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EFFECT OF F.Y.M. AND ZINC ON YIELD OF SORGHUM

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A field experiment was conducted to study the effect of individual and combined application of FYM(0. 10 and 20 t/ha) and $ZnSO_4$(0. 12.5, 25, 37.5 and 50 kg/ha) on zinc, availability to yield and zinc uptake by grain and straw of sorghum. Application of FYM at 20 t/ha increased the DTPA-Zn in soil significantly. Soil application of $ZnSo_4$ had effect on yield rather than the combined application of $Znso_4$ and FYM.

Though zine is present in some of the soils in adequate amount, its availability is limited in alkaline and calcareous soils because of high pH in those soils.

Organic manures are being used to bring the above series into productive one. Organic manures act as nutrient reservoir and more over upon decomposition produces organic acids which inturn solubilizes insoluble, sparingly soluble nutrients thereby increasing their availability in the soils. Further the addition of organic manures may help in mitigating the toxicity of heavy metals to some extent. In Tamil Nadu, Calcareous soils occupy a major area and variety of crops such as maize, groundnut, pulses are grown in these solis zinc and Fe Chrolosis are being observed in these crops. Sorgoum crop is extensively grown in Coimbatore and periyay districts of Tamil Nadn State.

In order to find out ways and means of alleviating zn problems in sorghum grown in calcareouc soil a field experiment was canducted to study the Effect of Individul and combined application of organic manures and $ZnSo_4$ on Zn availabilty in soils and grain and straw yield of sorghum.

MATERIALS AND METHODS

A field experiment was conducted in black clay loam soil (Typic ustivertept) of TNAU Farm with sorghum, CSH. 5, as test crop. There were five levels of $ZnSo_4$ (O, 12.5. 25, 37.5 and 50 Kg/ha) and three levels of FYM (O, 10 and 20 t/ha). Individual and all possible coimbination of $ZnSo_4$ and FYM were used as treatments. N, P, K at the rate of 90:45 45 Kg/ha respectively were applied as common dose to all plots. well decomposed FYM and $ZnSo_4$ were applied to the required plots.

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The crop was grown upto maturity. Soil and plant samples were taken at vegetative stage of the crop growth period to study the behaviour of the nutrients in soil and plant Soil was processed extracted with DTPA and micronutrient cations were determined by atomic absorption spectroscopy (Lindsay and Norvell, 1978). Processed plant samples were digested in triacid mixture and determined the total concentration of zn. At harvest stage grain and straw yield were recorded and statistically analysed for interpretation. plant samples at harvest stage were also considered for determining Zn nutrition of sorghum.

RESULTS AND DISCUSSION

The data on DTPA-Zn in soil and Zn content of plant at vegetative stage are presented in Table-1. The results showed that individual application of $ZnSo_4$ and FYM resulted in significant increase in Zn availability in soil. FYM at 20 t/ha significantly increased the DTPA-Zn in soil though increased effect was not observed at 10 t FYM level. The increase in Zn availability due to FYM application at 20 t/ha may be attributed to the metallo-organic complex reaction in soil. There is evidence to indicate that metal ions in the solution phase of the soil occur largely as metal-organic matter complexes. (Geering and Hodgson, 1969 and Mann *et al.*,1978)

The increased trend of available Zn in soil also reflected favourably in the plan Zn at the vegetative stage. Farm yard manure applications did not enhance Zn in plant at this stage.

YIELD AND UPTAKE ZN

a) Grain

Zinc fertilisation at 25, 37.5 and 50 kg $ZnSo_4$ levels significantly increased grain yield at CSH.5 sorg-hum crop. Similar trend was also observed in Zn uptake by grain (Table 2 and 3), The increased effect of Zn fertilisation on grain yield and Zn uptake by grain may be attributed to absorption and untilisation of Zn and other nutrients in the crop at different stages. Increased Zn availability in soil and plant (Table-1) at vegetative stage is an evidence and confirm the results on grain yield and Zn uptake by grain. A similar result was obtained for Zn by satinder Dev and Shukla (1980) who reported that adequate amount of Zn in the rhizosphere region of the crop has enhanced the utilisation and translocation of N in maize corp.

b) Straw

Sorghum straw yield was signifi-cantly increased by FYM application at 10 t/ha (Table 3). Interactions between FYM and $ZnSo_4$ also revealed the favourable effect on straw yield. Combined application of 50 kg $ZnSo_4$ and 10 t FYM resulted significant increase in straw yield. Zinc

TABLE 1. EFFECT OF FYM AND Zn on Zn IN SOIL AND PLANT

VEGETATIVE STAGE — CSH. 5 SORGHUM

$ZnSo_4$ kg/ha	DTPA-Zn (ppm)				Zn in Plant(ppm)			
	FYM(t/ha)				FYM(t/ha)			
	0	10	20	Mean	0	10	20	Mean
0	2.9	2.5	3.3	2.9	24	35	45	35
12.5	1.8	5.4	4.1	3.8	40	39	42	40
25.0	2.1	3.0	2.6	2.6	47	48	21	39
37.5	4.7	1.7	3.4	3.3	42	62	64	56
50.0	3.0	2.1	4.2	3.1	93	59	62	71
Mean	2.9	2.9	3.5		49	49	47	

	C.D at 5%	C.D at 5%
$ZnSo_4$	0.29	3.7
FYM	0.23	NS
$ZnSo_4$XFYM	0.50	6.5

TABLE 2. EFFECT OF FYM AND Zn ON YIELD

CSH.5 SORGHUM

$ZnSo_4$ Kg/ha	Grain Yield (Q/ha) FYM (t/ha) 0	10	20	Mean	Straw yield (Q/ha) FYM (t/ha) 0	10	20	Mean
0	34.8	43.2	37.3	38.4	88	94	94	92
12.5	38.3	32.3	42.3	37.7	87	88	91	89
25.0	43.3	38.5	46.0	40.5	91	90	92	91
37.5	41.0	38.7	43.7	41.1	87	92	92	91
50.0	42.0	43.7	42.3	42.7	86	101	91	93
Mean	39.9	39.3	40.2		88	93	92	

	C.D at 5%	C.D at 5%
$ZnSo_4$	1.8	NS
FYM	1.4	2.7
$ZnSo_4$ x FYM	3.0	6.0

TABLE 3. EFFECT OF FYM AND Zn ON UPTAKE

CSH. 5 SORGHUM

$ZnSo_4$ (Kg/ha)	Zn uptake (g/ha) Grain FYM (t/ha) 0	10	20	Mean	Zn uptake (g/ha) Straw FYM (t/ha) 0	10	20	Mean
0	82	83	75	80	238	207	201	215
12.5	92	73	109	91	267	232	245	244
25.0	113	105	98	105	253	266	189	230
37.5	115	105	128	116	345	257	194	265
50.0	138	129	154	141	295	449	238	327
Mean	108	99	113		280	282	213	

	CD at 5%	CD at 5%
$ZnSo_4$	10	25
FYM	8	19
$ZnSo_4$	NS	43

fertiliesation alone considerably increased Zn uptake by straw. This is due to the incteased Zn concentration in straw.

It may be concluded that results from sorghum experiment with FYM and $ZnSo_4$ encourage individual application of $ZnSo_4$ at 50 kg/ha to black clay ioam soil in rncreasing grain yield and Zn uptake by grain and straw of sorghum.

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