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An Updated Dose Assessment for Late Jute Seed Production

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Abstract: Jute seed scarcity in Bangladesh is a major problem for jute growers as jute and allied fibres are the most economic product for the country. Seed is a critical input for jute crop as it is not possible to get both the seed and fibre from the same crop. Organized late jute seed production is lacking in the whole country of Bangladesh. Therefore, updating seed production potential of jute was tested under Jute experimental station of Bangladesh Jute Research Institute. Following the strategy, additional nutrient response to O-9897 and O-72 (*Chorcorus olitorius L.*) in late jute seed production was assessed in Jute Agriculture Experimental Station (JAES), Manikganj, Bangladesh during the late Jute season. A highly significant effect was observed for plant height, number of branches/plant, number of pods/plant, number of seeds/pod and seed yield with the application of increasing doses of NPK fertilizer. Significantly high seed yields were found with the application of additional 25% NP or 25% NPK with existing recommended doses of fertilizer for late jute seed production for the varieties.

Keywords: Late Jute Seed Production, O-9897, O-72, Fertilizer

1. Introduction

In Bangladesh, annually the farmers require about 30 thousand tons of seeds annually. Many jute farmers use to produce jute crops by their own seeds to meet their requirements but such seeds are of poor quality. One of the most important problems for jute production in Bangladesh is the non-availability of quality seed at proper time of sowing. Only 30% quality jute seed is supplied by different national agencies but the rest amount of quality seed is yet to be managed to supply.

The conventional method of jute seed production is not enough at all to meet the demand of the farmers. The jute growers in Bangladesh generally do not grow a separate jute crop for seed production as it requires long time from March to December which hampers transplant aman rice and rabi (winter) crops. The farmers usually keep a small portion of the crop at one corner of the field to produce seed and rest of the crop is harvested for fibre. This traditional system of seed production is characterized by low yield and poor quality of seed. So, the country has been facing acute shortage of quality jute seed every year. Quality seed of an improved variety itself provide 20 percent additional yield of the crop [1].

Nutrient management is the most important factor for jute seed quality and yield ant it is extensively studied [2-11]. Therefore, appropriate technology to produce quality seed is a must, to increase the production of jute in Bangladesh. Late jute seed production technology can solve this problem. To overcome jute seed problems and to ensure supply of required quality seeds, Bangladesh Jute Research Institute has been advocation late or off season seed production for higher seed yield and economic return, which to be sown in the month of August and September and harvested in December and January and the crops are subjected to favourable environmental stimuli [12-14]. With these facts in mind, the present piece of work was, therefore, undertaken to find the comparative merits of yield and return of late jute seed production update.

2. Materials and Methods

The experiments were conducted at the JAES, Manikganj of Bangladesh Jute Research Institute with eight selective treatments in randomized complete block design with three replications. The unit plot size was 3.0m x 3.0m, space between plots, blocks and around the field was 1.0m. There were 20cm deep drain around each plot, block and around whole plot to drain out excess rain water. Experiment was set up in the month of august with the variety O-9897 & O-72. Total amount of PKS from TSP, MoP and Gypsum were applied to the plot at the time of sowing as per treatment. Total amount of N from urea as per treatment were applied in three equal splits-one at sowing-one at 20-25 DAS and rest at 40-45 DAS. The treatments were as follows: T_1=100% NPKS (FRG2012, BARC); T_2= T_1 + 25% N; T_3= T_1 + 25% NP;T_4= T_1 + 25% NK;T_5= T_1 + 25% PK;T_6= T_1 + 25% NPK;T_7= 75% of T_1; T_8= Control. Weeding, thinning, insect pest and disease management were done in time. The experiments were harvested within January of the following year when 80 percent of the pods were brown. During the time of harvest, plant population was recorded. The plant height, number of branches per plant, number of pods per plant, seeds per pod, and seed yield were recorded from each plot. All collected data were analyzed statistically following the ANOVA technique and the means were adjudged by DMRT [15].

