

EFFECT OF WEEDING AND HERBICIDE MANAGEMENT ON FIBRE YIELD AND YIELD ATTRIBUTES OF TOSSA JUTE

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Abstract

The experiment was conducted at Jute Agriculture Experimental Station (JAES), Manikganj and Jute Research Regional Station, Faridpur during 2019 to find out the effect of weeding and herbicide management on fibre yield and yield attributes of Tossa jute (Var. O-9897) cultivation. Two herbicide treatments, such as; W_1 = Fenoxaprop-p-ethyl (Whip Super 9 EC) and W_2 = Ethoxysulfuron (Sunrice ® 150WG) were tested. There were 14 treatments. T_1 - T_6 treatments did not include hand weeding which was done 20 days after the herbicide spray [T_1 = 100% recommended doses (RD) of both W_1 and W_2 where W_2 was sprayed one day after that of W_1 , T_2 = 50% dose both of W_1 and W_2 where W_2 was sprayed one day after that of W_1 , T_3 = 100% dose of both W_1 and W_2 where both of the herbicide mixed together and sprayed on the same day, T_4 = 50% dose of both W_1 and W_2 where mixture of both were sprayed on the same day, T_5 = only 100% dose of W_1 , T_6 = only 100% dose of W_2]. The treatments T_7 - T_{12} included one had weeding following the application of herbicides [T_7 = 100% dose both of W_1 and W_2 where W_2 was sprayed 1 day after that of W_1 , T_8 = 50% dose both of W_1 and W_2 where W_2 was sprayed 1 day after of W_1 , T_9 = 100% dose both of W_1 and W_2 were mixed and sprayed together on the same day, T_{10} = 50% dose both of W_1 and W_2 mixed together and sprayed same day, T_{11} = only 100% dose of W_1 , T_{12} = only 100% dose of W_2]. The treatments T_{13} and T_{14} did not include herbicide application [T_{13} = Two hand weeding (20-25 and 45-50 DAS) and T_{14} = control with no herbicide application]. The experiment was laid out in RCBD with three replications. Results revealed that Khudesama (*Echinochloa colonum*) and Angulighash (*Digitaria sanguinalis*), Khudesama and Mutha (*Cyperus rotundus*) were best controlled by herbicide application. T_3 gave highest fibre yield of 1.89 tha^{-1} when W_1 and W_2 sprayed at the same day with 100% RD. In case of one weeding 20 days after spray fibre yield and stick yield were differed significantly as compared to those of control at Manikganj. Treatment T_7 gave highest fibre yield (3.11 t ha^{-1}) when W_2 sprayed after 1 day of W_1 with 100% RD. At Faridpur, T_3 gave the highest fibre yield (2.68 t ha^{-1}) when W_1 and W_2 sprayed at the same day with 100% RD. In case of one weeding 20 days after spray, T_7 gave highest fiber yield (2.79 t ha^{-1}) when W_2 was sprayed 1 day after that of W_1 with 100% RD.

Introduction

Jute is an upland crop grown in summer season in Bangladesh. It is the most important fibre crop as well as one of the cash crops of the country. Weed is one of the most important pests in

jute which deteriorate the yield and quality of fibre to a considerable extent. Weeds affect light interception and passing of wind and affect photosynthesis in jute plant and ultimately crop will receive stunted growth. In consequence, yield of crop is reduced (Islam and Rahman, 2008); Kundu, 1958). The hot and humid environment of summer is highly favorable for weed germination and weed growth. As a result, weeding and thinning operations involve about 40% or more of the labour cost investment in jute cultivation. In Bangladesh, weeds are generally controlled by raking and nirani (hand weeding). In Bangladesh, weeds are generally controlled by raking and nirani (hand weeding) and weeding and thinning operations involve about 50% or more of the labour cost (Alam, 2003). An effective weed management practice is necessary for higher crop production and better economic return (Gaffer *et al.*, 1988). Herbicide has effectiveness in terms of weed control in jute field. Different factors affect weed infestation in a field, among them water, light and mineral nutrients (Talukder, 1978). Therefore, a routine weedicide field trial experiment was undertaken in two different AEZ for Jute fibre production.

