

Influence of nitrogen, potassium and sulphur levels on growth, yield attributes and yield of forage pearl millet [*Pennisetum glaucum* (L.) R. Br.]

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ABSTRACT

A field experiment on this crop (variety GFB 1) was conducted in R.B.D. with three replications during summer-monsoon seasons of 2003 and 2004 on different sites to study the influence of various levels of N, K and S. There were two levels of N viz., 100 and 150 kg ha⁻¹, three treatments of K viz., 0, 40 kg K₂O ha⁻¹ applied either entirely as basal and 50% as basal and remaining in two equal splits after first and second cuts and three levels of S viz., 0, 20 and 40 kg S ha⁻¹. There were three cuts in each year. Initial available N, K and S contents in soil were low, medium and marginal, respectively in their status. Yield of green forage, dry matter yields were increased by application of N, K and S. There was 31.8 per cent increase in green forage yield due to nitrogen (N₂) over that of N₁ (521.4 q ha⁻¹), 9.8 and 19.4 per cent increase for K₁ and K₂ over that of K₀ (550.7 q ha⁻¹) and 3.78 and 7.86 per cent increase for sulphur- S₁ and S₂ over that of S₀ (581.7 q ha⁻¹), respectively. Similarly the dry forage yield was also increased. The yield increase due to N, K and S treatment was supported by increase in growth parameters such as tillers per meter row length, number of internodes per plant and plant height. The beneficial effect due to K particularly that of K₂ may probably due to dominance of intensity factor in K supply mechanism.

Key words : Green and dry matter yield, Growth parameters

Multicut forage crops are grown extensively in Gujarat known for its dairy industry. Farmers grow these multicut crops throughout the year and even extend to the next year. Such intensive multicut forage harvesting naturally results in more nutrients absorption from the soil. Improved soil fertility management practices can increase forage production and improve the quality of forage (Varma, 2000). Application of fertilizers in forage crops has increased forage production per unit area and time along with improvement in forage quality. Hence, these crops require specific management practices for major nutrients like N, P, K as well as some of the secondary and micronutrient like S, Zn, Fe etc. (Yadavendra *et al.*, 2003). The forage pearl millet [*Pennisetum glaucum* (L.) R. Br.] locally known as “*Rajka bajri*” is popular in Gujarat and the variety GFB1 is widely cultivated as a multicut crop. It is a heavy feeder of nutrient due to good regeneration and high tillering capacity, ratooning and fast growth. Its fresh green fodder yield ranges from 500 to 650 q ha⁻¹ with 3 to 4 cuttings (Purushottam *et al.*, 2001).

Nitrogen plays a pivotal role in quantitative as well as qualitative improvement in forage crops. It helps in increasing protein and chlorophyll content, digestibility, and for decreasing fiber content in plant. Optimum N application increases the crude protein content and Metabolic energy besides improving leaf stem ratio,

succulence and palatability of forage crops (Yadavendra *et al.*, 2003). Potassium is another important major element for plant growth. It is accumulated in abundant amount during the vegetative growth period. It plays vital role in enzyme activities, water and energy metabolism, translocation of assimilates photosynthesis, protein and starch synthesis (Mengel and Kirkby, 1996). Sulphur plays an important role in not only increasing the yield, but also in improving the quality of fodder (Aulakh *et al.*, 1976). Sulphur performs best its role in the synthesis of proteins, oils and vitamins. It is a constituent of three essential amino acids viz., methionine, cysteine and cystine (Mengel and Kirkby, 1996).

MATERIALS AND METHODS

A field experiment was undertaken during summer-Kharif season 2003 and 2004 at the Experimental cum Commercial Farm Project (ECFP), Anand Agricultural University, Anand in RBD with three replications to study the influence the various levels of N, K and S. The forage pearl millet variety GFB 1 was sown on 20/07/2003 and 29/05/2004 in monsoon and summer, respectively and last cut harvested on 8/11/03 and 19/09/04 in winter and monsoon season, respectively for both years at different sites. There were two levels of N viz., 100(N₁) and 150(N₂) kg ha⁻¹, three treatments of K viz., 0(K₀), 40(K₁)