

EFFECT OF SOIL NITRATE-NITROGEN STATUS ON WHEAT RESPONSE TO APPLIED NITROGEN

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ABSTRACT

A field experiment was conducted at NARC on two sites, with medium and low $\text{NO}_3\text{-N}$ contents, to study the effect of initial $\text{NO}_3\text{-N}$ contents of soil on response of wheat to applied nitrogen fertilizer. Grain and straw yields of wheat were increased with the application of N on both the sites, but the magnitude of response varied. Nitrogen uptake and agronomic efficiency of applied N were affected by $\text{NO}_3\text{-N}$ content of the soil profile. Application of N fertilizer increased $\text{NO}_3\text{-N}$ content of the soil profiles, which accumulated in the upper 60 cm of soil only.

INTRODUCTION

Current agronomic and environmental concerns regarding efficiency of fertilizer N use emphasize the need for more accurate estimation of N fertilizer requirement of crops. Although substantial research efforts have been made on the development and evaluation of procedures to predict crop response to N fertilization in western countries, little attention has been given to this aspect in Pakistan.

This paper reports the effect of native $\text{NO}_3\text{-N}$ content of soil profile on response of wheat to applied N fertilizer under rainfed conditions.

MATERIAL AND METHODS

The experiment was conducted at NARC during 1986-87 and 1987-88 Rabi seasons under rainfed conditions. Soil samples were taken from 0-15, 15-30, 30-60, 60-90 and 90-120 cm depths of soil before sowing of wheat crop and after crop harvest to determine the $\text{NO}_3\text{-N}$ contents, by AB-DTPA soil test (Soltanpour and Workman, 1979). Both the sites were selected on the basis of initial $\text{NO}_3\text{-N}$ contents of soil. Native $\text{NO}_3\text{-N}$ contents at different soil depths were, 0-15 cm, 36.4 kg ha^{-1} ; 15-30 cm, 34.2 kg ha^{-1} ; 30-60 cm, 33.3 kg ha^{-1} and 5.71, 4.15 and 5.52 kg ha^{-1} at site 1 and 2 respectively. Wheat variety Pak-81 was sown and six levels of N fertilizer ranging from 0-125 kg ha^{-1} were applied in four repeats in a randomized complete block design. Grain and straw yields were

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