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Research Paper :

Effect of FYM and Fe-Zn-S supplementation on yield and quality of multicut forage sorghum (cv. SSG- 3)

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ABSTRACT

Eighteen treatments comprising of combination of three levels of FYM (0, (F_0), 10 (F_1) and 20 (F_2) t ha^{-1}) and six nutrient management treatments [control (M_0), Fe (M_1), Zn (M_2), S (M_3), Fe + Zn (M_4) and Fe + Zn + S (M_5)] were tested in factorial randomized block design with three replications in field experiments conducted during *Kharif* and summer seasons of 2003 and 2004. Fe, Zn and S were applied @ 10, 5 and 40 kg ha^{-1} as $FeSO_4$, $ZnSO_4$ and gypsum, respectively. Initial available S, Fe and Zn contents in the soil were low. Yield of green forage and dry forage were increased by the treatments F_2 and F_1 (8.5 and 5.3 %, respectively) over treatment F_0. The treatments M_5 and M_4 significantly increased the green fodder yield by 13.0 and 8.5 per cent, respectively, over that of M_0 (731.5 q ha^{-1}). The study of quality parameters *viz.*, crude protein content, neutral detergent fiber and sugar content revealed that application of FYM at F_1 and F_2 as well as Fe-Zn-S treatments favourably influenced the quality parameters in comparison to their respective control.

Key words : Green forage yield, Dry forage yield, quality parameter like crude protein content, neutral detergent fiber and sugar content.

Sorghum is an important forage crop grown in summer and *Kharif* seasons. It is becoming popular amongs the farmers of Gujarat State. Fodder and feeds are the major inputs in animal production, especially for milch animals. Gujarat is known for its dairy industry and multicut forage crops like sorghum and Lucerne are extensively grown in milk shed areas of the State. The farmenrs are growing milticut forage sorghum (SSG-59-3) during *Kharif* as well as in summer seasons. Such intensive multicut cropping of cereal forage crop naturally results in more nutrient mining from the soil. The nutrient management practices can increase the forage production and improve its quality (Varma, 2000).

Application of sulphur containing amino acids namely cystin, cystenin and methionine performs many physiological functions in the plant. It also plays an important role in activation of vitamins, metabolism of carbohydrates, proteins and lipids, formation of chlorophyll and flavour compounds. Because of the above functions, sulphur improves yield and quality of forage crops (Tandon, 1995)

The zinc is involved in many enzymatic activities as well as important in the synthesis of tryptophan, a component of some proteins and a compound needed for the production of growth hormones.Reduced growth hormone production in Zn deficiency plants causes the shortening of internodes and reduce the size of leaves (Tisdale *et al.*, 2003). Likewise, iron is a structural components of porphyrin molecules, cytochromes, hemes, hematin ferri chrome and leghem-globin. Iron is necessary for the maintenance of chlorophyll in plants.

MATERIALS AND METHODS

A field experiment was under taken during summer and *Kharif* seasons of 2003 and 2004 at Main Forage Research Station, Anand. The experiment consisted of nine treatments combinations of FYM [(F_0), (F_1) and (F_2)] and six levels of Zn-Fe-S supplements [N_0 Zn or Fe or S (M_0)], [10kg Fe ha^{-1} (50 kg $FeSO_4$ ha^{-1}) (M_1)], [5 kg Zn ha^{-1} (25 kg $ZnSO_4$ ha^{-1}) (M_2)], [40kg S ha^{-1} as gypsum (267 hg $CaSO_4$. $2H_2O$ ha^{-1}) (M_3)], [10kg Fe ha^{-1} + 5 kg Zn ha^{-1} (M_4)]and [10kg Fe ha^{-1} + 5 kg Zn ha^{-1}+ 40 kg S ha^{-1} (M_5)].

The field experiments was laid out in factorial randomized block design keeping three replications.

The soil of the experimental field was sandy loam (Typic ustochrepts). It was low in oirganic carbon (0.23%), medium available phosphorus (48.5 kg ha^{-1}) and available potash (235 kg ha^{-1}). The available sulphur, iron and zinc were low (19.0 kg ha^{-1}, 3.0 mg kg^{-1} and 0.35 mg kg^{-1}, respectively).

A common total dose of 100-40-40 NPK kg ha^{-1} was given in the form of Urea, DAP, muriate of potash. Application of 25-40-40 NPK, kg ha^{-1} was applied as basal, 25 kg N ha^{-1} at 30 DAS and 25 kg N ha^{-1} of each dose was applied after first and second cutting. The well