3. Results and Discussion

Plant population: There was no significant variation in plant population with the increasing dose of nitrogen, phosphorus and potassium fertilizer application on late jute seed production (data not shown). The application of additional fertilizers did not have any significant effect on the number of plants/m^2. Reported previously [16]

Plant height: Significant effect of increasing dose of fertilizer application on plant height was observed. The highest significant plant height was observed with the application of T_3(T_1 + 25% NP)which was identical with T_6 (T_1+ 25% NPK).

Number of branches/plant: Number of branches/plant increased significantly with increasing doses of N fertilizer. Application of increasing doses of P and K in combination or with N fertilizer affects the number of branches/plant significantly. Highest number of branches/plant were observed with T_6 (T_1+ 25% NPK) and T_3(T_1 + 25% NP).

Figure 1. *Experimental plots observation.*

Figure 2. *Seedcapsule and maturity observation.*

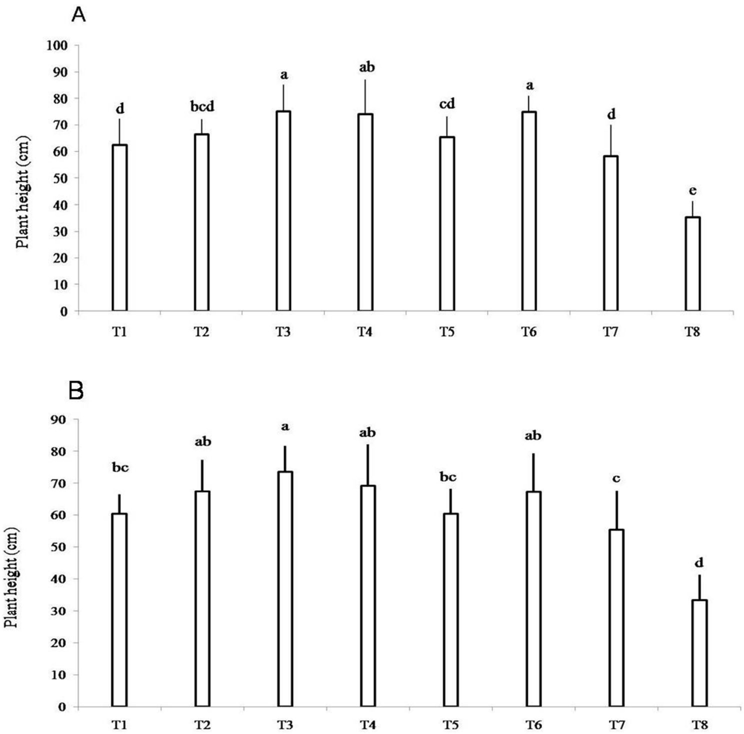

Figure 3. *Plant heightobservation by different treatments.(A) O-9897 (B) O-72. The results are expressed as the mean ± S. E. M and DMRT.*

