https://doi.org/10.29321/MAJ.10.A02412

*Madras Agric. J.* 72 (11) : 622-625 November, 1985

# EFFECT OF NITROGEN, FYM AND IRON ON SORGHUM (Var. Co. 24)

P. DEVASENAPATHY[1] and M. SUBBARAYALU[2]

Field experiments were conducted with treatmental schedule included four levels of N (0, 60, 90 and 120 kg/ha) and two sources of Fe (FYM as organic source and $FeSO_4$ as inorganic source applied through either soil or foliage) in *Kharif* and complete control and two levels of N (60 and 90 kg/ha) and methods of inorganic sources of iron application (soil and Foliar) were compared with and without organic source in *rabi*. Significant increase in plant height, LAI, earhead length, width, weight, grain and straw yield was observed up to 90 kg N/ha. Foliar application of iron with FYM found to be significantly superior over soil application and FYM alone.

Sorghum is one of the most important staple food crop of poor sections in India. The yield of this crop is limited by many factors. Intensive use of fertilisers, intensive cropping and high yielding seeds have no doubt brightened the hopes of humanity but it has also brought into sharp focus numerous problems of soil fertility. The deficiency of micronutrients are widespread in recent years especially in the case of zinc and iron. It is encountered in soils of high pH, high carbonates and low organic matter content on most calcareous soils and exhibited in crops like sorghum, sugarcane etc. The present study was taken up to find out the effect of N, FYM and iron and their interaction on sorghum.

## MATERIALS AND METHODS

Field experiments were conducted during *Kharif* and *rabi* seasons of 1980-1981 in Tamil Nadu Agricultural University farm, Coimbatore to study the effect of nitrogen, FYM and iron on sorghum.

The experiments were laid out in randomised blocks design with the following treatment combinations.

The treatmental schedule included four levels of N (0, 60, 90 and 120 kg/ha) and two source of Fe (FYM as organic sources and $FeSO_4$ as inorganic source applied through either soil or foliage) in *Kharif* and complete control and two levels of N (60 and 90 kg/ha) and methods of inorganic sources of iron application (soil and foliar) were compared with and without organic source in *rabi*.

## RESULTS AND DISCUSSION

(*a*) *Growth components*: (Table 1 and 2)

Positive effect on plant height, leaf area index and dry matter accumulation was observed with 90 kg N/ha. Significant reduction in number of days to 50 per cent flowering was also observed with 90 kg N/ha. The results are in confirmity with the findings of Krishnamurthy *et al* (1973). Korikanthimath (1975) and Panner selvam (1976).

1. Asst Prof (Agron), TNAU., Coimbatore.
2. Professor and Head, Regional Research Station, Aruppukottai.
Forms part of M Sc., (Ag). thesis submitted by first author.

Table 1. Effect of treatments on growth, yield components and yield of sorghum (Kharif)

| Treatments | Plant height at harvest cm. | Leaf area idex | Dry matter ac cumulation kg/ha. | Length of earhead cm. | Width of earhead cm. | Weight of earhead g. | Grain Yield Kg/ha | Straw Yield Kg/ha |
|---|---|---|---|---|---|---|---|---|
| Control | 143.76 | 4.34 | 10190 | 19.50 | 4.04 | 68.15 | 2537 | 8226 |
| N @ 60 Kg/ha | 148.21 | 5.41 | 12764 | 23.71 | 6.14 | 81.30 | 3578 | 9141 |
| N @ 90 Kg/ha | 152.00 | 6.29 | 13954 | 26.17 | 7.54 | 87.85 | 4157 | 9604 |
| N @ 120 Kg/ha | 152.98 | 6.68 | 14026 | 26.88 | 7.63 | 88.92 | 4210 | 9722 |
| FYM application | 148.32 | 5.49 | 12578 | 23.44 | 6.09 | 80.32 | 3608 | 8958 |
| Soil application of iron | 149.11 | 5 54 | 12640 | 24.13 | 6.48 | 81.69 | 3728 | 9203 |
| Foliar application of iron | 149.99 | 6.02 | 12983 | 24.41 | 6.56 | 82.65 | 3851 | 9358 |
| CD (P=0.05 N | 2.65 | 0.42 | 278.60 | 0.40 | 0 18 | 2.45 | 135.00 | 138 59 |
| Fe | NS | 0.26 | 241.28 | 0.34 | 0.16 | 2.12 | 114.35 | 122.02 |

Table 2. Effect of treatments on growth, yield components and yield of Sorghum (rabi)

