

DRY MATTER ACCRETION AT DIFFERENT HARVESTING STAGES OF NEWLY RELEASED JUTE VARIETY (BJRI TOSSA PAT 6)

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ABSTRACT

The growth analysis of a promising variety of BJRI Tossa pat 6 was determined at Jute Research Regional Station; Faridpur during March to September 2018 to know the appropriate time of harvest for maximum yield and to identify which improvement could be done to the variety. The variety BJRI Tossa pat 5 was grown as cheek variety. The plants were harvested to 15 days interval starting from 30 day after sowing to the age of 135 days. The genotype BJRI Tossa pat 6 was found superior in respect of stick, bark and root than BJRI Tossa pat 5. Plant height, base diameter, and dry-weight of leaf were higher in BJRI Tossa pat 5 than BJRI Tossa pat 6. The highest bark weight 19.19 g/plant was recorded at 135 day after sowing. 45 to 60 days and 90 to 105 days after sowing were more crucial for fibre production of BJRI Tossa pat 6.

Key words: Dry matter, harvested, jute.

Introduction

Jute is the eco-friendly and important fiber crop in the whole world. In entire life cycle of jute it is friendly to the environment and produces no toxic materials (Sarkar, 2008). On average, jute of about 1 hector land absorbs 15 ton CO₂ and 11 ton O₂ from the atmosphere during 100 days of its life. So for developing improved genotypes of this eco-friend crop, it is necessary to identify and quantify growth limitations of existing genotypes at all growth stages. Change in dry matter is the most important parameter for quantitative analysis of plant growth. It is required to explain the differences in plant growth in term of differences between species growing under same environmental condition or differences within a species growing in different environmental conditions (Pandey *et al.*, 2017). It is also very important to identify the most crucial time for the development of particular plant parts like leaf, root, bark stem etc. That's why an experiment was conducted to identify the dry weight increasing pattern of leaf, root, bark and stem of a newly released jute variety BJRI Tossa pat 6 in Jute Research Regional Station of Bangladesh.

Materials and Methods

This experiment was conducted at Jute Research Regional Station, Faridpur (23.58° N latitude and 89.81° longitude). Two varieties of jute viz. BJRI Tossa pat 5 (as control) and BJRI Tossa pat 6 were practiced in this experiment. The date of sowing was 28 March, 2018 following the spacing 30 x 5 cm. The experiment followed Randomized block design and the recommended fertilizer doses. Four weeding was done at 10 April, 26 April, 4 May and 4 June, 2018 respectively. 1st thinning was done during 17 April and 2nd at 5 May, 2018. To control the mite infestation Kumulas was sprayed at 04 June, 2018. The plants were harvested at 15 days interval starting from 30 days after sowing to the age of 135 day. A sample of 10 plants was collected from each replication and the samples were subjected to analyze for dry mater distribution. The plant height, base diameter were recorded at every harvest. The dry weight of leaf, stick, bark and root were determined after drying at 100 °c temperature for 48 hr. Eight harvests were completed to know the dry matter distribution. Data analysis has been done by SPSS.

Results and Discussion

The results indicate that the plant height, base diameter as well as dry weight of leaf, root, bark and stick continuously increased throughout the growth period for both varieties. Stick dry weight accented for major portion of total dry matter produced in plant (Table 1).

Table 1. Interaction effect of variety and harvest time on growth attributes and dry matter accumulation in jute

Treatments	Plant height (m)	Base diameter (mm)	Dry wt. (g/plant)			
			Leaf	Root	Bark	Stick
V ₁ x H ₁	0.31	4.3	0.76	0.17	0.22	0.23
V ₁ x H ₂	0.88	8.17	3.35	1.22	1.69	1.87
V ₁ x H ₃	1.67	10.6	4.5	2.12	5.4	7.04
V ₁ x H ₄	2.18	10.78	3.68	4.27	8.03	9.84
V ₁ x H ₅	2.51	11.42	3.17	5.1	8.82	12.32
V ₁ x H ₆	2.77	11.9	2.37	6.21	17.08	25.97
V ₁ x H ₇	3.12	13.63	2.1	6.53	17.2	26
V ₁ x H ₈	3.2	13.28	1.57	6.54	19.19	27.59
V ₂ x H ₁	0.29	4.07	0.61	0.13	0.18	0.21
V ₂ x H ₂	0.83	7.91	3.18	0.87	1.49	1.74
V ₂ x H ₃	1.63	11.5	4.6	2.17	5.06	6.16
V ₂ x H ₄	2.13	11.6	3.82	3.92	6.82	10.56
V ₂ x H ₅	2.44	11.25	3.27	4.33	7.59	10.66
V ₂ x H ₆	3.02	12.06	3.26	4.68	14.38	20.88
V ₂ x H ₇	3.16	13.31	2.82	4.7	16.96	22.7
V ₂ x H ₈	3.22	13.83	2.32	5.01	17	23.65
LSD	0.55	1.86	0.61	1.47	3.12	4.92
SE	0.26	0.91	2.99	0.72	1.52	2.41
Sig. level (%)	5	5	5	5	5	5

