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EFFECT OF NITROGEN MANAGEMENT ON FIBRE YIELD OF CAPSULARIS JUTE IN EASTERN UTTAR PRADESH

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ABSTRACT

A field experiment was conducted at the crop research station, Bahraich (U.P.) during 2009-10 and 2010-11 to study the effect of nutrient management on fibre yield and nutrient uptake. The result revealed that the increasing levels of N had beneficial effect on growth and yield of jute over control. Application of 60 kg N in three splits (20 kg as basal, 20 kg at 5 WAS and 20 kg at 7 WAS) and 5 t FYM ha^{-1} produced highest fibre yield (29.98 q ha^{-1}) along with net return of Rs. 36685 ha^{-1}. The uptake of N (65.9 kg ha^{-1}), P(35.6 kg ha^{-1}) and K (74.3 kg ha^{-1}) was significantly higher with 60 kg N in three splits + 5 t FYM ha^{-1}. Application of chemical fertilizer along with FYM 5 t ha^{-1} produced higher growth as comparison to chemical fertilizer along. The splitting of nitrogen in three parts produced higher plant growth as well as fibre yield in comparison to nitrogen splitting in two parts. Increasing N doses showned the increasing pattern of net returns upto 60 kg N ha. The uptake of nutrients also improved with increasing nitrogen levels.

Key words: Nirtogen management, fibre yield, capsularis jute, eastern Uttar Pradesh

INTRODUCTION

Among different fibre crops of U.P. Jute is the most important crop in area and production. Jute growers in U.P. are marginal farmers who cannot afford to use the recommended dose of chemical fertilizer because of its higher cost. Thus, the nutrient removal by jute is not replenished by the low dose of fertilizer applied by the farmers. However, presently there is renewed interest for the use of organic manure largely because of increasing cost of chemical fertilizer. The approach of integrated nutrient management through the judicious mixing of organic as well as chemical sources of nutrients is an imperative which will not only economized the use of chemical fertilizer but also improved the physicochemical status of the soil. A little information is on available N management through organic and inorganic sources in Jute. Therefore, the present study was undertaken to evaluate the effect of integrated nitrogen management on fibre yield of capsularis jute.

MATERIALS AND METHODS

A field experiment was conducted during 2009-10 and 2010-11 at the crop research station, Bahraich using capsularis jute as a test crop. The soil of experimental plot was sandy loam in texture with pH 7.5, available N 180.5 kg, P 13.5 kg and K 240 kg ha^{-1}. The ten treatment viz. T_1 Control, T_2 40 kg N ha^{-1} in 2 split equal dose at 3-4 and 6-7 WAS, T_3 60 kg N in 2 equal split at 3-4 and 6-7 WAS, T_4 - 40 kg N in 3 split doses, 10 kg as basal, 15 kg at 3-4 and 15 kg at 6-7 WAS, T_5 - 60 kg N in 3 equal split doses, 20 kg as basal, 20 kg at 3-4 and 20 kg at 6-7 WAS, T_6 - FYM 5 ton ha^{-1} , T_7 - FYM 5 ton ha^{-1}+ 40 kg N ha^{-1} in 2 split equal dose at 3-4 and 6-7 WAS, T_8 - FYM 5 ton /ha+ 60 kg N ha^{-1} in 2 equal split dose at 3-4 and 6-7 WAS, T_9 - FYM 5 ton ha^{-1}+ 40 kg N ha^{-1} a in 3 split equal doses, 10 kg as basal, 15 kg at 3-4 and 15 kg at 6-7 WAS and T_{10} - FYM 5 ton ha^{-1}+ 60 kg N ha^{-1} in 3 spit equal dose, 20 kg as basal, 20 kg at 3-4 and 20 kg at 6-7 WAS, were tested in randomized block design with 3 replications. The N, P and K were used as urea, single superphasphate and muriate of potash, respectively. The crop was sown on 15 May on both the years with seed rate of 5 kg ha^{-1}. Spacing was maintened 30 * 10 cm row to row and plant to plant after one month of the sowing. All agronomical practices were followed as per requirement of crop. The growth parameter, plant hight, basal diameter, green weight q ha^{-1} was recorded before harvesting of crop. The fibre, stick yield and net return were recorded after harvesting of crop. Plant samples were analyzed for N, P, K by adopting standard methods (Jackson 1973).

RESULTS AND DISCUSSION

The higher value of growth characters were recorded with each increasing N levels up to 60 Kg N ha^{-1} (Table 1) with three splits. This improvement in crop growth might be because of the increased availability and uptake of N at higher N levels. Kumar *et al.* (2010) also reported similar results. Increasing levels of N from 0 to 40 and 40 to 60 Kg N ha^{-1} markedly improved the fibre yield and stick yield of jute. The beneficail effect of N application is responsible for enhancing productivity at higher N levels as reported by Kumar et al. (2010). The pooled

data indicated that the higher plant height (324.56 cm), basal diameter (2.23 cm) and green weight (428.4 q ha^{-1}) were noticed under the application of 60 kg ha^{-1} in 3 splits + 5 t FYM ha^{-1}, which proved significantly superior to other treatments. The higher value of above characters may be due to the application of FYM along with higher dose of nitrogen application in 3 equal doses at proper growth time of plant. The application FYM improved soil health, increased water retention capacity as well as enhanced plant root ultimately uptake of more nutrient thus reflect in growth as well as fibre yield. Similar results were reported by Kumar *et al.* (2010). Application of 40 kg N ha^{-1} in two equal splits along with 5 t FYM ha^{-1} produced lower growth of plant because of nitrogen was not sufficient to meet the requirement of crop.The splitting in 3 equal doses was better than 2 equal doses of nitrogen application. The lower growth of jute plant was noticed when crop was grown with only 5 t FYM ha^{-1}. The data on growth indicated that integrated nutrient approach found significantly better than inorganic fertilizer only. Application of FYM improved crop growth as well as root development of plant which resulted in better growth of crop Shaha et.al. (2008) and Singh *et al.* (2011) also reported similar results.

