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EFFECT OF BUD SOURCES AND THEIR TREATMENT IN NUTRIENT SUBSTANCES ON GERMINATION AND GROWTH OF SUGARCANE

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ABSTRACT

A field experiment was conducted at the Sugarcane Research Station, Cuddalore to study the influence of treatment of sugarcane setts with nutrient substances on the germination and growth of chip and single bud setts drawn from 10 month old sugarcane (Var.Coc.85061) during special season. Of the treatments tried, Cow's urine 50 per cent solution had exercised significant effect on the germination and growth of single budded setts. NAA 150 ppm solution had enhanced germination in chip bud.

The average germinability of the sugarcane crop is around 55 to 60 per cent (Daniel, 1986). In the formative phase, cane growth is slow and it takes about 70 to 90 days to cover the field soil. Hence, weeds grow well by utilising moisture, nutrient and sunlight, and reduce the cane growth. If any nutrient substances can encourage initial cane growth, the problem of weeds could be solved. With this in view, the present investigation was undertaken.

MATERIALS AND METHODS

A field experiment was conducted during August, 1992 at the Sugarcane Research Station, Cuddalore with sugarcane (var.Coc.85061) as the test crop. The experimental field was sandy loam in texture. The treatments included combination of two bud sources, *viz.*, single budded setts, chip buds and nutrient substances, *viz.*, cow's urine at 50 per cent dilution, DAP slurry at 5 per cent con centration, and NAA at 150 and 200 ppm con centration along with one control (dipping in water).

Raised bed to a height of five cm was prepared and the bed was dusted with BHC 10 per cent powder against soil insects. Cane chip buds and single budded setts drawn from 10 month old cane were dipped in the nutrient substances for one min as per treatments before planting and planted in the nursery at 0.5 cm depth on 26 August 1992. In each raised bed, either 25 single or chip buds were planted as per the treatments. Uniform basal application of 63 kg $P_2O_5 ha^{-1}$ was given to all the nursery plots. Irrigation was given immediately after planting and further irrigation was based on requirement.

The experimental design followed was factorial randomised block design with three replications. Germination count was taken on 36 days after planting (DAP) and germination percentage was calculated. The data on germination was subjected to logarithmic transformation (Log (x+2) before statistical analysis. Randomly five plants were taken on 36 DAP from each treatment for recording plant height, leaf number, total leaf area, and dry weight of root and shoot. From this, the root-shoot ratio was calculated. The mean data were subjected to statistical analysis.

RESULTS AND DISCUSSION

The data on germination, plant height, leaf number, total leaf area per plant and root-shoot ratio are given in the Tables 1 and 2. The observations recorded on cane germination and early vigour were significantly influenced by the bud source. Single bud sett had higher germination per cent (41.89), plant height (10.37 cm), leaf number (4.06) and total leaf area per plant (79.07cm^2) than the chip bud whereas chip bud recorded significantly high root-shoot ratio (3.61).

All nutrient substances tried, had significant effect on increasing the germination and plant height. Single cane sett dipped in cow's urine registered significantly higher germination per cent (41.99) but it was on a par with NAA 200 ppm solution. The same set of treatments had influenced plant height also. Regarding leaf number, all the treatments were on a par, but superior to control. Due to early germination with cow's urine, the leaf area and leaf numbers were more and it had consequent effect on total leaf area of the cane plant. The enhancement of germination and plant vigour under cow's urine, might be due to

Table 1. [illegible] sources and their treatment in nutrient substances on germination and early growth

Treatment	Germination (%)	Plant height (cm)	Leaf number	Total leaf area/plant (cm²)	Root : shoot ratio
Bud sources					
[illegible]	[illegible]	10.37	4.06 (0.6028)	79.07	3.27
[illegible]	[illegible]	3.64	3.33 (0.48351)	32.67	3.61
[illegible]	0.0263	0.22	0.0222	2.43	0.038
[illegible]	0.0263	0.46	0.0466	5.12	0.197
Treatment					
[illegible] cow's urine	41.99 (1.5832)	9.15	4.00 (0.5880)	30.86	1.63
DAP 5 per cent	31.99 (1.4951)	7.41	3.44 (0.5461)	52.18	3.34
NAA 150 ppm	36.50 (1.5775)	6.26	3.83 (0.05811)	59.97	3.76
NAA 200 ppm	40.66 (1.6031)	8.80	3.83 (0.5811)	59.30	3.74
Control	18.00 (1.2190)	6.40	2.66 (0.4184)	31.72	3.37
SE (d)	0.0416	0.35	0.0351	3.35	0.141
CD (0.05)	0.0874	0.73	0.0737	8.09	NS

(Figures in parentheses are logarithmically transformed values)
NS : Not-Significant

conversion of non-reducing fraction of the sugar in the setts to reducing sugar and its availability to germinating buds. This findings corraborate with the results of Babu (1979). NAA 200 ppm caused higher germination with chip bud. This might be due to cell enlargement (Noggle and Fritz, 1989).

Regarding interaction between bud source and nutrient substances, cow's urine had increased germination in single budded setts and it was on par with DAP 5 per cent and NAA 150 ppm. In the case of chip bud, NAA 200 ppm had significant effect on the germination. Plant height was significantly increased with cow's urine in single budded setts where as in chip bud, all the treatments were significantly different from control.

