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SHORT COMMUNICATION

Evaluation of jute genotypes (*Corchorus olitorius* L.) for screening fibre yield components and biotic stress factors under terai region of Province -1 Nepal

Sujan Karki[1*], Govinda Prasad Timsina[1], and Sabita Sharma[2]

[1]Jute Research Program, Itahari, Sunsari, NARC, Nepal
[2]Directorate of Agricultural Research, Tarahara, Sunsari, NARC, Nepal

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ABSTRACT

A total of 11 tossa jute genotypes were sown in RBD with three replications. Among the genotypes, JRO-524 produces highest plant height (322.97 cm), green fibre yields (17.26 t ha^{-1}), green stick yields (17.97 t ha^{-1}), dry fibre yields (2.73 t ha^{-1}), dry sticks yield (6.31 t ha^{-1}), whereas, genotypes SRP-7016 produces highest green plant yield (51.18 t ha^{-1}) followed by JRO-524 (48.73 t ha^{-1}). Respective of biotic stress factor, the genotype JRO-524 was found to be less susceptible against Bihar hairy caterpillar (5.68%), semilooper (5.25%) and yellow mites (2.53 mites' $leaf^{-1}$). The genotype JRO-524 gave superior on growth, yield and yield contributing traits, and biotic stress tolerance.

Keywords: Jute; Genotypes; Performance; Yield; Biotic stress

INTRODUCTION

A significant bast fibre crop, jute (Corchorus capsularis L.) is one of two cultivated species in the Tiliaceae family. and L. Jute grows across a wide range of tropical and subtropical climatic conditions. Due to its better productivity, olitorius is widely grown in India's jute farming regions. Jute is grown on 7,507 hectares in Nepal, with an annual production of 11,159 tonnes and an average productivity of 1.48 t ha^{-1}. The most important properties of jute are that it is non-toxic and non-polluting. In addition, it is superior to synthetics in

*Corresponding author:
ksujan165@gmail.com (S. Karki)

many ways. However, due to the lack of better jute cultivars and other biotic stress factors, the production and quality of olitorius jute are currently declining. Insect pests are the principal biotic stress factors in jute farming. Toxic caterpillars (Spilosoma obliqua), are destroying the Timsina and Karki jute crops (2019). Determining the best jute varieties to grow on farms and utilise quality tossa fibres in the jute sector industry will help farmers choose the best jute varieties to grow.

MATERIALS AND METHODS

An experiment was conducted in the Jute Research Program, Itahari, Sunsari (26°15' N, 87° 20' E) in 2017 and 2018. Eleven tossa jute genotypes were sown in RBD with three replications, each with 12 lines with 25 cm inter and intra row spacing and 5 to 7 cm intra row spacing. Thin dense plants 20-25 days after sowing. Intercultural weeding, thinning, and water management were done as needed.

Insect pest infestations were monitored weekly in ten plants from each treatment and replication. The Bihar hairy caterpillar and semilooper damages were measured as a percentage of afflicted plants to total plants. The yellow mite population was measured as mites per square centimetre of the plant's second unfolded leaf.

The peak pest infestation time was used to compare genotypes. The data was analysed statistically using Gen stat 15th edition software for Randomized Block Design, as specified by Gomez and Gomez, and a reasonable conclusion was drawn by Panse and Sukhatme (1978).

RESULTS AND DISCUSSION

The influence of eleven different tossa jute genotypes on yield and yield components combined over two years 2017-18 is presented (table 1). ANOVA had significant differences amongst genotypes for almost all the traits except plant population and basal diameter. From the mean performance (table 1), it was observed that the highest plant height was observed in genotype JRO-524 (322.97 cm) followed genotypes ILM – YPY – 067(311.27 cm), SRP – 7016 (302.60 cm) and the lowest plant height was observed in genotype YA – 023 (266.72 cm). Similarly, the highest green plant yield was observed from genotype SRP – 7016 (51.18 t ha^{-1}) followed by genotype JRO-524 (48.73 t ha^{-1}) and lowest green fibre yield from genotype JRO – 3690 (33.96 t ha^{-1}). Likewise, the highest green fibre yields were observed from genotypes JRO-524 (17.26 t ha^{-1}), ILM – YPY – 067 (16.10 t ha^{-1}), followed by genotype SRP-7016 (15.52 t ha^{-1}) whereas, the lowest green fibre yields were observed from genotype JRO-3690 (10.52 t ha^{-1}).

Concerning green stick yields, the richest yields were observed from genotype JRO-524 (17.97 t ha^{-1}) followed by genotypes ILM – YPY – 067 (17.63 t ha^{-1}), DS-46 (17.40 t ha^{-1}) and lowest from JRO-3690 (9.30 t ha^{-1}). Further, the economic yields *i.e.,* dry fibre yields were observed highest from genotype JRO-524 (2.73 t ha^{-1}, ILM – YPY – 067 (2.52 t ha^{-1}), DS-46 (2.27 t ha^{-1}), SRP-7016 (2.25 tha^{-1}) and lowest dry fibre yields, were observed from genotype YA-41 (1.41 t ha^{-1}).

