

Nitrogen Management and Nitrapyrin Effects on Yield and N Recovery of Wheat

A.S. Modaihsh, F.M. Al-Romian, and M.O. Mahjob

*Soil Science Department, College of Agriculture, King Saud University,
Riyadh, Saudi Arabia*

(Received 12/1/1415; accepted for publication 6/8/1415)

Abstract. The influence of nitrification inhibitor (nitrapyrin), fertilizer nitrogen application rate, and nitrogen splitting were evaluated in a lysimeter experiment with wheat grown on a sandy loam (Torrifluent) highly calcareous soil [$292 \text{ g Kg}^{-1} \text{ CaCO}_3$]. The effect of treatments on wheat yield, N uptake and N recovery was reported. Wheat yields were most significantly affected by the rate of applied N. Increasing fertilizer application rate from 50 to 150, 250, and 350 kg N ha^{-1} resulted in 88, 139 and 166% increases in grain yield (G.Y) respectively. Neither nitrapyrin addition nor nitrogen splitting resulted in any significant increases in wheat yield. However, number of tillers (N.T) was significantly increased by addition of nitrapyrin. The nitrification inhibitor, therefore, did apparently conserve fertilizer N, but not enough to affect grain yield. Nitrapyrin did not result in any increases of N concentration in plants, whereas increasing the splitting of N to nine splits resulted in a significant increase in N concentration in wheat grains leaching losses of N were generally very small and constitute an insignificant path way for N losses [0.6-2.8%].

Introduction

The relatively large need of plants for nitrogen besides the limited ability of soils to supply it, cause nitrogen to be the most limiting nutrient for crop production. This is especially evident in arid and semi-arid regions of the world, as in Saudi Arabia where supplemental additions of nitrogen are usually required for successful crop production. The use of fertilizer N for crop production and the benefit it gives in increasing yield and quality is not without potential hazards to the environment. Nitrogen lost from the soil is also an economic loss for the farmer. Recently, there is a growing concern that fertilizer N should be used as efficient as possible to minimize economic loss and environmental pollution [1; 2].