V₁= BJRI Tossa pat 6; V₂= BJRI Tossa pat 5; H₁, H₂, H₃, H₄, H₅, H₆, H₇ and H₈= Harvest at 30, 45, 60, 75, 90, 105, 120 and 135 Days after sowing (DAS), respectively; LSD = Least significant difference; SE = Standard error.

In Table 1, the highest plant height was found as 3.22 m in BJRI Tossa pat 5 during harvested at 135 DAS, which were statistically identical with the same variety harvested at 120 and 105 DAS as well as BJRI Tossa pat 6 harvested at 120 and 135 DAS, respectively. The increasing pattern of plant height was almost same in case of both the variety up to 90 DAS and after 90 DAS this parameter increase pattern was remain sharper in case of variety BJRI Tossa pat 6 compare to BJRI Tossa pat 5 upto 120 DAS. The highest base diameter was observed as 13.83 in BJRI Tossa pat 6 harvested at 135 DAS, which were statistically identical with the same variety harvested at 120 DAS and the variety BJRI Tossa pat 5 harvested at 120 and 135 DAS, respectively. Base diameter increase rate is higher at 30 to 60 DAS in case of both the variety as shown in Fig. 2. The weight of dry leaf was recorded highest as 4.6 g/plant (shown in Table 1) in case of variety BJRI Tossa pat 5 harvested at 60 DAS which was statistically identical with the variety BJRI Tossa pat 6 harvested at the same time. The leaf weights were started to decline after 60 DAS in case of both varieties (Fig. 3). The leaf of jute was maximum at 60 days (Palit and Bhattacharya, 1987). In Fig. 4, it was cleared that the root growth of both varieties had a distinct difference after 75 DAS.

