Response of Kenaf Variety, HC-583 to Different Levels of Nitrogen

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SUMMARY

An experiment was conducted in a replicated randomised block design at the Field Research Station of the Regional Research Laboratory, Jammu to study the effect of different levels of nitrogen, 0, 40, 80, 120, 160 and 200 kg/ha, on the growth and yield of Kenaf variety, HC–583 during the years 1976–1977. The differences in plant height, basal diameter and dry yield of stalk were all significant over control with 80 kg N/ha and highly significant with 200 kg N/ha. However, between 80 kg, 120 kg, 160 kg, 200 kg N/ha the differences were not significant. 80 kg N/ha is, therefore, recommended as the optimum dose for the Kenaf variety, HC–583.

INTRODUCTION

In earlier publications[1,2], we discussed about the introduction and performance of several Kenaf varieties and recommended the cultivation of HC–583 variety under the agro-climatic conditions prevailing in Jammu. In order to exploit its yield potential, this variety was subjected to further experimentation to different sowing dates and different levels of Nitrogen. Findings of the former experiment have already been published in an earlier issue of Ippta [3] and that of the latter are being discussed here.

MATERIALS AND METHODS

The experiment was conducted at the Field Research Station of the Regional Research Laboratory, Jammu during the years 1976 and 1977 in a randomised block design with 6 levels of Nitrogen (0, 40, 80, 120, 160, and 200 kg/ha) and 6 replications. The soil of the Field Research Station was sandy loam in texture (sand 53.4%, silt 32.0% and clay 14.0%), poor in organic matter (carbon 0.378%) and available nutrients (K_2O 125.5 kg/ha; P_2O_5 16.2 kg/ha) with pH 7.9. Net size of the experimental plot was 2592 m^2.

In both the years, sowing was done in the Ist week of May and the seed rate was maintained@15 kg/ha. A basal dose of phosphorus and potash @ 40kg/ha as single superphosphate and muriate of potash respectively was applied at the time of sowing. Nitrogen was applied in 3 split doses. The first dose was applied after 3 weeks of sowing and the subsequent ones at monthly intervals. Seeds were sown in rows, 40 cm apart. Thinning was done after a fortnight to maintain the plant to plant distance to about 20 cm. Other cultural operations were attended to as and when needed. The crop was harvested in mid-November, when the plants were in full bloom.

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RESULTS AND DISCUSSION

PLANT HEIGHT

Increasing levels of N progressively increased the the plant height. There was an increase of 123.77 cm or 44.76% in height over control with the application of 200 kg N/ha (Table—I). The differences in plant height over control were significant with 80 kg, 120 kg and 160 kg N/ha and highly significant with 200 kg N/ha. However, between themselves, the differences were not significant, suggesting thereby that 80 kg N/ha is the optimum dose for increase in plant height.

BASAL DIAMETER OF STALK

Increasing levels of N progressively increased the basal diameter of stalk. There was an increase of 0.62 cm or 40.25% in basal diameter of stalk over control with the application of 200 kg N/ha. The differences in basal diameter of stalk over control were significant with 80 kg and 120 kg N/ha. However, between themselves, the differences were not significant, suggesting thereby that 80 kg N/ha is the optimum dose for increase in basal diameter of stalk.

DRY YIELD OF STALK

In the first year of experimentation (1976), increasing levels of N progressively increased the dry yield of stalk upto the level of 120 kg N/ha, but there was slight reduction in dry yield of stalk with the application of 160 kg and 200 kg N/ha. However, the reduction in the dry yield of stalk with 160 kg and and 200 kg N/ha was not significant over 120 kg N/ha.

TABLE—I. SHOWING THE EFFECT OF DIFFERENT LEVELS OF NITROGEN ON THE GROWTH AND YIELD OF KENAF VARIETY, HC-583

Levels of Nitrogen(Kg/ha)	Plant height (cm) 1977	Basal diameters (cm) 1977	Dry yield of stalk (Q/ha) 1976	1977
0	276.50	1.54	122.85	79.73
40	331.12	1.77	142.89	122.05
80	357.84*	1.86*	149.12	167.05*
120	368.93*	1.88*	169.30**	179.01*
160	368.76*	1.96**	168.70**	192.00**
200	400.27**	2.16**	165.92**	217.19**
S.Em ±	23.96	0.10	9.40	27.56
C.D. at 5%	69.79	0.29	27.38	80.27
C.D. at 1%	94.52	0.39	37.08	108.72

* Significant, ** Highly significant.