| Treatments | Plant height at harvest cm. | Leaf area index | Dry matter accumulation Kg/ha | Length of earhead cm. | Width of earhead cm. | Weight of earhead g. | Grain yield kg/ha | Straw yield kg/ha |
|---|---|---|---|---|---|---|---|---|
| 1. Control (No treatment) | 136.51 | 3 02 | 7640 | 16.20 | 3.00 | 53.84 | 998 | 6404 |
| 2. N @ 60 kg/ha | 141.31 | 3.60 | 9462 | 17.19 | 3.00 | 63.71 | 2164 | 7957 |
| 3. N @ 60 kg/ha + soil appln. of iron. | 143.50 | 3.15 | 9926 | 18.26 | 4.16 | 64.14 | 2663 | 8544 |
| 4. N @ 60 kg/ha + Foliar appln of iron. | 144.84 | 4.20 | 10012 | 19.12 | 4.23 | 64.71 | 2667 | 8587 |
| 5. FYM + N @ 60 kg/ha. | 143.13 | 3.78 | 10420 | 19 80 | 3.16 | 68.67 | 2255 | 8200 |
| 6. FYM + N 60 @ kg/ha + soilappln. of iron | 145.21 | 4.87 | 10894 | 22.67 | 5.66 | 70.63 | 2757 | 8694 |
| 7. FYN + N @ 60 kg/ha + Foliar appln. of iron | 146.00 | 4.95 | 11144 | 22.33 | 5.66 | 71.03 | 2840 | 8692 |
| 8. N @ 90 kg/ha | 146.00 | 4.52 | 10480 | 18.79 | 5.50 | 66.82 | 2870 | 8668 |
| 9. N @ 90 kg/ha + soil appln. of iron. | 147.50 | 4.92 | 10765 | 19.98 | 6.00 | 70.27 | 3110 | 9040 |
| 10. N @ 90 kg/ha. + Foliar appln. of iron. | 147.81 | 5.08 | 11180 | 20.27 | 6.16 | 73.14 | 3240 | 1131 |
| 11. FYM + N @ 90 kg/ha | 147.00 | 4.89 | 11443 | 20.42 | 5.66 | 72.16 | 3080 | 8790 |
| 12. FYM + N @ 90 kg/ha + soil appln. of iron | 148.00 | 5.38 | 11984 | 24.00 | 6.50 | 79.49 | 3511 | 9353 |
| 13. FYM + N @ 90 kg/ha + Foliar appln. of iron | 148.22 | 5.34 | 12246 | 24.10 | 6.50 | 81.21 | 3629 | 9484 |
| CD (P= 0.05) N | 2.15 | 0.19 | 414.86 | 1.31 | 0.90 | 1.24 | 74 57 | 97 07 |
| Fe | NS | 0.24 | 508.10 | 1.71 | 1.09 | 1.51 | 91.33 | 18.92 |
| FYM | NS | 0.19 | 414.86 | 1.39 | NS | 1.24 | 74.57 | 97.09 |
| N×Fe | NS | NS | NS | NS | NS | NS | NS | NS |
| N×FYM | NS | NS | NS | NS | NS | 2.15 | NS | NS |
| FYM×Fe | NS | NS | 718.56 | 2 39 | NS | NS | 129.16 | NS |
| FYM×N×Fe | NS | NS | 1016.00 | 3.41 | NS | 3.03 | 182.66 | NS |

Neither the source nor the methods of Fe application registered significant effect on height of the plant and number of days to 50 per cent flowering. In both the seasons foliar application of Fe recorded significant effect on leaf area index. It might have been due to increased chlorophyll content which resulted in larger sized leaves. Increased chlorophyll dontent with foliar spray of Fe was reported by Kanakaraj and Ramanathan (1981). Foliar application of iron combined with FYM registered increased dry matter accumulation over that without FYM.

*b) Yield components*: (Table 1 and 2)

Increasing N levels up to 90 kg/ha recorded significant increase in length. width and weight of earhead. No significant effect was noticed on number of primary rachil per earhead and thousand grain weight. Similar results were given by Vijayakumar (1977), and Pawar *et al*. (1980).

Foliar spray of iron registered significant increase in length and width of earhead. Number of primary rachil per earhead, thousand grain weight and weight of earhead were not altered by either source or methods of iron application.

C. *Yield* :

a) *Grain Yield* : (Table 1 and 2)

Application of 90 kg N/ha increased the grain yield by 16 per cent and 30 per cent over 60 kg N/ha during *Kharif* and *rabi* seasons respectively.

Foliar application of iron found to besignificantly superior over soil application of iron. The effect of inorganic source of Fe was further increased with the addition of FYM.

b) *Straw Yield* : (Table 1 and 2)

Significant increase in straw yield was observed upto 90 kg N/ha. Inorganic source of iron was found to be superior when combined with organic source in increasing the yield of straw

## REFERENCES

KANAGARAJ, T. and G. RAMANATHAN. 1981 Effect of iron application in chlorophyll content, catalase and peroxidase activities and protein content of sorghum varieties National seminar on micronutrients in agric Tamil Nadu Agricultural University Coimbatore.

KORIKANTHIMATH, V. S. 1975. Studies on the nitrogen uptake pattern of sorghum (CSH 5) as influenced by the time, quantity and method or application of nitrogen. M. Sc. (Ag.) Thesis, Tamil Nadu Agricultural University. Coimbatore.

KRISHNAMURTHY, K., A. BOOME GOWDA, B. G RAJASHEKARA, M. K. JAGANNATH G. RAGHUNTHAN, N. VENUGOPAL E. JAYARAM, T. V. RAMACHANDRA PRASAD, 1973. Investigation on the structure of yielding in cereals (Maize and sorghum). Final report of the PL 480 project. Pub. by Univ. of Agric Sci., Bangalore.

PANNEERSELVAM, V 1976 Studies on the yield and the uptake pattern of major nutrients in three genotypes of sorghum as influenced by row spacing under rainfed conditions. M. Sc. (Ag.) Thesis, Tamil Nadu Agricultural University Coimbatore.

PAWAR, H. K B. N. NARKHEDE and V. S. KHUPSE, 1980. Response of sorghum (*Sorghum bicolor* L. Moench) hybrid CSH I and Variety M - 35 - I to different levels of N, P and K in rabi under irrigated conditions. (I) Studies on growth and yield. Journal of MAU. 5 : 36-40.

VIJAYAKUMAR, M. R. 1977. Nitrogen management for ratoon sorghum. M. Sc. (Ag.) Thesis, Tamil Nadu Agric. Univ., Coimbatore.