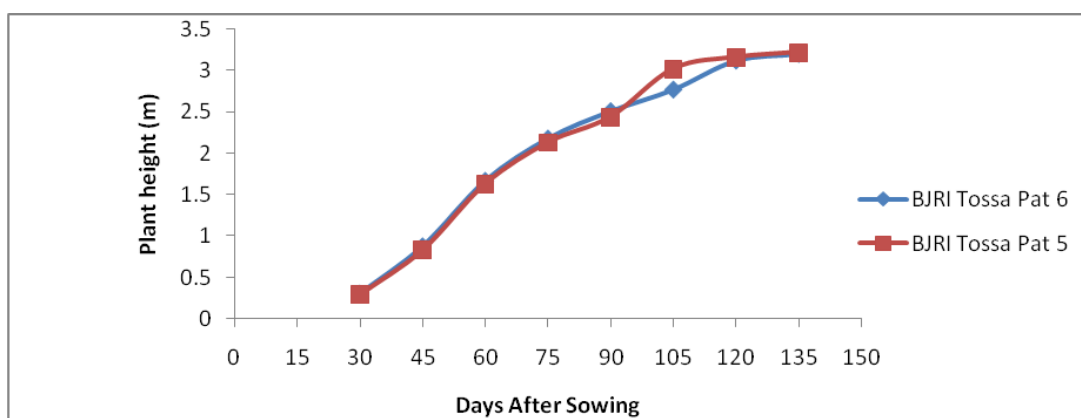


Fig 1. Plant height of jute at different harvest time

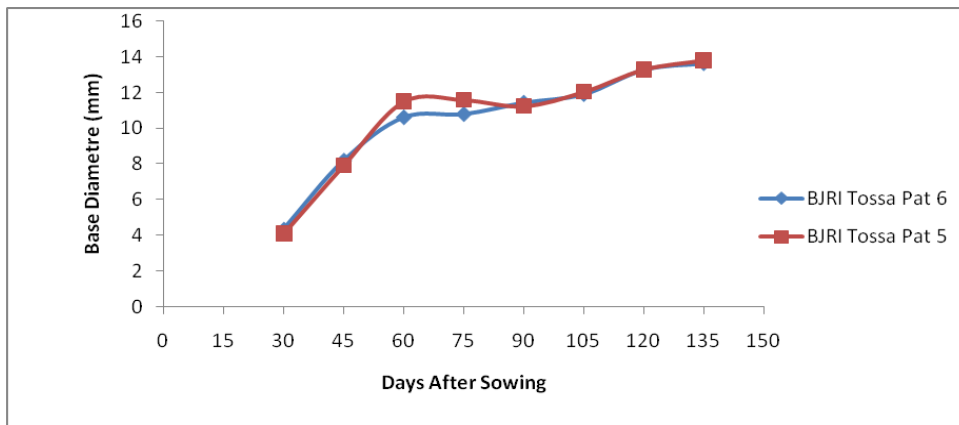


Fig 2. Base diameter of jute at different harvest time

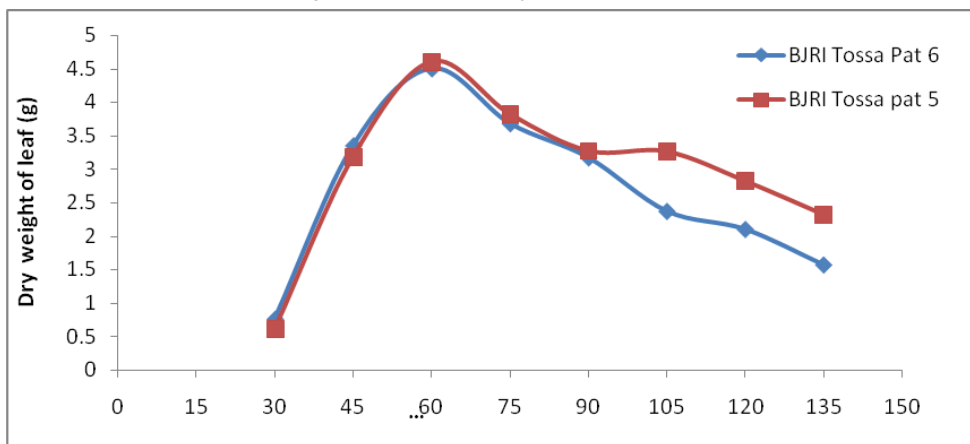


Fig 3. Leaf dry weight of jute at different harvest time

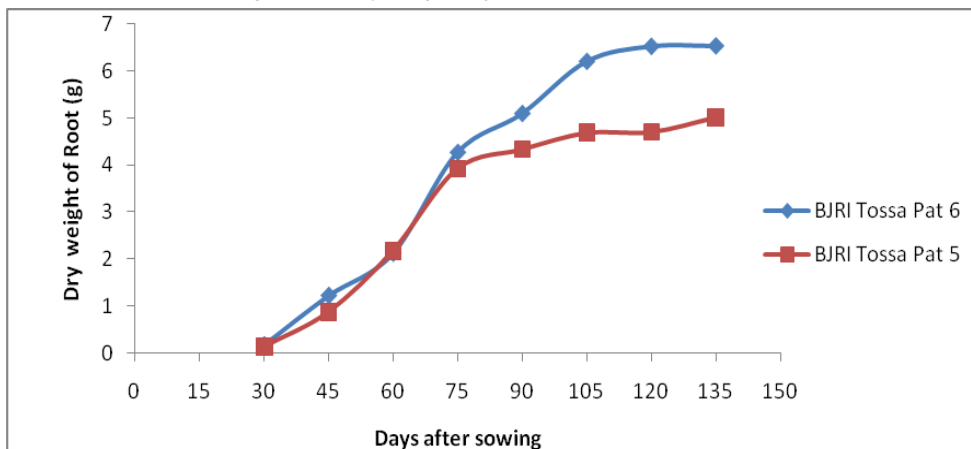


Fig 4. Root dry weight of jute at different harvest time

It was also recorded that the highest dry bark weight was as 19.19 g/plant in case of variety BJRI Tossa pat 6 harvested at 135 DAS, which were statistically identical with the same variety harvested at 105 and 120 DAS as well as variety BJRI Tossa pat 5 harvested at 120 and 135 DAS, respectively. In Fig. 5, it was observed that 45 to 60 days and 90 to 105 DAS was very important period for increasing bark weight of BJRI Tossa pat 6. The weight of highest dry stick was recorded as 27.58 g/plant from BJRI Tossa pat 6

harvested at 135 DAS, which were statistically identical with the same variety harvested at 105 and 120 DAS as well as BJRI Tossa pat 5 harvested at 120 and 135 DAS. In Fig 6, it was observed that dry weight of stick increased higher during 90 to 105 DAS. Overall the variety BJRI Tossa pat 5 was found better in respect of plant height, base diameter, dry weight of leaf in comparison with BJRI Tossa pat 6. The increasing rate of dry bark weight of BJRI Tossa pat 6 was higher during 30-45 days and 60-75 days. The dry bark weight of BJRI Tossa pat 6 was statistically identical which were harvested during 105, 120 and 135 days after sowing, respectively.

