EFFECT OF IRRIGATION REGIMES AND NITROGEN SOURCES ON GROWTH AND NITROGEN UPTAKE BY SORGHUM FODDER

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A field experiment was conducted to find out the most efficient source of N for sorghum under different water regimes. Ammonium nitrate, sulphur-coated urea and prilled urea were applied, each @ 150 kg N ha^{-1}. Irrigations were applied at 25% <ET (evapo-transpiration, I_1), equal to ET (I_2) and 50% > ET (I_3). All nitrogen sources produced significantly higher yield than control. The difference between ammonium nitrate and sulphur-coated urea with respect to green fodder yield, N uptake, N recovery and agronomic efficiency were non-significant, but both were significantly better than urea. Irrigation regimes had significant effect on fodder yield. However fodder yield, N uptake, N ecovery and agronomic efficiency were more in I_2 as compared to I_1 and I_3, irrigation regimes. Interaction between fertilizer treatments and irrigation regimes was also significant. Combination of ammonium nitrate x irrigation equal to ET (F_1 x I_2) was observed best regarding sorghum fodder yield, N uptake, N recovery and agronomic efficiency. Leaching losses of NO_3-N were not observed under I_1 and I_2 irrigation treatments, but the leaching under I_3 irrigation regime was expected as NO_3-N content in lower soil depths were more as compared to I_1 and I_2 irrigation regimes.

Key Words: *Sorghum, NO_3-N, Irrigation regimes, Evapotranspiration.*

INTRODUCTION

The average N fertilizer use is 80 kg N/ha/annum in Pakistan (Agri. Stat. of Pakistan, 1990), but the recovery/utilization of applied N by crops is very low, which seldom exceeds 50% (Hauk, 1971). The major factors contributing for low recovery of applied N are runoff, denitrification, leaching and volatilization (Millar 1987 and Pleysier *et al.* (1987). Hipp and Gerard (1973) and Benbi and Singh (1988) reported that under low moisture conditions NO_3-N accumulates in the surface layers. While on the other hand NO_3-N leached down with percolating water where heavy irrigation is applied (William *et al.*, 1985). Efficient fertilizer practices along with improved irrigation practices increase fertilizer use and irrigation efficiency and will ultimately lead to higher

of three N s
gen sources
phur-coated
(two splits)
60 kg P ha-1
(F_0) were r
design. Crop
vis; I_1 = 25

Table 1:

Parameters
Texture
pH
EC_e (dSm^{-1})
Organic Matt
Total N (%)
AB-DTPA Ex
NO_3-N (mg k
NH_4-N (mg k
NaHCO3 Extr
P (mg kg^{-1} so
Ammonium a
K (mg kg^{-1} so
Rainfall data