 15 days aged plant whereas die back found maximum at 45-75 days old tossa jute plants.

Key words: Jute, *Corchorus olitorius*, diseases severity, die back.

Introduction

After cotton, jute ranks as the second most significant fibrous plant in global textile fiber production. Jute is an important cash crop in Bangladesh and India, which together accounts for about 84% of world production of jute fibre. It is mainly grown for fibre rather than the seed. Its fibre is primarily used for making hessian, sack and carpet backing clothes. It has versatile uses for making mats, blankets, furnishing fabrics 2 and packaging materials in the jute mills. Besides the use of jute fibre, jute sticks and root stamps are traditionally used as fuel in the rural areas (Islam *et al*., 2013). Moreover, the sticks are used as house construction materials either directly or with mill processed hardboard while the leaves continue to be used as a favorite vegetable. In addition, jute plants improve soil productivity because of its massive leaf dropping and root proliferation in the field. Now a day attempt is being made to popularize the jute plants for making pulp in paper industries. Plant diseases and pests are a global threat to crop yields, and they may be even more destructive for smallholder farmers whose livelihoods depend heavily on healthy harvests. Unfortunately, jute is still usually cultivated by smallholder farmers. Disease symptoms appear on leaves, fruits, buds, and young branches on jute plants. Jute diseases come in a variety of types, each of which can result in big economic loss. Recently, disease prevention has become increasingly significant as a result of the demand for finer quality fiber (Barkoula *et al*., 2008). In Bangladesh and India normal jute growing season is April to July. In agricultural calendar it is known as Kharif-1 season. At this time weather was so hot and humid. This weather is suitable for fungal diseases spreading rapidly. Most types of jute prefer well-drained sandy loam in warm and humid areas with at least 3 to 4 inches (7.5 to 10 cm) of monthly rainfall during the growing season. The light green leaves of the plant are usually 4 to 6 inches (10 to 15 cm) long, 2 inches (5 cm) broad, serrated on the margins, and taper to a point. Jute crops face significant challenges, mainly due to fungal diseases. These diseases are estimated to cause a staggering 60% loss in jute fiber yield annually in Bangladesh. The major culprits include stem rot (*Macrophomina phaseolina*), anthracnose (*Colletotrichum corchori* and *C. gloeosporioides*), soft rot or seedling blight (*Sclerotium rolfsii*), black band (*Botryodiplodia theobromae*), die-back (*Gloeosporium sp*.), root rot (*Rhizoctonia sp*.), and powdery mildew (*Oidium sp.*). These diseases not only reduce the amount of jute fiber produced but also affect the quality of the fiber and seeds. (Biswas *et al*., 1980). In most cases jute has suffered seriously by different fungal diseases. Seedling blight or soft rot, dieback, black band, anthracnose etc. are causes by various fungi. Seedling blight occur both white (*Corchorus capsularis* L.) and dark jute (*C. olitorius* L.) at

seedling stage whereas die back found severe in dark jute. Considering above circumstances this study was designed to understand the disease severity of dark jute.

Materials and Methods

The experiment was conducted at Jute Agriculture Experimental Station (JAES), Bangladesh Jute Research Institute, Jagir, Manikganj during the period from 15 March to 30 May, 2023.The experimental field was located with an altitude of 1262 m above sea level, latitude 23° 54' 8" N and longitude 90° 0' 39" E. The soils are well drained. The center experiences annual average rainfall is 2376 mm and average daily temperature range is 21–28◦ C. The research was done on land belonging to the AEZ-8 containing slightly acidic soil (pH 6.5) following the Randomized Complete Block Design (RCBD) with three replications. Four jute genotypes viz. O-9897(V_1), O-72(V_2), O-795(V_3) and OM-1(V_4) were used as experimental materials. Seeds of all jute varieties were collected from Jute Agricultural Experimental Station, Bangladesh Jute Research Institute, Jagir, Manikganj. Land was prepared by ploughing and cross ploughing with laddering and was fertilized using 145kg of urea, 26 kg of triple super phosphate, 32 kg of muriate of potash, 42 kg zipsum and 11kg zinc sulphate per hectare. Half of urea and total amount of other fertilizers were used during final land preparation. The unit plot size was 3m x 4m and seeds were sown in line. The crops were sown on 15 March, 2023. All intercultural operations were done as and when necessary. Data on plant population, die back, seedling blight and healthy plants of different jute varieties were collected at 15, 45, 75 days after sowing. Data were subjected to ANOVA using MSTAT-C (Gomez and Gomez, 1984). Treatment means were separated with LSD (Least significant difference).

Results and Discussion

Plant population: Plant population per square meter do not differ significantly among different varieties of the experiment (Table 1). Plant population per square meter varied significantly among different harvesting time. The highest plant population was recorded in 15 days after sowing (DAS) and the lowest was recorded in 75 DAS whereas plant population of 45 DAS remains in the middle position (Table 2). Plant population varied significantly among different harvesting time X variety interaction. The highest plant population was recorded in 15 DAS and all varieties interaction and the lowest plant population was recorded in 75 DAS harvesting with all variety's interaction. Other interactions were remained in the middle position (Table 3).