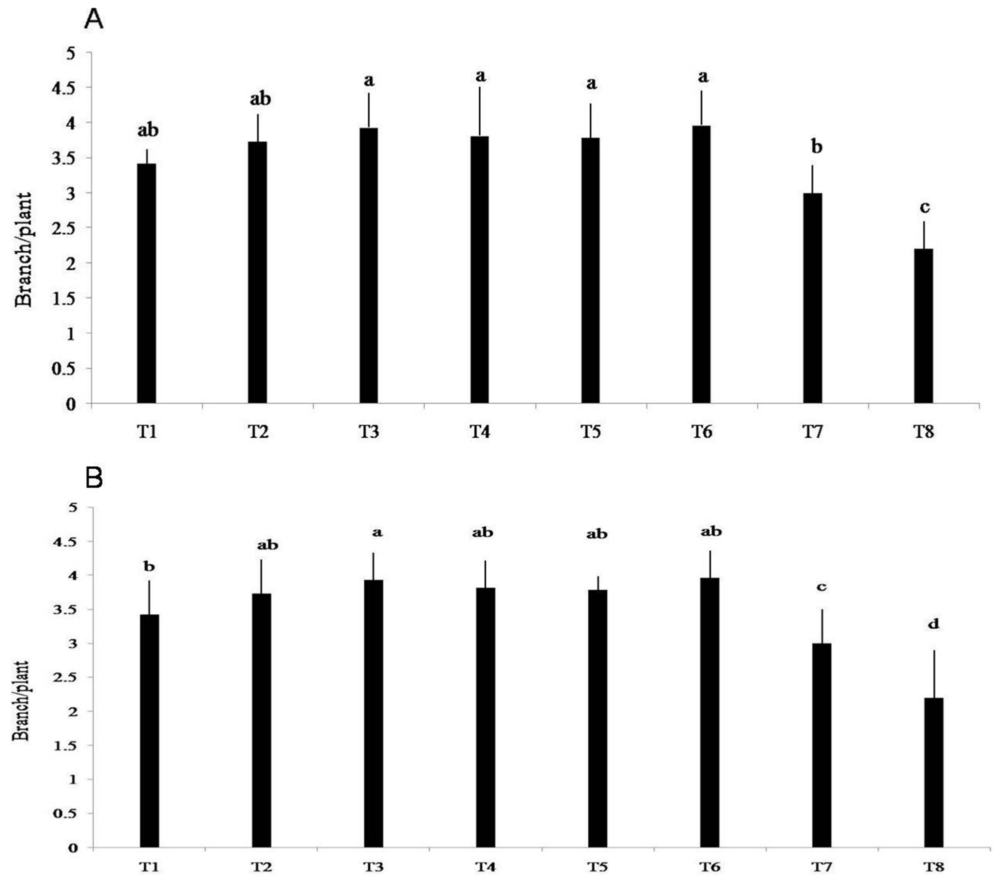

Figure 4. *Branch per plant observation by different treatments.(A) O-9897 (B) O-72. The results are expressed as the mean ± S. E. M and DMRT.*

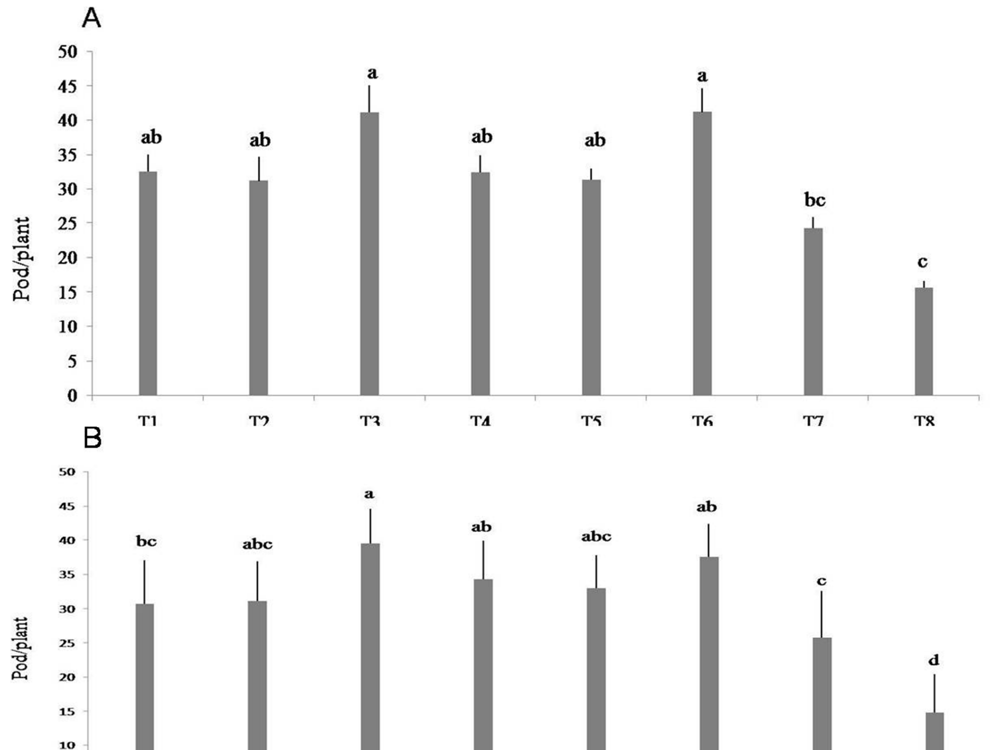

Figure 5. *Pod per plant observation by different treatments.(A) O-9897 (B) O-72. The results are expressed as the mean ± S. E. M and DMRT.*