The highest dry stick yields were observed from genotypes JRO-524 (6.31 t ha^{-1}), ILM – YPY – 067 (6.14 t ha^{-1}), SRP-7016 (6.08 t ha^{-1}) whereas, the lowest yield was observed from genotype JRO-3690 (4.15 t ha^{-1}).

Biotic stress components

Insect pest is the major biotic stress factor affecting commercial jute cultivation in Nepal. The incidence of major pest attacks *the olitorius* jute genotype results in a significant infestation on jute crops among the tested genotypes presented in table 2.

Table 1. Mean performance of the eleven tossa jute genotypes for fibre yield components over two years

Genotype	Plant population (ha)	Plant height (cm)	Basal Diameter (cm)	Green plant yield (t ha^{-1})	Green fibre yield (t ha^{-1})	Green stick yield (t ha^{-1})	Dry fibre yield (t ha^{-1})	Dry stick yield (t ha^{-1})
JRO – 524	239861	322.97	1.32	48.73	17.26	17.97	2.73	6.31
SM- 100	251667	295.92	1.25	41.18	13.93	12.70	2.20	4.88
BRD - SRB - 070	258148	291.40	1.22	42.97	13.54	14.30	2.03	4.80
JRO - 3690	232963	273.12	1.14	33.96	10.52	9.30	1.75	4.15
JRO – ACC – 102	275741	288.05	1.17	41.20	13.39	13.07	2.06	4.43
YA – 023	261667	266.72	1.05	37.12	11.41	12.00	1.41	4.90
IJO – CHN – FJ – 050	267685	304.63	1.20	46.94	14.19	14.77	2.06	5.91
Itahari - 2	242407	288.87	1.30	44.75	12.80	13.77	1.99	5.22
SRP - 7016	261204	302.60	1.24	51.18	15.52	15.64	2.25	6.08
ILM – YPY – 067	243611	311.27	1.30	44.88	16.10	17.63	2.52	6.14
DS – 46	259583	297.17	1.39	46.82	14.85	17.40	2.27	5.67
Mean	254048.7	294.7	1.24	43.61	13.96	14.41	2.11	5.32
SEM (±)	32536.60	13.70	0.10	2.79	1.11	1.38	0.22	0.55
LSD (0.05)	-	28.59	-	5.81	2.31	2.89	0.45	1.15
CV (%)	15.70	5.70	9.50	7.80	9.70	9.90	12.60	12.70
F-Value	NS	0.026	NS	<.001	<.001	0.001	<.001	0.007

Table 2. Incidence of major pests on *Corchorus olitorius* jute genotypes at JRP, Itahari combined over two years

Genotype	Bihar hairy caterpillar (%)	Semilooper (%)	Yellow mites (number /cm^2)
JRO - 524	5.68	5.25	2.53
SM- 100	9.71	7.05	4.40
BRD - SRB - 070	15.83	11.02	6.21
JRO - 3690	7.97	8.86	12.05
JRO – ACC – 102	12.87	12.00	11.12
YA – 023	13.69	11.73	9.77
IJO – CHN – FJ - 050	9.44	9.44	9.44
Itahari - 2	10.98	11.44	11.90
SRP - 7016	13.87	12.39	10.90
ILM – YPY – 067	14.22	13.77	13.32
DS – 46	13.31	12.08	10.86
Mean	11.60	10.46	9.32
SEM (±)	1.96	1.67	1.39
LSD (0.05)	4.08	3.49	2.90
CV (%)	20.60	19.60	18.60
F-Value	0.001	0.002	0.003

Among the genotypes tested in succeeding growing season 2017/18, the genotypes JRO-524 (5.68%) and JRO-3690 (7.97 %) were found to be less susceptible, while genotypes IJO – CHN – FJ – 050 (9.44%), SM-100 (9.71%) and Itahari-2 (10.98%) were found to be moderately susceptible and genotypes ILM – YPY – 067(14.22%) and BRD - SRB – 070 (15.83%) were found to be highly susceptible against Bihar hairy caterpillar. With respective to semilooper infestation, the genotypes JRO-524 (5.25%), SM- 100 (7.05%) and JRO-3690 (8.86 %) were found to be less susceptible, whereas genotype IJO – CHN – FJ – 050

(9.44%) was found to be moderately susceptible and genotypes SRP – 7016 (12.39 %) and ILM – YPY – 067 (13.77 %) were found to be highly susceptible against semilooper among the tested genotypes. With regards to yellow mite infestation, the minimum mite population was recorded from genotypes JRO-524 (2.53 mites leaf^{-1}), SM-100 (4.40 mites leaf $^{-1}$) which was considered as least susceptible genotypes. In contrast, the maximum mite population was recorded from genotypes ILM – YPY – 067 (13.32 mites leaf^{-1}) and regarded as highly susceptible jute genotype against mites. Das and Chaudhuri (2002), found JRO-524 as highly sensitive to yellow mite among various germplasm tested.

CONCLUSION

The variety JRO-524 had more efficiency on the yield and yield attributing traits, and insect pest tolerance capacity. So, we strongly recommended that jute variety JRO-524 will be more successful in the terai region of Province -1 Nepal.

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