

Research Paper :

Quality parameters and plant nutrient ratios of forage pearl millet as influenced by nitrogen, potassium and sulphur levels in loamy sand soils of Anand

B.T. SHETA, N.K. KALYANASUNDARAM AND K.C. PATEL

Accepted : April, 2010

ABSTRACT

Field experiment was conducted on loamy sand soil of Anand (Gujarat) during 2003 and 2004 to study the effect of different levels of N, K and S on forage pearl millet [*Pennisetum glaucum* (L.) R. Br.]. There were two levels of N viz., 100(N₁) and 150(N₂) kg ha⁻¹, three treatments of K viz., 0 (K₀), 40 kg K₂O ha⁻¹ applied either entirely as basal (K₁) or 50% as basal and remaining in two equal splits after first and second cuts (K₂) and three levels of S viz., 0 (S₀), 20 (S₁) and 40 (S₂) kg S ha⁻¹. Application of higher N rate (150 kg N ha⁻¹) or K (40 kg K₂O ha⁻¹) or S (40 kg S ha⁻¹) increased crude protein content (CPC) and crude protein yield and decreased acid detergent fiber (ADF) or neutral detergent fiber (NDF) or both. Interaction effect of N x K showed that N₂K₁ and N₂K₂ reduced NDF content and improved the quality more than that of lower levels of N and K. The values were in acceptable range for good quality fodder. The nutrient ratios N:S (6.03 to 7.71), S:P (0.63 to 0.75), S:Zn (85.81 to 95.41) and Ca:P (1.47 to 1.60) of pearl millet were in the acceptable range and either favorably or neutrally influenced by N₂, K₁ or K₂ and S₂. Thus, the crude protein yield and quality of forage pearl millet were improved through N, K and S application.

See end of the article for authors' affiliations

Correspondence to :

B.T. SHETA

DWSR, Anand Centre,
B.A. College of
Agriculture, Anand
Agricultural University,
ANAND (GUJARAT)
INDIA

Key words : Crude protein content, Neutral detergent fiber, Nutrient ratio

The forage pearl millet [*Pennisetum glaucum* (L.) R. Br.], locally known as "Rajka bajri" is popular in Gujarat and the variety GFB 1 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). Such intensive multicut forage harvesting naturally results in more nutrients absorption from the soil. 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 and Fe etc.

(Yadavendra *et al.*, 2003).

The nutrient management of forage pearl millet (var.GFB 1) as a multicut crop has not been studied in detail. Hence a field study involving application of N, P and S was taken up. Results relating to quality parameters and nutrient ratios are presented hereunder.

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 following Randomized Block Design

Table 1 : Methods used for analysis of soil and plant samples

Constituent	Method	Reference
Soil analysis		
Available N	Alkaline Permanganate method	Subbiah and Asija, 1956
Available K ₂ O	Flame Photometric method (1N NH ₄ OAc pH 7.0 extractant)	Jackson, 1973
Available S	Turbidimetric method (0.15% CaCl ₂ extractant)	Chaudhary and Cornfield, 1966
Plant analysis		
Nitrogen	Microkjeldahl method	Jackson, 1973
Phosphorus	Vanadomolybdophosphoric yellow colour method	Jackson, 1973
Potassium	Flame photometric method	Jackson, 1973
Ca and Mg	Versenate titration method	Chang and Bray, 1951
Sulphur	Turbidimetric method	Chaudhary and Cornfield, 1966
Micronutrients	Atomic absorption spectrophotometric method	Jackson, 1973
ADF and NDF	Van Soest and Wine method	Van Soest and Wine, 1967