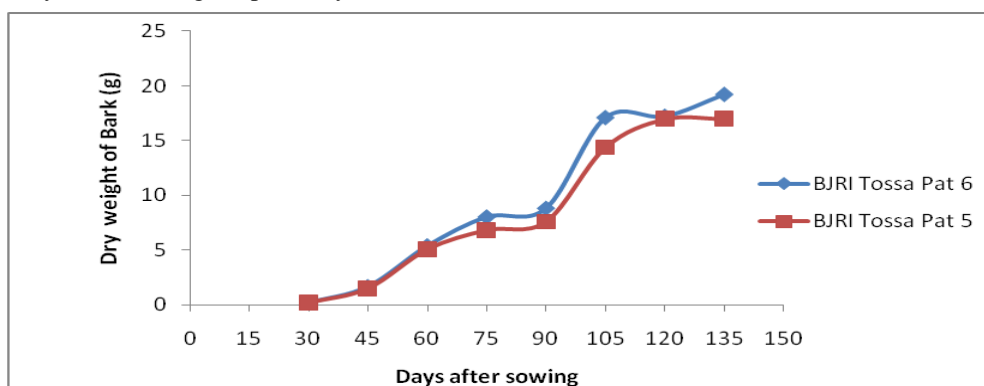


Fig 5. Bark dry weight of jute at different harvest time

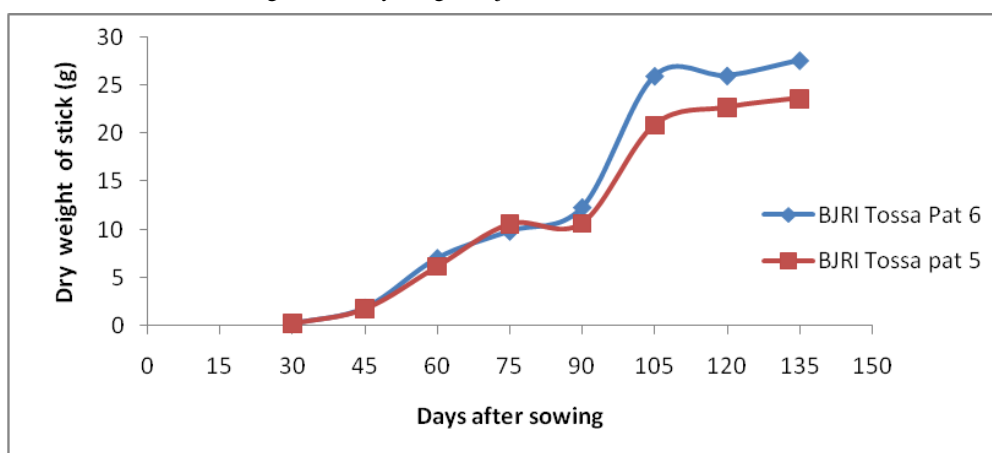


Fig 6. Stick dry weight of jute at different harvest time

Conclusion

It can be concluded that 45 to 60 DAS and 90 to 105 DAS was very critical for BJRI Tossa pat 6. Because of in this time the bark increased very rapidly. During this time care should be maintained properly.

References

- Palit, P. and Bhattacharyya, A. C. 1987. Interception of radiant energy, canopy photosynthesis and growth of cultivated jute (*Corchorus olitorius* L.). *Photosynthetica*, 21: 453-61.
- Pandey, R., Paul, V., Das, M., Meena, M. and Meena, R. C. 2017. Plant Growth Analysis, Manual of ICAR Sponsored Training Programme on “Physiological Technique to Analyze The Impact of Climate Change on Crop Plants”.
- Sarkar, S. 2008. Good Practices for Jute and Allied Fibre Crops. In: Souvenir, International Symposium on Jute and Allied Fibre Production, Utilization and Marketing, 1-3 pp. Organized by Indian Fibre Society (Eastern Region). Kolkata, 9-12 January.