Table 1: Effect of nitrogen on growth, yield and uptake of nutrients in capsularis jute (mean of two years)

Treatments	Plant height (cm)	Basal diameter (cm)	Green weight qha^{-1}	Fibre yield q ha^{-1}	Stick yield q ha^{-1}	Net return Rs ha^{-1}	B:C Ratio	Nutrient uptake (kg ha^{-1})		
								Nitrogen	Phosphorus	Potassium
T_1	150.13	1.27	160.53	11.23	22.58	2418	1.15	24.7	13.4	28.0
T_2	249.73	1.76	351.10	24.57	50.85	28606	2.50	54.1	29.4	61.4
T_3	287.73	1.99	388.70	27.20	62.68	33605	2.79	59.8	32.5	68.0
T_4	258.96	1.84	358.86	25.11	52.50	29696	2.56	55.2	30.0	62.7
T_5	297.66	2.12	394.36	27.60	63.50	34348	2.83	60.7	33.1	79.3
T_6	203.96	1.42	338.66	21.37	43.50	19505	2.17	47.0	26.3	54.6
T_7	266.96	1.88	366.43	25.64	52.50	28081	2.61	56.4	30.6	64.0
T_8	321.6	2.19	418.76	29.30	63.80	35278	3.00	64.4	35.3	73.5
T_9	272.6	1.99	370.7	25.94	58.70	28488	2.66	57.0	31.2	64.7
T_{10}	324.56	2.23	428.4	29.98	64.80	36685	3.06	65.9	35.6	74.3
CD (P=0.05)	17.8	0.012	15.8	0.15	2.45	250	.025	3.5	2.2	3.8

The yield data indicated that the higher fibre yield (29.98 q ha^{-1}) was recorded under 60 kg N ha^{-1} in 3 equal splits with 5 t FYM ha^{-1} which was found significantly better than other treatments. Application of nitrogen in 3 equal splits with 5 t FYM was found more productive as compared to chemical fertilizer with two equal splits. The application of 5 t FYM ha^{-1} produced lower yield (21.37 qha^{-1}) which was due to the fact that organic manure was not sufficient for meeting the nutrients requirement of the productivety of crop. Similar finding was reported by Ray and Chawdhary (2000), Saha *et al.* (2008) and Paikary *et al.* (2006). The data (Table 1) revealed that the higher net return of Rs. 36685 was obtained under N 60 kg ha^{-1} in three splits + 5 t FYM ha^{-1} which were due to production of higher yield. While lower net return of Rs. 2418 was recorded under control.

The higher B:C ratio 3.06 was recorded under the treatment T_{10} and lower value 1.15 was recorded under treatment T_1 (control). The data on nutrient uptake by the crop (Table 1) indicated that higher uptake of N (65.9 kg ha^{-1}), P(35.6 kg ha^{-1}) and K (74.35 kg ha^{-1}) was found under 5t FYM ha^{-1} + 60 kg N in 3 equal splits which was due to higher production under same treatment. The lower NPK uptake 24.7, 13.4 and 28.0 kg ha^{-1} was recorded under control. The NPK uptake 64.4, 35.3 and 73.5 was recorded under T_8 which was found at second place.

On the basis of the findings it may be concluded that 5 t FYM + 60 kg N in three splits proved beneficial for better crop growth as well as higher fibre yield. This treatment (60 kg N ha^{-1} in three splits + 5 t FYM ha^{-1}) proved more remunerative for Jute growers of eastern U.P.

REFERENCES

Jackson M.L. (1973) Soil Chemical Analysis. *Prentice Hall of India Pvt. Ltd., New Delhi.*

Kumar, Neeraj, Srivastava R.K., Singh M.V., Singh R.B. and Singh R.K. (2010) Nitrogen

substitution in jute (*Corchorus olitorius*) through green manure and farmyard manure for sustainable production in eastern tarai region of Uttar Pradesh. *Paper published in Jute and Allied Fibers Production, Utilization and Marketing. pp 179-182.*

Paikary R.K., Mahanta D. and Swanil S.K. (2006) Effect of nutrient management in white jute-rice cropping system under rained condition. *Indian Journal of Agronomy. 51(4) : 256-258.*

Ray P.K. and Chawdhary J. (2000) Nutrient management in jute and allied fibre, F*ertilizers News. 45(10):40-45*.

Saha A.R., Mitra D.N., Mazumdar B., Saha S. and Mitra S. (2008) Effect on integrated nutrient management on rosselle (*Hibiscus sabdariffa*) productivity its mineral nutrition and soil properties. *Indian Journal of Agricultural Sciences. 78(5):418-421.*

Singh M.V., Neeraj Kumar, Singh R.K.(2011) Influence of integrated nutrient management in mesta-rice crop sequence system in Eastern U.P. *Annals of Plant and Soil Research.13(2):128-130.*