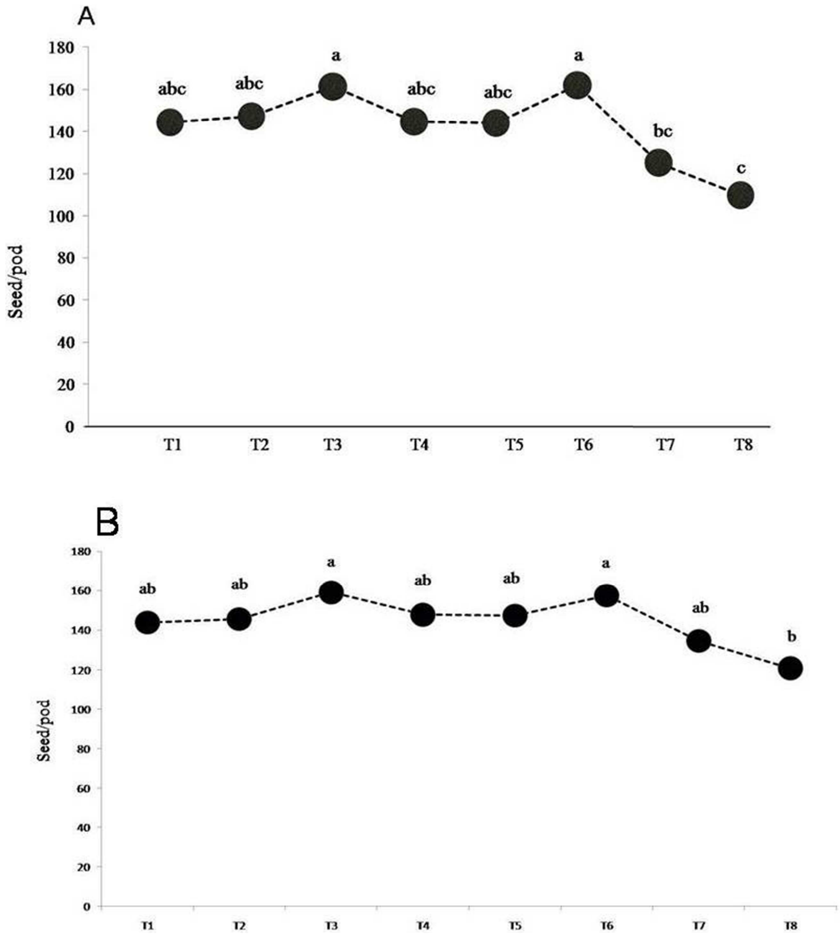

Figure 6. *Seeds per podobservation by different treatments.(A) O-9897 (B) O-72. The results are expressed as the mean ± S. E. M and DMRT.*

