EFFECT OF SOIL WATER POTENTIAL ON YIELD AND NUTRIENT UPTAKE BY WHEAT AT DIFFERENT FERTILIZER RATES

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ABSTRACT

Information about optimum soil water content for efficient use of nutrients is essential for higher crop yield. A pot experiment was conducted from 1996 to 1998 to assess the effect of soil water potential and NPK fertilizer rates on yield and nutrient uptake of wheat. Four water potential ranges (0 to 33, 33 to 100, 33 to 500, 33 to 1000 kPa) along with three fertilizers rates (0-0-0, 37-25-25, 75-50-50 mg of NPK kg^{-1}) were investigated in factorial arrangements. Soil water content at prefixed water potential was determined from soil moisture characteristic curve. When soil water content decreased beyond the lower limit of prefixed soil water potential treatment, the required amount of water was added to raise the soil water content at 33 kPa of each treatment, except 0 to 33 kPa treatment, which fluctuated between 33 to 1000 kPa. The increase in soil water potential from 33 to 500 kPa significantly decreased grain and straw yields and uptakes of N, P and K. Conversely, increase in fertilizer rate application increased the yields of grain and straw and uptake of N, P and K. The data suggested that optimum wheat yield could be obtained at lower soil water potential level, and balanced fertilizer application can compensate the losses due to the moisture stress to some extent.