

Fertilizer Requirement for Maximum Growth and Yield of Salt Tolerant Variety BJRI DESHI PAT-10

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Abstract: The research work was conducted in saline areas (southern parts) of Bangladesh. The present study aimed at determining the nutritional requirement for optimum growth and yield of salt tolerant variety BJRI Deshi Pat-10 in Bangladesh. BJRI Deshi pat-10 (C-12221) which can't grow well in saline areas having more than 12.71dSm⁻¹ salinity stress. The results indicated significant effect on yield and yield contributing characters over control with different fertilizer (N P K S) levels of BJRI Deshi Pat-10. The highest fibre yield (2.98 t/ha) and Stick yield (7.66 t/ha) was obtained by the combined dose of N₁₅₀P₁₀K₃₀S₂₀ kg/ha. Therefore, this combination N₁₅₀P₁₀K₃₀S₂₀ kg/ha seemed to be optimum for maximum growth and yield of BJRI Deshi Pat-10.

Keywords: Fertilizer, salt tolerant, fibre yield, BJRI Deshi Pat-10

1. Introduction

Jute is an eco-friendly and the major cash crop in Bangladesh. Jute holds an important position in the industrial sector of the economy of Bangladesh [1]. Demand of jute fibre is being increased in recent years both in home and abroad [2]. Jute fiber is produced mainly from white jute (*C. capsularis*) and tossa jute (*C. olitorius*). Nutrients play a vital role on the production of newly released jute varieties. Proper dose of nutrients is essential for each of the variety of jute for its optimum growth and yield. Jute varieties may be different due to their variation in genetic potentialities, Judicial application of NPK and S may increase the yield of a variety. In this aspect, research regarding development of new high yielding varieties of jute and determination of its fertilizer requirement is very important. In fact, these requirement vary within the same type of crop. For example, fertilizer requirement of *olitorius* variety is higher than that of *Capsularis*. The importance of N, P, K and S on the growth, yield and quality of fibre is well established [3-5]. It is necessary to find a fertilizer combination which is economically profitable and at the same time gives yield very close to maximum yield potential. Recently it was reported that jute can be grown rapidly in saline soils. In saline soil, plant growth is affected by reduction in the uptake of water, lack of nutrients and accumulation of toxic sodium and chloride ions [6].

Considering its tolerance especially to the chlorine salinity, jute has been recently suggested as a promising candidate for planting in wet lands and saline soils [7]. Bangladesh Jute Research Institute (BJRI) has developed a highly salt tolerant variety BJRI Deshi pat-10 that can be grown in saline area of Bangladesh. BJRI Deshi Pat-10 may be needed different fertilizer for its maximum growth and higher fibre yield. So, an experiment was undertaken to obtain suitable dose for the maximum production of highly Salt tolerant variety BJRI Deshi Pat-10.

2. Methodology

The experiment was conducted at the experimental field of Kalapara, Patuakhali under Bangladesh Jute Research Institute. The experiment was laid out in Randomized Complete Block Design with 3 replications. Total 10 treatment combination along with a control distributed randomly in each plot as one replication. The dimension of unit plot was (3.1mX 3.1m) having 1 m space between plots, blocks and around the field. There was 20 cm deep drain around each block and plot. The land was well prepared and fertilizers were applied as per treatment The following treatments combinations were used in the experiment:

Tr. N-P-K-S- kg/ha	Tr. N-P-K-S- kg/ha
T 1: 00- 00- 00-00	T 6: 100-15-30- 20
T 2: 50- 10- 30-20	T 7: 100-10-60- 20
T 3: 100-10-30-20	T 8: 100-10-90- 20
T 4: 150-10-30-20	T 9: 100-10-60- 10
T 5: 100-05-30-20	T 10: 100-10-90- 30

Required amount of N, P, K, S fertilizers applied in the form of urea, TSP, MoP and Gypsum. Half urea and total amount of TSP, MoP and Gypsum were incorporated to the experimental plot as per treatment design at the time of final land preparation. Remaining half of urea was top dressed at 45 days after sowing (DAS). Weeding, Thinning, insect pest and disease management were done in time. Plant height, Base diameter, Fibre yield, Stick yield were recorded from each plot. All collected data were analyzed statistically following the ANOVA technique and the means were adjusted by DMRT^[8]

3. Results and Discussion

This experiment was undertaken for maximum fibre production of salt tolerant variety of BJRI Deshi Pat 10. To introduce combination treatments, the experiment used 10 treatment combinations. Fibre yield and yield contributing characters were affected by different treatment combinations.

Plant Height

Increasing dose of fertilizer application on plant height was significant. The highest significant plant height was observed with the application of treatment T₄ (N₁₅₀P₁₀K₃₀S₂₀). But plant height was found identical by N@ 150Kg/ha and @ 100Kg/ha. The result showed that 150 kg N/ha may be an adequate amount to produce maximum production of BJRI Deshi Pat-10. (Figure 1).

Base Diameter

The effects of different fertilizer application on BJRI Deshi Pat-10 growth and yield metrics were

investigated. Results also explored that the base diameter (24 mm) were found significantly higher with the treatment combination of T₄ (N₁₅₀P₁₀K₃₀S₂₀) (Figure 2).

