

Evaluation of hybrid napier (*Pennisetum purpureum*) genotypes under different levels of nitrogen for forage production in rainfed condition

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Hybrid napier (*Pennisetum purpureum* Schum.) undoubtedly is a high-tonnage forage crop. The cultivation of 'NB 21' cultivar is in practice since long. Hence it is essential to evaluate some new genotypes, which can give higher yield than old one. Under Chotanagpur plateau conditions, 'IGFRI 6' and 'HGN/BN 1' are found phenotypically stable genotypes among others (Singh *et al.*, 1991). Therefore an experiment was conducted to evaluate the performance of these 2 new cultivars compared with old one under the different agronomic management.

The experiment was conducted at Ranchi during rainy season of 1988–90 to evaluate the sustainable yield potential of newly introduced genotypes of hybrid napier under different nitrogen levels at each cut. The soil of the experimental plot was sandy loam with 23.0% clay. It was low in available nitrogen (124.0 kg N/ha) and phosphorus (8.4 kg P/ha) and medium in exchangeable potassium (158.5 kg K/ha), with pH 5.9.

Hybrid napier genotypes 'IGFRI 6', 'HGN/BN 1' and 'NB 21' (control) in main plots and 4 nitrogen levels (0, 20, 40 and 60 kg N/ha/cut) in subplot (5.0 m x 4.0 m), thus making 12 treatment combinations were put in split-plot design and replicated thrice. Farmyard manure @ 10 tonnes/ha

with 17.6 kg P/ha and 25.0 kg K/ha were applied basal to all the treatments during each year before the onset of monsoon. The stem cuttings were planted on 13 July 1987. After the establishment of crop, 1 uniform cutting was taken before the onset of rain in June during 1988 and the N levels were applied accordingly after each cut. Total 3 cuts during each year between June and October were taken. The green and dry-forage yields were pooled for each year and analysed statistically. The economics of production and net returns under each treatment were also computed and analysed. The total rainfall received during the crop periods of 1988, 1989 and 1990 was 879, 1,810 and 1,306 mm respectively.

Maximum yields of all the genotypes during the second year and reduction in yield were recorded during the third year. Bhagat *et al.* (1992) also reported such trend in herbage production of hybrid napier. 'IGFRI 6' and 'HGN/BN 1' gave statistically equal yields during all the years except the second year where 'IGFRI 6' outyielded the 'HGN/BN 1'. However, in pooled yield (Table 1) of the 3 years, these 2 were equally good and superior to 'NB 21' (control), both in terms of green- and dry-matter yields.

Linear response to N levels was recorded

Table 1. Green-forage and dry-matter yields and economical parameters of hybrid napier

Treatment	Green forage (tonnes/ha)	Dry matter (tonnes/ha)	Cost of production (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	Net return (Rs/Re)	Increase (%) over control
<i>Cultivar</i>							
'NB 21'	63.5	11.5	10,325	25,400	15,075	1.46	
'IGFRI 6'	74.4	12.8	10,325	30,960	20,635	1.90	36.3
'HGN/BN 1'	63.3	13.0	10,325	29,320	18,995	1.84	26.0
CD (P = 0.05)	5.89	1.32			1,550	0.13	
<i>N (kg/ha/cut)</i>							
0	59.9	10.8	9,800	23,860	14,160	1.44	
20	67.8	12.2	10,200	26,960	26,760	1.64	13.9
40	74.0	12.8	10,500	29,600	19,100	1.82	26.4
60	81.1	14.1	10,800	32,400	21,640	2.04	41.7
CD (P = 0.05)	5.14	0.78			1,351	0.15	

for both green- and dry-matter yields. Application of 60 kg N/ha/cut (3 cuts in a season) was found statistically superior (with 81.1 tonnes green- and 14.1 tonnes dry-matter yields/year) to lower levels of N. Even application of only compost (10 tonnes/ha/year) gave 59.9 tonnes of green- and 10.8 tonnes of dry-matter yields.

'IGFRI 6' gave the maximum net return (Rs 10,635/ha/year), which was statistically higher than those received under rest of the genotypes. The trends in net return in presence of different N levels were almost same as recorded for herbage production. Thus application of 60 kg N/ha/cut was found more remunerative than rest of the N levels. 'IGFRI 6' also gave the maximum net return (Rs 1.99/rupee invested) and accordingly it gave 36.3% more net return

than 'NB 21' and 10.3% more 'HGN/BN 1'. Application of 60 kg N/ha/cut also gave the maximum net return/rupee invested (Rs 2.04) over rest of the N levels, which was 41.7% higher than the control and even 15.3% higher than 40 kg N/ha/cut. Thus among the genotypes, 'IGFRI 6' and 60 kg N/ha/cut were found superior to other treatments in relation to yield, which was also found more remunerative.

REFERENCES

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