Materials and Methods

The experiment was conducted at Jute Agriculture Experimental Station (JAES), Jute Research Manikganj and Jute Research Regional Station, Faridpur in 2019 to find out the effect of weeding and herbicide management on fibre yield and yield attributes of Tossa jute cultivation. The experiment was laid out in RCBD with three replications. Unit plot size was 4.0m x 2.5m. Space between plot to plot and around the field was 1.0 m and between replications 1.5 m. Tossa jute varieties O-9897 was used as the study material. Two different herbicide treatments, such as; W_1 = Fenoxaprop-p-ethyl (Whip Super 9 EC); W_2 = Ethoxysulfuron (Sunrice®150WG) were tested. There were 14 treatments. $T_1 - T_6$ treatments did not include hand weeding which was done 20 days after the herbicide spray [T_1 = 100% doses of both W_1 and W_2 where W_2 was sprayed one day after that of W_1 , T_2 = 50% dose both of W_1 and W_2 where W_2 was sprayed one day after that of W_1 , T_3 = 100% dose of both W_1 and W_2 where both of the herbicide mixed together and sprayed on the same day, T_4 = 50% dose of both W_1 and W_2 where mixture of both were sprayed on the same day, T_5 = only 100% dose of W_1 , T_6 = only 100% dose of W_2]. The treatments $T_7 - T_{12}$ included one had weeding following the application of herbicides [T_7 = 100% dose both of W_1 and W_2 where W_2 was sprayed 1 day after that of W_1 , T_8 = 50% dose both of W_1 and W_2 where W_2 was sprayed 1 day after of W_1 , T_9 = 100% dose both of W_1 and W_2 were mixed and sprayed together on the same day, T_{10} = 50% dose both of W_1 and W_2 mixed together and sprayed same day, T_{11} = only 100% dose of W_1 , T_{12} = only 100% dose of W_2]. The treatments T_{13} and T_{14} did not include herbicide application [T_{13} = Two hand weeding (20 - 25 and 45 - 50 DAS) and T_{14} = control with no herbicide application]. Crops were sown on last week of March to first week of April and harvested 120 days after sowing.

Results and Discussion

Manikganj

Results revealed that all the weedicide of different dose significantly controlled the weeds. The parameters like plant population, base diameter and plant height differed significantly due to weeding and herbicide application at Manikganj (Table 1). Plant population and plant height both were significantly increased at different treatments with weedicide spray than control plot. Fibre yield and stick yield were differed significantly with control but in case of only weedicide spray without weeding at Faridpur (Fig. 1).

Treatment T₃ (2.06 t ha⁻¹) gave maximum fibre yield when W₁ and W₂ sprayed at the same day with 100% RD followed by T₄ (2.06 t ha⁻¹) when W₁ and W₂ sprayed at the same day with 50% RD. In case of one weeding 20 days after spray, fibre yield and stick yield were differed significantly than control at Manikganj (Fig. 1). Treatment T₇ (3.11 t ha⁻¹) gave maximum yield when W₂ sprayed after 1 day of W₁ with 100% RD followed by T₁₀ (2.81 t ha⁻¹) when mixture sprayed same day of W₁ with 50% RD. The lowest result was found at control (1.44 t ha⁻¹). The results were in agreement with Sadiq *et al.* (2002); Salkin and Nagaari (1983); Rafique (1980) and Ross and Lembi (1985).

Table1. Effect of weeding and herbicide management on growth parameters of Tossa jute at Manikganj

Treatments				PP (m ⁻²)	PH (m)	BD (mm)
T ₁	W ₁ +W ₂	100% of RD	W ₂ was sprayed 1 day after of W ₁	35.15	2.57	14.85
T ₂	W ₁ +W ₂	50% of RD	W ₂ was sprayed 1 day after of W ₁	34.79	2.52	13.97
T ₃	W ₁ +W ₂	100% of RD	Mixture was sprayed same day of W ₁	36.03	2.65	15.11
T ₄	W ₁ +W ₂	50% of RD	Mixture was sprayed same day of W ₁	33.63	2.53	14.32
T ₅	W ₁	100% of RD	W ₁ was sprayed as per method	33.62	2.55	14.62
T ₆	W ₂	100% of RD	W ₂ was sprayed as per method	34.43	2.35	14.74
T ₇	W ₁ +W ₂	100% of RD	W ₂ was sprayed 1 day after of W ₁	40.40	2.93	15.73
T ₈	W ₁ +W ₂	50% of RD	W ₂ was sprayed 1 day after of W ₁	36.87	2.71	14.77
T ₉	W ₁ +W ₂	100% of RD	Mixture was sprayed same day of W ₁	39.52	2.75	14.19
T ₁₀	W ₁ +W ₂	50% of RD	Mixture was sprayed same day of W ₁	36.38	2.78	15.38
T ₁₁	W ₁	100% of RD	W ₁ was sprayed as per method	35.16	2.62	15.34
T ₁₂	W ₂	100% of RD	W ₂ was sprayed as per method	35.04	2.48	14.59
T ₁₃	Normal weed management		2 weeding (20-25 & 45-50 DAS)	37.78	2.89	15.59
T ₁₄	Control		(No weeding & spraying)	28.50	2.08	11.41
LSD _(0.05)				2.39	0.30	2.71
CV (%)				2.55	3.81	6.18

