

EFFECT OF COPPER AND ZINC ON THE NUTRITION OF RICE PLANT

The importance of micronutrients especially copper and zinc in crop production is well known. Yamasaki (1964) reported that the small grain crops require less micronutrients than other crops. The introduction of high yielding varieties and modern agronomic measures have paved the way for the extraction of more nutrients from the soil resulting in an imbalance in the available plant nutrients in the soil especially that of micronutrients. Karunakar (1952) reported that application of copper, manganese and zinc to rice crop was beneficial. The experiments conducted at CRRRI, Cuttack showed that foliar application of copper and zinc gave increased rice yields (Anon, 1955). The object of the present study was to investigate the effect of copper and zinc in combination with nitrogen, phosphorus and potassium on the yield of rice.

The experiment was conducted in the sandy loam soil of the Research Station and Instructional Farm, Mannuthy for six seasons commencing from the first crop of 1977 to the second crop of 1979-1980. The treatments consisted of

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| 1) Control | 2) Zinc sulphate 25 kg/ha |
| 3) Zinc sulphate 50 kg/ha | 4) Zinc sulphate 100 kg/ha |
| 5) Zinc sulphate 25 kg/ha +
copper sulphate 25 kg/ha | 6) Zinc sulphate 50 kg/ha +
copper sulphate 25 kg/ha |
| 7) Zinc sulphate 100 kg/ha +
copper sulphate 25 kg/ha | 8) Zinc sulphate 25 kg/ha +
copper sulphate 50 kg/ha |
| 9) Zinc sulphate 50 kg/ha +
copper sulphate 50 kg/ha | 10) Zinc sulphate 100 kg/ha +
copper sulphate 50 kg/ha |
| 11) Copper sulphate 25 kg/ha | and 12) Copper sulphate 50 kg/ha |

The experiment was laid out in randomised block design with four replications. The test variety was Triveni. The seedlings were planted at a spacing of 20 x 10 cm. Nitrogen, phosphorus and potassium were given at the rate of 60:30:30 kg/ha. The entire doses of phosphorus and potassium and half the dose of nitrogen were applied as basal dressing. The other half of the nitrogen was given as top dressing one month after planting. The micronutrients were applied as basal for every crop.

The data on yield as influenced by the treatments are given in Tables 1 and 2. The general yield level was low because of the inherently low fertility status of the sandy loam soil in which the experiment was conducted. The data revealed that there were no significant variation between the various treatments. Addition of zinc and/or copper had no beneficial effects on grain yield. Similar observations were

Table 1
Mean yield of grain, kg/ha

Treatment No.	1977-78		1978-79		1979-80		Mean yield
	First season	Second season	First season	Second season	First season	Second season	
1	2700	1850	3016	2826	2683	2193	2545
2	2416	1876	3016	2670	2276	2516	2462
3	2543	1850	3343	2860	2560	2576	2622
4	2566	1916	3250	2833	2483	2383	2572
5	2466	1850	2850	2766	2276	2416	2437
6	2316	1960	3193	2583	2216	2400	2445
7	2433	1750	321 E	2600	2350	2576	2487
8	2260	1843	2833	2683	2210	234?	2362
9	2650	1826	3093	2516	2416	2410	2485
10	2433	1873	2816	24S3	2416	2150	2362
11	2266	1876	2750	2533	2050	2600	2246
12	2343	1860	2983	2683	2116	2493	2413
CD (0.05)	IMS	NS	NS	NS	NS	NS	

Table 2
Yield of straw (kg/ha)

Treatment No.	1977-78		1978-79		1979-80		Mean
	First season	Second season	First season	Second season	First season	Second season	
1	3210	3816	3708	2458	3600	6100	3815
2	2693	3866	3741	2391	4100	6426	3870
3	3193	3750	3591	2366	3633	6760	3865
4	3126	4350	3816	2416	3741	5710	3860
5	2950	3876	3600	2383	3433	6543	3797
6	2666	3883	3291	2283	3566	5293	3497
7	2643	2660	3308	2316	3758	5966	3608
8	2543	3693	3100	2341	3750	5166	3432
9	2733	3516	3758	2250	3316	5626	3533
10	2893	3533	3491	2153	3066	4610	3292
11	2483	3576	3383	2133	3633	5510	3453
12	2510	3576	3133	2275	3508	6126	3521
CD (O.C5)	NS	NS	NS	NS	NS	NS	

made by George and Sreedharan (1966). No general trend was also observed in the yield of grain and straw for the various treatments of copper and zinc in combination with nitrogen, phosphorus and potassium in all the seasons tried. The lack of significant response may be because of the fact that the acidic nature of the soil (pH 5.2) would have enhanced the availability of these micronutrients to the required level. This finding is in agreement with that of George and Sreedharan (1966) and Kabeerathumma *et al.* (1977).

സംഗ്രഹം

പാകൃഷ്ണകം, ഭാവഹം, ക്ഷാരം എന്നീ മൂലകങ്ങളോടൊപ്പം ചെമ്പ്, നാകം എന്നിവ വിവിധ അളവുകളിൽ നൽകി ഒരു പരീക്ഷണം നടത്തുകയുണ്ടായി. ഇതിൽ നിന്നും ചെമ്പ്, നാകം എന്നീ മൂലകങ്ങൾ നെല്ലിന്റെ വിളവിൽ കാര്യമായ പ്രതികരണം ഉളവാക്കിയില്ല എന്നു മനസ്സിലായി.

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