In the second year (1977), increasing levels of N progressively increased the dry yield of stalk upto the maximum level of 200 kg N/ha. There was an increase of 137.45 Q/ha or 172.40% in dry yield of stalk over control with the application of 200 kg N/ha. The differences in dry yield of stalk were significant with 80 kg and 120 kg N/ha and highly significant with 160 kg and 200 kg N/ha over control. However, between 80 kg, 120 kg, 160 kg, and 200 kg N/ha, the differences were not significant, suggesting thereby that 80 kg N/ha is the optimum dose for increase in dry yield of stalk.

INCREASE IN DRY YIELD OF STALK PER KG N APPLIED

Though there was progressive increase in dry yield of stalk with increasing levels of N, there was, however, no proportionate increase in dry yield of stalk per kg N applied; the rate of this increase for every additional kg of N decreased gradually(Table-II). It is thus evident that the relationship between increase in dry yield of stalk and N applied was not proportional or linear.

CONCLUSION

It is thus clear from the foregoing discussion that the Kenaf variety, HC-583 responded significantly over control to 80 kg N/ha for increase in plant height, basal diameter and dry yield of stalk and is therefore, recommonded as the optimum dose for the crop.

TABLE—II. SHOWING MEAN INCREASE IN DRY YIELD OF STALK IN Q/HA OVER CONTROL AND INCREASE IN YIELD IN KG OF N APPLIED

Levels of Nitrogen (kg/ha)	Dry yield of stalk (Q/ha) 1976	1977	Mean	Increase in yield over control	Increase in yield in Kg of N applied
0	122.85	79.73	101.29	—	—
40	142.89	122.05	132.47	31.18	0.77
80	149.12	167.05	158.09	56.80	0.71
120	169.30	179.01	174.16	72.87	0.61
160	168.70	192.00	180.35	79.06	0.49
200	165.92	217.19	191.56	90.27	0.45

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Colour and COD Reduction of Bleach Effluents

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SUMMARY

Experiments have been carried out to see the effect of addition of calcium hypochlorite on the colour and chemical oxygen demand of the alkali extraction stage effluents of bamboo and mixed hardwoods. Optimum doses of hypo for maximum colour and COD reduction have been determined. A quick and precise method to measure colour in chloroplatinate units employing UV-visible spectrophotometer has been described. Studies have also been carried out to see the influence of addition of calcium hypochlorite on the concentration of phenolic compounds.

INTRODUCTION

Effluents from the extraction stage of pulp bleaching are highly coloured and have a high chemical oxygen demand (COD). Removal of the coloured substances by massive lime treatment combined with addition of high molecular polyacrylamide is used in some mills (e.g. Oji Paper Mills, Kasugai, Japan) but is complicated and expensive. A report of the Swedish Environmental Care Project (SSVL, 1974) indicated, that the colour of the E. stage effluent can be reduced by adding hypochlorite to the alkali extraction stage. Jauhari and Maheshwari [1] reported effective reduction of colour by adding 1.25% active chlorine as hypochlorite on o.d. pulp basis to E. stage. According to Komarov [2,3] addition of hypochlorite to the extraction stage made it possible to carry out alkaline extraction at 25°C instead of 60–70°C. In the present study the colour and COD reduction using small amounts of hypochlorite in the alkali extraction stage, was investigated. For measuring colour the platinum-cobalt [4] method is most widely used. The unit of colour is taken to be the colour produced by 1 mg/litre of platinum in the form of chloroplatinate ions. A rapid colour determination by spectrophotometry was developed in this study. The destruction of phenolic structures by hypochlorite addition to E. stage was studied by Delta-Epsilon ($\Delta\varepsilon$) curves according to Aulin-Erdtman [5-7] and Goldschmid [8]. This method is based on the fact, that phenolic groups are ionised in alkaline medium and have a deep colour, but are less ionised in neutral medium and thus less coloured. The difference in absorbance indicates the presence of phenolic groups.

EXPERIMENTAL

Laboratory pulp from mixed hardwoods of Bastar area [9] of Kappa number 28 was clhorinated at 3.0% consistency, 30 minutes at 30°C using 7.1% chlorine on o.d. pulp. The pulp was washed and extracted with 1.5% NaOH (on o.d. pulp) at 8.0% consistency, 60 minutes at 60°C. Bamboo pulp from Ashoka Paper Mills of Kappa number 25 was chlorinated at 3.5% consistency, 45 minutes at 28°C with 5.5% chlorine. The chlorinated pulp was washed and extracted with 2.0% NaOH at 10.0% consistency, 90 minutes at 65°C. In both cases 0.2%–1.0% hypochlorite on o.d. pulp was added to the E. stage and for comparison, to the E. stage effluent.

For colour measurements the Pt standard solu-

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