NS = Not-significant, PP = Plant population, PH = Plant height, BD = Base diameter, W₁ = Fenoxaprop-ethyl (Whip Super 9 EC); W₂ = Ethoxysulfuron (Sunrice 150WG); RD = Recommended dose

Faridpur

Results showed that all the weedicide of different dose significantly controlled the weeds. Yields and all the yield contributing parameters like plant population, base diameter and plant height differed significantly due to weeding and herbicide management at Faridpur (Table 2). Plant population and plant height both were significantly increased at different treatments with

weedicides spray when compared with control plots. Fibre yield and stick yield were differed significantly than in comparison to those of control but only under weedicide spray without weeding at Faridpur (Fig. 2). Treatment T₃ (2.68 t ha⁻¹) gave the maximum fibre yield when W₁ and W₂ were sprayed at the same day using 100% RD which followed by T₅ (2.52 t ha⁻¹) when only W₁ was sprayed using 100% RD. One weeding 20 days after spray, the fibre yield and stick yield were differed significantly compared to those of control at Faridpur (Fig 2).

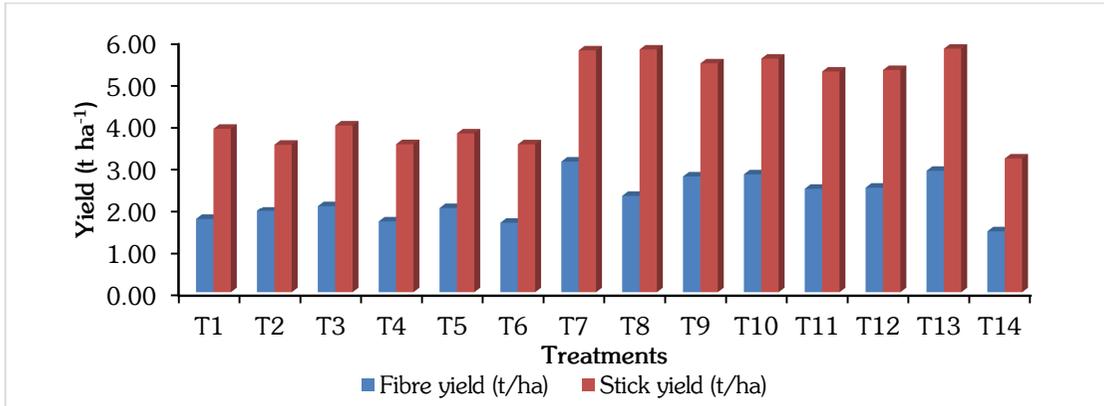


Fig. 1. Effect of weeding and herbicide management on fibre and stick yield of Tossa jute at Manikganj

Table 2. Effect of weeding and herbicide management on growth parameters of Tossa jute at Faridpur

Treatments				PP (m ²)	PH (m)	BD (mm)
T ₁	W ₁ +W ₂	100% of RD	W ₂ will be sprayed 1 day after of W ₁	34.81	2.34	10.74
T ₂	W ₁ +W ₂	50% of RD	W ₂ will be sprayed 1 day after of W ₁	34.22	2.42	11.18
T ₃	W ₁ +W ₂	100% of RD	Mixture will be sprayed same day of W ₁	34.79	2.63	11.85
T ₄	W ₁ +W ₂	50% of RD	Mixture will be sprayed same day of W ₁	33.48	2.48	11.14
T ₅	W ₁	100% of RD	W ₁ will be sprayed as per method	34.00	2.64	12.60
T ₆	W ₂	100% of RD	W ₂ will be sprayed as per method	34.43	2.25	9.82
T ₇	W ₁ +W ₂	100% of RD	W ₂ will be sprayed 1 day after of W ₁	39.53	2.70	13.51
T ₈	W ₁ +W ₂	50% of RD	W ₂ will be sprayed 1 day after of W ₁	36.35	2.55	11.77
T ₉	W ₁ +W ₂	100% of RD	Mixture will be sprayed same day of W ₁	36.70	2.29	10.94
T ₁₀	W ₁ +W ₂	50% of RD	Mixture will be sprayed same day of W ₁	38.14	2.61	13.04
T ₁₁	W ₁	100% of RD	W ₁ will be sprayed as per method	34.78	2.43	10.51
T ₁₂	W ₂	100% of RD	W ₂ will be sprayed as per method	34.83	2.56	11.70
T ₁₃	Normal weed management		2 weeding (20-25 & 45-50 DAS)	37.61	2.50	11.54
T ₁₄	Control		(No weeding & spraying)	28.54	2.48	10.65
LSD _(0.05)				3.38	NS	2.95
CV (%)				3.19	7.01	8.53

