WHEAT YIELD, FERTILIZER N UTILIZATION AND WATER USE EFFICIENCY AS INFLUENCED BY TILLAGE AND P LEVELS UNDER RAIN-FED CONDITIONS

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ABSTRACT

A field experiment was conducted to study the response of wheat to two tillage treatments (tillage and no-tillage) and two P levels (30 and 60 kg P ha^{-1}) at farmer's field (Urmar) in Peshawar during 1998-2002. The objective was to improve the wheat yields through improved water and fertilizer management practices under the rain-fed conditions. Tillage treatment on the average did not improve the yield of wheat significantly but application of phosphorus at 60 kg ha^{-1} improved the grain yield of wheat in all growing seasons compared to 30 kg P ha^{-1}. On the average, wheat crop utilized upto 37 % of applied fertilizer N. The proportion of N derived from fertilizer (%NdFF) by wheat was slightly higher in the tillage (27.3 %) than in the no-tillage treatment (25.3%), and it was the case for the amount of fertilizer-N contributed to plant (14.6 kg ha^{-1} under tillage and 12.7 kg ha^{-1} under no-tillage). The %NdFF by wheat was also higher at higher P level (27.2 %) than at low P level (25.5%). The wheat yields and N fertilizer utilization during 2000-2001 was relatively lower because of prolonged dry spell over the growing period. The %N utilization from residual ^{15}N labelled urea indicated that less than 1% of fertilizer N applied in previous year was utilized by the following wheat crop. The tillage had improved the WUE of wheat grain (6.2 kg ha^{-1} mm^{-1}) relative to the no-tillage treatment (5.9 kg ha^{-1} mm^{-1}). The P level at 60 kg ha^{-1} also resulted in higher WUE (7.12 kg $ha^{-1}mm^{-1}$) than at 30 kg ha^{-1} (6.44 kg ha^{-1} mm^{-1}). Over all higher water use efficiency was recorded during 1999-2000 compared to 1998-99 although more rain was received during 1998-99. These results suggested that P fertilization was more important than the tillage treatment under the prevailing rain-fed environment in Peshawar valley.