Fibre Yield

Significant effect of increasing dose of fertilizer application on fibre yield was observed. Significantly highest fibre yield (2.98 t/ha) was observed with T₄ (N₁₅₀P₁₀K₃₀S₂₀) treatment (Figure 3). Results showed that plant height, base diameter had influence on fibre yield. Higher plant height and higher base diameter produced higher fibre yield. [16]

Stick yield

Significant effect of additional fertilizer application on stick yield was observed. Significantly highest stick yield (7.66 t/ha) was observed with T₄ (N₁₅₀P₁₀K₃₀S₂₀) treatment for the cultivation of salt tolerant variety BJRI Deshi Pat-10 (Figure 4). These findings are strongly supported by the previous research results. [9-15]

Table 1 Soil Analysis Report at the experimental plot

pH	EC (dS/m)	OM	Nitrogen (meq/100gm)	Phosphorus (meq/100gm)	Pottasium (meq/100gm)	Sulphur (meq/100gm)
5.2	12.71	1.70	.085	0.28	5.7	12.7

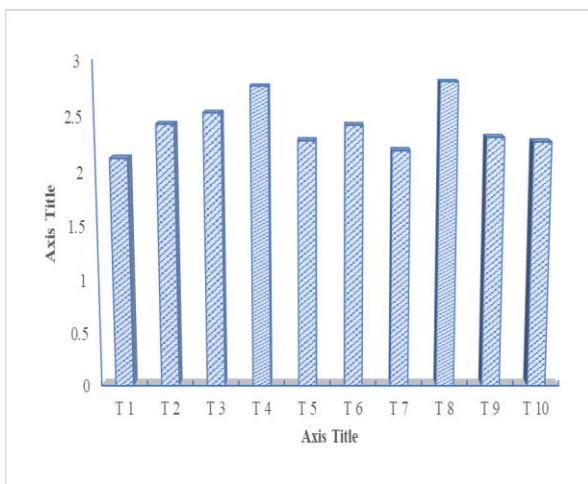


Figure 1. Plant height of BJRI Deshi Pat-10 using different chemical fertilizer treatments. Each datum was calculated from three independent experiments.

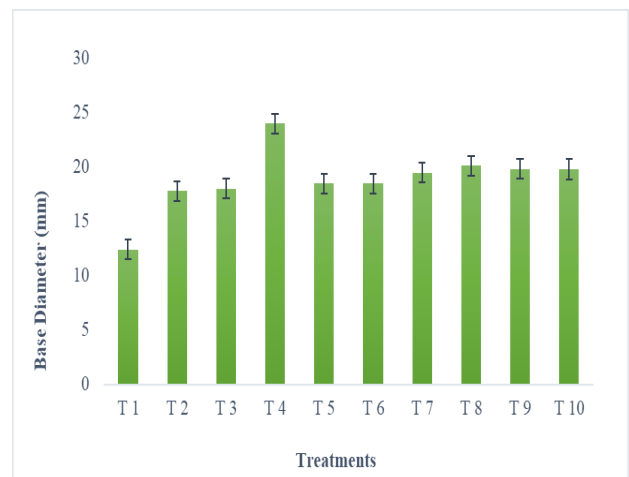


Figure 2. Base diameter of BJRI Deshi Pat-10 using different treatments. Each datum was calculated from three independent experiments.

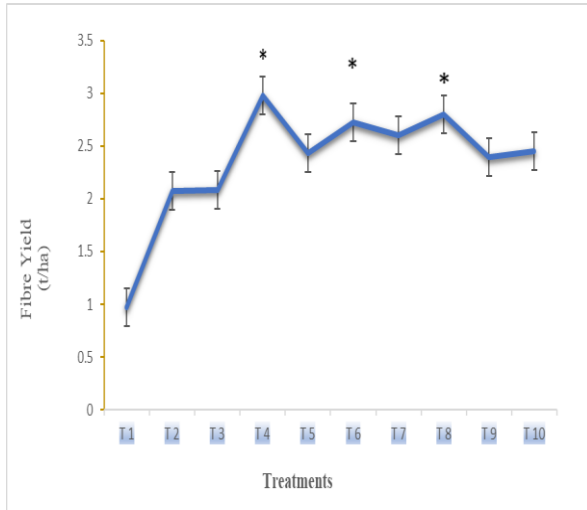


Figure 3. Fibre yield of BJRI Deshi Pat-10 using different treatments. Each datum was calculated from three independent experiments. The results are expressed as the mean \pm S.E.M. * $p < .05$ significance by the student's t-test.

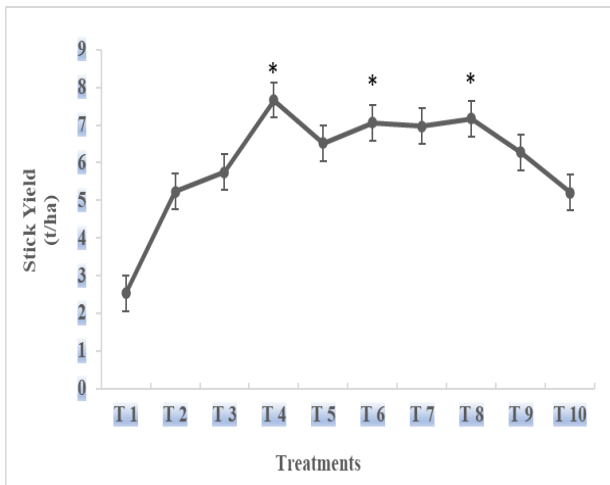


Figure 4. Stick yield of BJRI Deshi Pat-10 using different treatments. Each datum was calculated from three independent experiments. The results are expressed as the mean \pm SE.M. * $p < .05$ significance by the student's t-test.



Figure 5. Intensive supervision signifying in experimental field for good agricultural practices (A) seedling (B) Experimental plot

Conclusion

The use of combined chemical fertilizers had a considerable favorable impact on all yield contributing characteristics as well as yield. So, we can found that combined dose of N₁₅₀ P₁₀ K₃₀ S₂₀ is a suitable dose for the cultivation of salt tolerant variety BJRI Deshi Pat - 10 in Bangladesh.

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