NS = Not-significant, PP = Plant population, PH = Plant height, BD = Base diameter, W₁ = Fenoxaprop-ethyl (Whip Super 9 EC); W₂ = Ethoxysulfuron (Sunrice 150WG); RD = Recommended Dose

Treatment T₇ gave highest yield (2.79 t ha⁻¹) when W₂ was sprayed one day after that of W₁ using 100% RD. The lowest fibre yield was found with control (1.74 t ha⁻¹) which could be due

to incidence of more weeds in the control plots. Similar results were also reported by Jamil *et al.* (2000); Ross and Lembi (1985); Sadiq *et al.* (2002) and Ahmad (1996).

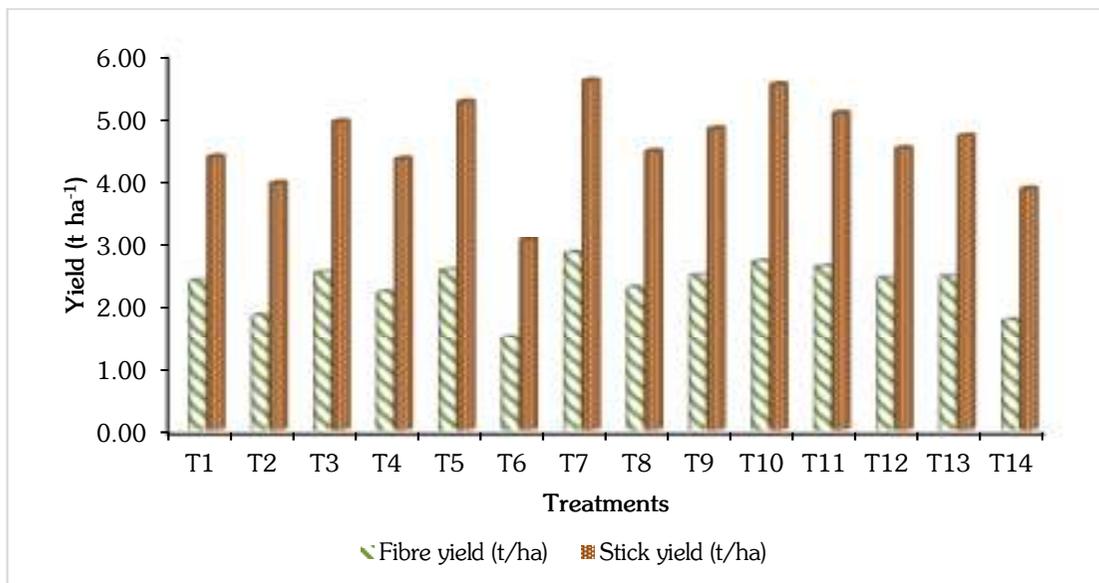


Fig. 2. Effect of weeding and herbicide management on fibre yield and Stick yield of tossa jute at Faridpur

Conclusion

From the above results, it could be concluded that the fibre yield and stick yields differed significantly in comparison with those of control under weedicide spray without weeding both at Manikganj and Faridpur. Treatment T₃ gave highest fibre yield of 1.89 t ha⁻¹ when W₁ and W₂ were sprayed at the same day with 100% RD. In case of one weeding 20 days after spray, both the fibre yield and stick yields differed significantly compared to those of control at Manikganj with T₇ (3.11 t ha⁻¹) which gave the highest yield when W₂ was sprayed after one day of W₁ using 100% RD. At Faridpur T₃ gave the highest fibre yield (2.68 t ha⁻¹) when W₁ and W₂ were sprayed at the same day using 100% RD. In case of one weeding 20 days after spray, T₇ also gave the highest yield (2.79 t ha⁻¹) when W₂ was sprayed one day after that of W₁ using 100% RD.

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