IRRIGATION AND NITROGEN MANAGEMENT FOR WHEAT

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ABSTRACT

A field experiment was conducted on sandy clay loam soil with two irrigation levels (7.5 & 12.5 cm) and four nitrogen rates (0, 50, 100 & 150 kg N ha^{-1} as urea) to study irrigation-nitrogen management for wheat. Wheat straw and grain yield and N uptake was affected significantly by nitrogen rates and were maximum with the application of 150 kg N ha^{-1} where as irrigation depths did not affect these parameters. All the fertilizer treatments gave nitrogen recovery more than 60% and maximum (86%) was recorded where 50 kg N ha^{-1} was applied. In general, losses of nitrogen varied from 14-37%. Like nitrogen recovery, grain: nutrient ratio was also maximum in case of 50 kg N ha^{-1} application. Grain: nutrient ratio decreased with increasing rate of nitrogen but it was same in case of both the irrigation depths. Results indicated no leaching of NO3-N in the present study.

INTRODUCTION

Nitrogen is highly deficient in our soils and requires judicious application in the form of chemical nitrogen fertilizers in order to meet the demand of this essential major nutrient by high yielding and responsive wheat cultivars. However, a considerable fraction (40-50%) of the applied nitrogen is lost through volatilization as ammonia, overcome the deficiency of nitrogen in order to improve crop production, the choice of the proper nitrogen source, its rate and time of application is of prime importance. Nevertheless, the appropriate water management will also tend to improve the nitrogen recovery through crop production and reduce the danger of leaching of unused nitrates into water supplies.

MATERIALS AND METHODS

A field experiment was conducted on well drained sandy clay loam soil (Bhalwal soil series), low in organic matter, free from salinity/sodicity hazard and alkaline in reaction (Table 1). Before sowing of wheat, representative soil samples were taken plot–wise from 0-30, 30-60, 60-90, 90-120 and 120-150 cm depths (1st soil sampling). Each soil sample was a composite of three sites. The experiment was laid out in split plot design with two irrigation levels (7.5 and 12.5 cm) in main plots and four nitrogen rates (0, 50, 100 and 150 kg ha^{-1}) in sub plots. The net plot size measured 4.5 x 14 m^2. Each treatment was replicated thrice. At sowing, basal doses of phosphorus (single superphosphate) and potas-

Table 1: Characteristics of the soil of experimental site.

Soil depth	Sand	Silt	Clay	ECe	pHs	O.M	CEC	SP