

Effect of 2-Chloroethyl Trimethyl Ammonium Chloride on the Yield and Yield Attributes of Co. 7 Ragi Under Graded Doses of Nitrogen

BY

A. A. DASON¹ and S. KOLANDAI SWAMY²

ABSTRACT

The effect of nitrogen and CCC was studied in respect of yield and yield attributes of Co. 7 ragi. The combination of the highest level of nitrogen (200 kg N/ha) and the highest concentration of CCC (7500 ppm) gave the maximum grain yield. The percentage of increases by CCC ranged from 7.9 to 92.5 per cent over the control. Response curves fitted with different levels of nitrogen and concentration of CCC, showed linear trend. The data on yield attributes reveal that the number of productive tillers, length of ear, number of grains per ear, weight of grains per ear and the straw yield were significantly influenced by the levels of nitrogen while it had no influence on the length of ear, number of fingers per ear and thousand-grain weight while CCC also significantly influenced the number of productive tillers, length of ear, number of fingers per ear and the number of grains per ear, but it had no influence over thousand-grain weight and straw yield.

INTRODUCTION

Among the growth regulators, 2-Chloroethyl trimethyl ammonium chloride has been claimed to possess outstanding properties in influencing the yield and yield attributes in field crops and its practical application appears to be revolutionary in crops like wheat, barley etc. Arnold *et al.*, (1965) obtained increased yields of several hundred kilograms of grains/ha in wheat by using CCC. Das *et al.*, (1968) also reported significant increase in the grain yield of paddy. The yield of grain with CCC alone was as much as

that obtained with 40 kg N/ha. Besides, Arnold *et al.* (1965) and Bachthaler (1966) reported that CCC increased the number of productive tillers per plant. Szabo (1969) recorded increased yield of wheat as a result of increase in number of grains per year.

MATERIALS AND METHODS

With the object of studying the effect of CCC on the yield and yield attributes of Co. 7 ragi (*Eleusine coracana*) under graded doses of nitrogen an experiment was laid out at Agricultural College, Madurai during 1970-71. Six levels of nit-

1. Regional Agricultural Research Station, Koilpatti, 2. Associate Professor of Agronomy, Agricultural College, Madurai.

TABLE. 1. Effect of CCC and nitrogen on yield and Yield attributes

Characters/ Treatment	Grain Yield(kg/plot)	Grain Yield (kg/ha)	Number of productive tillers/plant	Length of ear (cm)	Number of fingers per plant	Weight of ear (g)	Number of grains per ear	Weight of grains per ear (g)	Straw yield (kg/plot)
N0	1.07	2716	3.39	6.88	7.50	5.28	1627	3.99	1.65
N40	1.22	3096	3.45	6.85	7.58	5.44	1707	4.08	1.14
N80	1.60	4061	4.06	7.26	7.90	6.21	1903	4.60	2.93
N120	1.66	4213	4.32	7.33	7.91	6.06	1945	4.53	3.20
N160	1.62	4112	4.29	7.28	7.95	6.24	2159	4.88	3.32
N200	1.76	4467	5.04	7.47	8.62	6.55	2118	4.87	4.58
S. E.	0.10	254	0.35	Not sig-	Not sig-	0.10	113	0.13	0.52
C. D.	0.22	558	0.78	nificant	nificant	0.21	252	0.29	1.16
C0	1.05	2665	2.64	7.38	6.60	5.19	1676	3.95	3.00
C1500	1.12	2833	3.10	7.28	7.31	5.49	1812	4.22	3.01
C3000	1.37	3447	3.75	7.46	7.74	5.92	1934	4.43	3.23
C4500	1.60	4061	4.15	7.06	8.41	6.06	1955	4.45	3.00
C6000	1.78	4518	4.95	7.07	8.36	6.34	2036	4.79	2.91
C7500	2.12	5381	5.94	6.84	9.07	6.73	2147	5.11	3.12
S. E.	0.016	406	0.16	0.14	0.25	0.20	71	0.11	lot sig-
C. D.	0.032	812	0.31	0.28	0.49	0.39	138	0.22	nificant

rogen 0, 40, 80, 120, 160 and 200 kg N/ha was tried in combination with six concentrations of CCC at 0, 1500, 3000, 4500, 6000 and 7500 ppm in a

split plot design with three replications. Ragi seedlings were transplanted in the main field on the 25th day of sowing. The entire quantity of nitrogen was

applied at the time of transplanting and CCC was applied as foliar spray ten days after transplanting. The yield and yield attributes were recorded at the time of harvest. (Table 1)

RESULTS AND DISCUSSION

In the present study, though there was response for the applied nitrogen upto 200 kg/ha, significant increase in grain yield of ragi was obtained at 80 kg N/ha. This is in accordance with the findings of Willimut and Anthony (1958). The response to per kg of nitrogen was maximum at the second incremental dose namely 40 to 80 kg N/ha, which is in agreement with the results of Long and Mcleod (1960).

The grain yield was significantly increased with increase in concentration of CCC, upto 7500 ppm which is the maximum concentration tried. The differences in yield was significant among all the concentrations of CCC. The increase in yield with the different concentration of CCC ranged from 7.9 per cent to 92.5 per cent over the control. The results are in accordance with the findings of Arnold *et al.* (1965).

The interaction between nitrogen and CCC was significant (Table 2). With the combination of 7500 ppm concentration of CCC, all the levels of nitrogen gave maximum yield. Likewise, with the combination of 200 kg of N/ha, all the concentration of CCC gave maximum yield. But without CCC 120 kg N/ha produced the maximum yield. The combination of 200 kg N/ha and 7500 ppm CCC concentration produced the highest grain yield

of 6218 kg/ha. An additional yield of 4383 kg/ha over the control by using 200 kg N/ha and CCC spray at 7500 ppm, indicate the prospects of practical application of this chemical along with nitrogen to get maximum yield of ragi.