All the treatments had significantly influenced the leaf number over control. But, single budded sett produced more leaves than the chip bud. Cow's urine had increased the total leaf area/plant from 47.19 cm^2 to 127.91cm^2 which was significantly higher than other treatments. For chip buds NAA 200 ppm had recorded higher total leaf area/plant, but it was on a par with NAA 150 ppm and cow's urine.

Table 2. Effect of bud sources and their treatment with nutrient substances.

Treatment	Germination (%)		Plant height (cm)		Leaf number		Total leaf area/plant (cm²)		Root : shoot ratio	
	Single bud	Chip bud	Single bud	Chip bud	Single bud	Chip bud	Single bud	Chip bud	Single bud	Chip bud
Cow's urine 50%	58.66 (1.7681)	25.33 (1.3989)	12.5	5.8	5 (0.6989)	3 (0.4771)	127.91	33.82	3.65	3.61
DAP 5%	46.66 (1.6664)	17.33 (1.2369)	10.0	4.8	433 (0.6343)	3 (0.4600)	76.46	30.50	3.38	3.71
NAA 150 ppm	36.00 (1.5544)	40.00 (1.6005)	9.7	6.8	4 (0.4020)	3.86 (0.5603)	69.25	38.69	3.29	3.42
NAA 200 ppm	42.66 (1.6296)	38.66 (1.5807)	10.7	6.8	4 (0.6020)	3.66 (0.5603)	74.53	44.07	3.02	3.60
Control	24.00 (1.3761)	12.00 (1.0670)	8.9	3.9	3 (0.4771)	2.33 (0.3597)	47.19	16.28	3.03	3.72
SE (d)	0.058		0.496		0.0496		5.451		0.20	
CD (0.05)	0.123		1.043		0.1043		11.453		NS	

(Figures in parentheses are logarithmically transformed values)
NS : Not-Significant

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RATOON CROPPING IN RICE FOR BETTER WATER RESOURCE MANAGEMENT IN A RIVER COMMAND AREA IN TAMIL NADU

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ABSTRACT

Two year yield study on ratoon management of rice revealed that in single crop wet land areas of Periyar-Vaigai river command, raising CV.*Bhavani* rice as the main crop and ratooning it after the harvest would be desirable. Application of 125 kg.ha $^{-1}$ nitrogen and impounding 5 cm depth of water one day after the disappearance of ponded water are recommended for higher yield, water use efficiency and net return of the ratoon crop.

KEY WORDS : Plant crop, Ratoon crop, Water resource

Ratooning is one strategy to enhance rice production cost in a shorter period of time and at a lower production cost. It is also a practical tool in exploiting the ability of the plants to regenerate after harvest.

Ratooning ability differs among cultivars. The genetic factor which affects ratoon performance is the inherent tillering ability of the cultivar. Nitrogen is another important input that greatly determines the growth and yield of rice. Water management before and after crop harvest also affects ratooning ability. Against this back-drop, the present investigation was undertaken to choose a suitable ratoon rice for the single crop rice area and to optimise nitrogen and water input.

MATERIALS AND METHODS

Field experiments were laid out at the Agricultural College and Research Institute, Madurai during 1984-'86. In a split plot design, combinations of three cultivars *viz.,Bhavani* (V_1), *Ponni* (V_2), and IR 20 (V_3) and two irrigation levels *viz.*, impounding 5 cm depth of water throughout crop period (T_1) and impounding 5 cm depth one day after disappearance of ponded water (I_2) were allotted to the main plot and four N levels *viz.*, 50 Kg (N_1), 75 kg (N_2), 100 kg (N_3) and 125 (N_4) N ha^{-1} to the sub plot. During 1984-85, *Bhavani, Ponni* and IR 20 were transplanted on 15 July 1984. IR 20 plant crop came to harvest on 22 November 1984 whereas *Bhavani* and *Ponni* were harvested on 26 November 1984. In the ratoon crop, *Bhavani* and *Ponni* were harvested earlier on 5 Febuary 1985 and IR 20 on 10 Febuary 1985. During 1985-'86, all the three varieties were transplanted on 1 August 1985. In the plant crop, IR 20 was harvested on 5 December 1985, and *Bhavani* and *Ponni* on 8 December 1985. In the ratoon crop, *Bhavani* and *Ponni* were harvested on 15 Febuary 1985 and IR 20 on 28 Febuary 1985. The quantity of water applied inclusive of rainfall during the growth period of ratoon crop was 855 mm and 595 mm respectively for I_1 and I_2. Irrigation treatment was regulated through Parshall flume.

At harvest, 20 cm long stubbles were left behind to facilitate regrowth. In the ratoon crop, the plots were cleaned and dried leaves, weeds and decaying stubbles were removed. First irrigation was given three days after the harvest of the plant crop. Half the N and full dose of P_2O_5 and K_2O were applied in two equal splits on 27th day and 37th day after harvest which coincided with tillering and panicle initiation stages. The applied fertilisers were incorporated by pressing under the feet.