

## CRITICAL LEVEL OF IRON IN SOILS OF COIMBATORE DISTRICT

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### ABSTRACT

Critical level of Fe in 15 different soils of Coimbatore was established through a green house experiment with Sorghum CSH.5 as test crop and six levels of Fe Viz. 0, 5, 10, 20, 40 and 80 ppm Fe through ferrous sulphate. The dry matter production of sorghum was significantly increased by the application of Fe at 5 and 10 ppm to the Fe deficient soils. D.T.P.A. - extractable Fe at 6.1 ppm was found to be critical level of Fe in calcareous soils of Coimbatore District in Tamil Nadu State with regard to sorghum crop

**Key words :** Critical Level of Fe - Calcareous Soils.

It is necessary to know critical soil test level for a nutrient below which the probability of economic response of a crop to added fertiliser is high. Iron Chlorosis in sorghum crop is frequently observed in calcareous soils of Coimbatore. The present work was related to the establishment of critical level of Fe in the grain sorghum.

### MATERIALS AND METHODS

A pot experiment with 15 soils from different locations viz., 8 deficient, 4 medium and 3 adequate with regard to the status of Fe availability, were collected from Coimbatore District. Sorghum CSH.5 was the test crop with 6 treatments (0, 5, 10, 20, 40, and 80 ppm Fe as ferrous sulphate). All the pots received on uniform dose of N : P<sub>2</sub>O<sub>5</sub> : K<sub>2</sub>O at 90 : 45 : 40 kg/ha in the form of urea, diammonium phosphate and muriate of potash respectively. The experiment was laid out in a completely randomised block design with three replications. Eight seeds of sorghum CSH.5 were sown to each pot. Afterwards, only 4 plants were allowed to grow upto 7 weeks period. Bray's per cent yield was calculated with following formula for 20 ppm Fe treatment.

$$\text{Bray's per cent yield} = \frac{\text{Yield at control}}{\text{Yield at 20 ppm Fe}} \times 100$$

Initial soil samples of 15 locations were analysed for D.T.P.A. extractable micronutrients (Lindsay and Norwell, 1978). The pH (1:2.5),

mechanical composition and CaCO<sub>3</sub> (pressure calcimeter) of the soils were determined as per procedures enunciated by Jackson (1973). Critical level of Fe was estimated using graphical and statistical methods proposed by Cate and Nelson (1965 and 1971).

### RESULTS AND DISCUSSION

#### Response :

Application of iron at 5, 10, and 20 ppm Fe as Ferrous sulphate significantly increased the total dry matter yield over control (Table 1). It is observed that deficient soils (soils 1 to 8) recorded higher yield for the first three levels of Fe. The response decreased Fe status of soils increased. The results are in conformity with the findings of Bisht *et al.* (1978).

#### Critical level for iron :

Critical level was fixed in the present study using both graphical and statistical methods of Cate and Nelson (1965 and 1971).

Bray's per cent yield of Fe application ranged from 44.6 to 98.2. The study revealed that 6.1 ppm of 0.005 M.D.T.P.A extractable Fe as critical level for graphical and statistical methods respectively (Fig.1). The per cent predictability for determining the dependability of critical level of Fe from the present study was 80 per cent. This showed that the critical level of 6.1

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Table 1. Effect of Fe on Total dry matter (TDM) yield of sorghum (g/pot). mean of three replications

Var.CSH.5

Period of growth: 7 Weeks

Soil No.	Fe (ppm)						Bray's Mean per cent yield
	0	5	10	20	40	80	
1.	14.0	15.2	19.8	21.5	13.2	10.5	15.8 - 65.1
2.	9.9	10.2	11.7	15.6	10.6	9.4	11.2 - 63.6
3.	18.6	20.6	20.5	21.7	16.6	14.3	18.7 - 85.7
4.	15.4	17.2	19.4	23.9	19.6	20.3	19.3 - 64.4
5.	11.3	13.1	14.1	18.6	11.1	8.9	13.0 - 60.8
6.	12.6	15.3	19.0	17.9	10.9	10.0	14.3 - 70.3
7.	8.5	9.1	14.0	18.0	14.3	12.6	12.8 - 47.2
8.	6.7	9.4	12.7	15.0	8.6	7.3	9.9 - 44.6
9.	10.1	12.9	14.5	15.9	13.5	13.3	13.4 - 63.5
10.	15.3	18.3	21.9	24.6	19.2	17.6	19.5 - 63.5
11.	10.4	17.3	13.4	14.6	15.4	11.5	13.8 - 72.0
12.	24.2	35.6	36.9	42.5	29.5	31.3	356.9
13.	11.6	13.3	9.8	14.2	8.4	10.4	11.3 - 81.7
14.	11.6	13.8	12.6	14.3	15.0	10.7	13.0 - 81.1
15.	16.8	21.1	15.2	17.1	18.8	17.8	17.3 - 98.2
Mean	13.1	16.1	17.0	19.7	14.8	13.8	

Factors	SE	CD (5%)
Fe level	0.572	1.58
Soils	0.905	2.50
Fe x Soils		NS

ppm Fe can be used effectively for determining deficient soils from sufficient soils.

Several workers have fixed limits for Fe in soils. Deboer and Reisenaur (1973) established a critical level of 5 ppm Fe from green house experiment using D.T.P.A. extractant.

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