To study the response of grain yield to successive levels of nitrogen and for different concentrations of CCC response curves were fitted to the yield data. In both the cases a linear trend was found to be significant. The functions obtained are as follows :

Levels of Nitrogen

$$Y = 2551 + 8.6 \times$$

Concentration of CCC

$$Y = 1972 + 12.7 \times$$

Number of Productive Tillers

Nitrogen at 200 kg/ha significantly increased the number of productive tillers over 40 and 0 kg N/ha which were on par with one another. The differences between 200, 160 and 120 kg/ha were not significant. Similar results were observed between 120, 160 and 80 kg N/ha. The findings are in line with the findings of Kolan-daisamy (1964).

The number of productive tillers was significantly influenced by CCC. The number of productive tillers increased with increase in levels of CCC and the difference was significant among all concentrations. The percentage of increase ranges from 17.4 per cent to 125 per cent over the control. The findings are in accordance with the results of Szabo (1969) in

TABLE 2. Effect of Nitrogen x CCC on grain yield per plot

Nitrogen	CCC					
	C 0	C 1500	C 3000	C 4500	D 6000	R 7500
N 0	0.723	0.748	1.080	1.136	1.270	1.452
N 40	0.868	0.880	1.049	1.303	1.596	1.637
N 80	1.208	1.293	1.445	1.678	1.940	2.035
N 120	1.306	1.275	1.523	1.760	1.857	2.258
N 160	1.125	1.235	1.472	1.723	1.875	2.270
N 200	1.060	1.296	1.628	1.968	2.157	2.450

Between two sub-plot means at any one level of main plot. S. E. = 0.04, C. D. = 0.078

Between two main plot means at any one level of sub-plot S. E. = 0.105, C. D. = 0.225

wheat. The interaction between nitrogen and CCC has shown lack of response on the number of productive tillers.

Length of ear

The levels of nitrogen and its interaction with CCC do not seem to exert any significant influence on the length of ear. However, the levels of CCC significantly decreased the length of ear, but the decrease in length of ear was not uniform. Concentration of CCC at 7500 ppm recorded the minimum length of ear. These findings are in accordance with the results of Geering (1965).

Number of fingers per ear

There was significant increase in number of fingers per ear with increase

in concentration of CCC. Maximum number of fingers per ear was recorded at 7500 ppm, which was 37.4 per cent over the control. Neither the levels of nitrogen nor the interaction between and CCC had any influence on the number of fingers per ear.

Weight of ear

The ear weight significantly increased with increase in level of nitrogen, except at 120 kg N/ha. Nitrogen at 200 kg/ha was significantly superior to other treatments. This is in accordance with the finding of Kolandaiswamy (1964). As regards the effect of CCC on ear weight, it was progressively increasing from the control to the highest concentration of CCC used and significant differences were observed

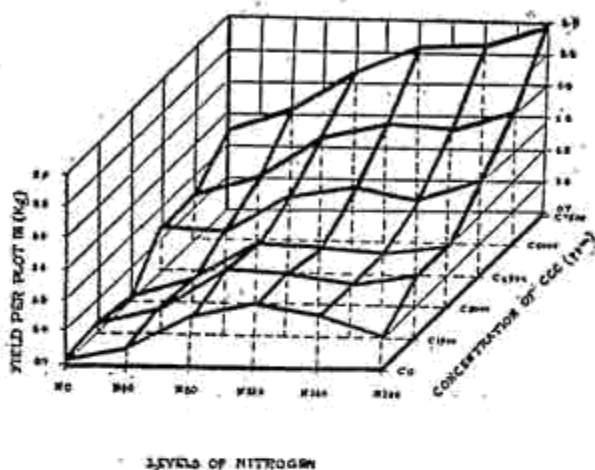


Fig. 1 Effect of nitrogen and CCC on grain yield Kg/Plot)

among the treatments. These findings are in accordance with the findings of Mathan (1968). The results further revealed that the interaction between nitrogen and CCC was not significant.

Number of grain per ear

Added nitrogen significantly increased the number of grains per ear. It was significantly higher at 160 kg N/ha than at 80, 40 kg N / ha and the control and was on par with 200 and 120 kg N / ha.

The number of grains per ear was significantly increased with increasing concentration of CCC. The maximum number of grains per ear was recorded at 7500 ppm concentration of CCC which was on par with 6500 ppm and significantly higher than the rest of the treatments. These findings are in line with the results of Szabo (1969) and Mathan (1968).

Weight of grains per ear

The weight of grains per ear also was significantly influenced by the levels of nitrogen, the concentration of CCC and their combinations. As the concentration of CCC increased the weight of grains per ear also increased at all levels of nitrogen. The combination of the highest concentration of CCC and the highest level of nitrogen tried gave the maximum grain yield. This increase in grain weight was evidently reflected on the yield where a similar trend was observed. But the thousand-grain weight was not influenced by the levels of nitrogen or the concentration of CCC.

Yield of Straw

The straw yield was significantly influenced by the level of nitrogen. Nitrogen at 200 kg ha recorded significantly higher yield of straw than the other levels of nitrogen tried. This increase is evidently a reflection of the trend observed in plant height on the 35th day and at harvest. The present finding is in agreement with the findings of Ranganathan (1962). Neither concentration of CCC nor the interaction between CCC and nitrogen had any influence on the straw yield. Though there was reduction in height at higher concentrations of CCC, there was increase in number of tillers at higher concentrations. This explains the reason for the absence of influence of CCC on straw weight. Response curve was fitted to the different levels of nitrogen and a linear trend was found to be most significant. The function fitted is $Y = 4248 + 33.1 \times$ (Fig 1).

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