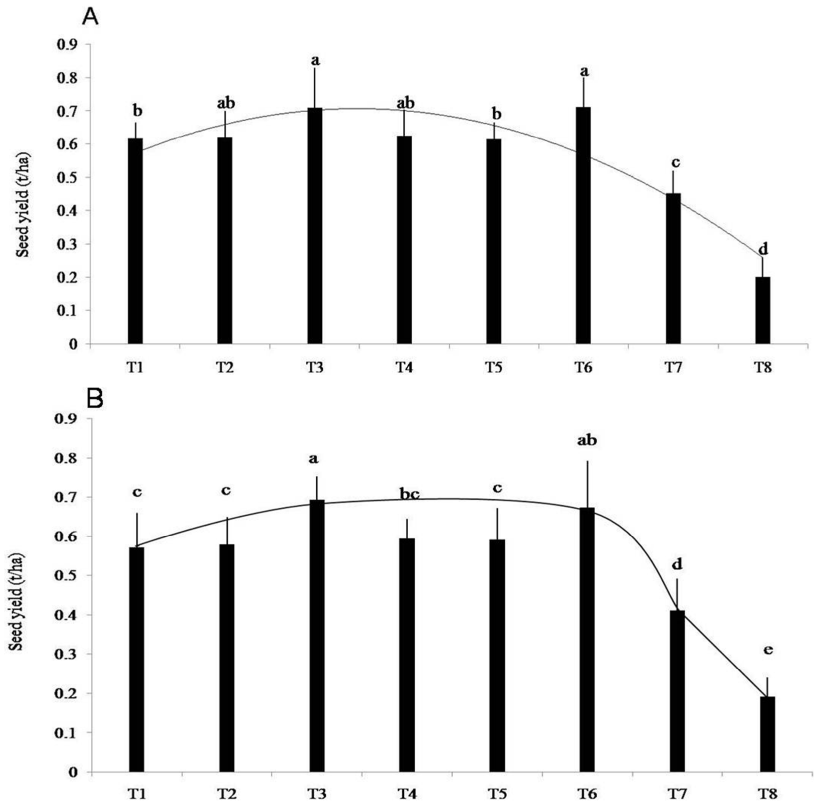

Figure 7. *Seed yield observation by different treatments. (A) O-9897 (B) O-72. The results are expressed as the mean ± S. E. M and DMRT.*

Number of pods/plant: N fertilizer application affects significantly the number of pods/plant. The significant highest number of pods/plant obtained having no significant difference in between the treatments T_6 (T_1+ 25% NPK) and T_3 (T_1 + 25% NP) per hectare. An increase in pods number by applying phosphatic fertilizer was observed [17-18].

Number of seeds/pod: Application of increasing doses of N fertilizer affect significantly the number of seeds/pod. Application of T_6 (T_1+ 25% NPK)and T_3(T_1 + 25% NP) per hectare produced the highest number of seeds/pod. About 127 to 200 seeds in each fruit of C. olitorius L were reported [19].

Seed yield: Significant effect of additional N, P and K fertilizer application on seed yield was observed. In case of increasing doses of NPK fertilizer application, significantly high seed yield was observed with T_6 (T_1+ 25% NPK) and T_3(T_1 + 25% NP) per hectare. P & K application without N, had little effect on jute [20]. In presence of P and K without N, fibre yield markedly decreased below the yield obtained without fertilizer [21]. The results indicated that the plant height, number of branches per plant, number of pods per plant, number of seeds per pod had influence on seed yield. Higher seed yield from crops having higher number of branches per plant, number of pods per plant, number of seeds per pod and weight of 1000 seeds [22-25].

4. Conclusion

It may be concluded that the application of increasing doses of NPK fertilizer has significant effect on seed yield and yield contributing characters. However, the highest seed yield may be obtained with the application of T_6 (T_1+ 25% NPK) or T_3(T_1 + 25% NP) per hectare in Bangladesh.

Authors' Contribution

Ali, M. S. designed and performed research, analyzed data and wrote the manuscript; Hoque, M. M. & S. Shahanaz performed research and analyzed data; Gani, M. N. supervised the research; and Islam, M. M., supervised and edited the first draft of the manuscript.

Conflict of Interest

The authors declare that they have no competing interests.

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Biography

Md Mahbubul Islam awarded PhD in 2008 from the Department of Agronomy of Bangladesh Agricultural University especially on Jute seed quality, plant establishment and yield. He had done his M.Sc. (Agriculture) in Agronomy and B.Sc. Agriculture (Hons.) from Bangladesh Agricultural University. He is working at Bangladesh Jute Research Institute (BJRI) since 1989. He is serving as Chief Scientific Officer & Head of Agronomy Division. He has 6 books, 80 scientific papers and more than 75 popular articles published in international and national journals, newsletters etc. He visited United Kingdom, Malaysia, and India for training, seminar, workshop purpose.