Table 1. Effect of variety on diseases severity of tossa jute

Variety	Plant population/m^2	Die back	Seedling blight	Healthy plants/m^2
O-9897	77.667 a	20.889 a	14.889ab	41.889c
O-72	83.778 a	10.667 c	7.889c	65.222a
O-795	83.556 a	20.667 a	15.778a	47.111bc
OM-1	78.556 a	15.556b	12.667b	50.333b
CV (%)	11.35	29.45	24.05	16.37
LSD (%)	8.9721	4.8783	3.0105	8.1829

Note: CV= Coefficient of variation, **= Significant at 1% level, In a column, figures having similar letter(s) do not differ significantly at 5% level as per DMRT

Die back: Die back is the devastating disease of tossa jute now a days. Severe damage occurred in tossa jute field due to die back disease infection. Die back severity varied significantly among different varieties. The highest die back infection was found in V_1 which was statistically identical with V_3 and the lowest die back infection was found in V_2 whereas V_4 remain in the middle position (Table 1). Die back infection found significant also at different harvesting time. The highest die back severity found in 45 DAS and the lowest was found in 15 DAS whereas die back severity was found optimum in 75 DAS harvesting time

(Table 2). Harvesting time X variety interaction have significant effect on die back severity of tossa jute. The highest die back severity was found in H_2xV_1 interaction which was statistically identical with H_2xV_3 interaction and the lowest die back severity was found 15 DAS harvesting time with all varieties interactions (Table 3). 15.88% die back infestation in tossa jute reported by Akter *et al*., 2009.

Table 2. Effect of harvesting time on diseases severity of tossa jute

Harvesting time	Plant population/m^2	Die back	Seedling blight	Healthy plants/m^2
15 DAS	116.67a	0.0000c	38.417a	78.250a
45 DAS	84.08b	30.750a	0.0000b	53.333b
75 DAS	41.92c	27.083ab	0.0000b	21.833c
CV (%)	11.35	29.45	24.05	16.37
LSD (%)	7.7701	4.2247	2.6071	7.0866

Table 3. Harvesting time X Variety interaction effect on diseases severity of tossa jute

Harvesting time x variety	Plant population/m^2	Die back	Seedling blight	Healthy plants/m^2
H_1xV_1	110.33a	0.0000d	44.667a	65.667bc
H_1xV_2	120.33a	0.0000d	23.667c	96.667a
H_1xV_3	121.00a	0.0000d	47.333a	73.667b
H_1xV_4	115.00a	0.0000d	38.000b	77.000b
H_2xV_1	80.33b	41.667a	0.0000d	38.667d
H_2xV_2	88.33b	13.333c	0.0000d	75.000b
H_2xV_3	88.33b	41.000a	0.0000d	47.333d
H_2xV_4	79.33b	27.000b	0.0000d	52.333cd
H_3xV_1	42.33c	21.000bc	0.0000d	21.333e
H_3xV_2	42.67c	18.667bc	0.0000d	24.000e
H_3xV_3	41.33c	21.000bc	0.0000d	20.333e
H_3xV_4	41.33c	19.667bc	0.0000d	21.667e
CV (%)	11.35	29.45	24.05	16.37
LSD (%)	15.54	8.4494	5.2143	14.173

Note: HT= Harvesting time, CV= Coefficient of variation, In a column, figures having similar letter(s) do not differ significantly at 5% level as per DMRT

Seedling blight: Seedling blight is another serious fungal disease of tossa jute especially at seedling stage. Seedling blight severity varied significantly among different varieties. The highest seedling blight infection was found in V_3 and the lowest seedling blight infection was found in V_2 whereas V_4 and V_1 remain in the middle position (Table 1). Seedling blight infection found significant also at different harvesting time. The highest seedling blight severity found in 15 DAS and the lowest was found in 45 DAS which was statistically identical with 75 DAS harvesting time (Table 2). Harvesting time X variety interaction have significant effect on seedling blight severity of tossa jute. The highest seedling blight severity was found in H_2xV_1 interaction which was statistically identical with H_2xV_3 interaction and the lowest seedling blight severity was found 45 and 75 DAS harvesting time with all varieties interactions (Table 3). They are not only responsible for yield loss but also deteriorate the quality of fiber and seeds (Nasim *et al*., 2017).

Healthy plant: Healthy plants per square meter varied significantly among different varieties of the experiment. The highest healthy plants were found in V_2 and the lowest was found in V_1 whereas V_3 and V_4 remain in the middle position (Table 1). Healthy plants per square meter varied significantly among

different harvesting times. The highest healthy plants were recorded in 15 DAS which was decreasing with increasing harvesting age of jute plants (Table 2). Healthy plant varied significantly among different harvesting time X variety interaction. The highest healthy plant was recorded in H_1xV_2 interaction and the lowest was recorded in H_1xV_2 interaction which was statistically identical with 75 DAS harvesting age with all variety's interaction. Other interactions were remained in the middle position (Table 3).

Conclusion

Among different varieties diseases severity found maximum in V_1 and V_3 varieties. Seedling blight was found severe at 15 days old jute seedling and die back severity found maximum at 45-75 days old jute plant. This is one year experiment. Further experimentation is needed for getting more confirmation.

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