INTERACTIVE EFFECT OF SODICITY AND NITROGEN ON YIELD AND CHEMICAL COMPOSITION OF TWO WHEAT VARIETIES

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ABSTRACT

Interactive effect of sodicity and N levels on growth and nutrient concentration of two wheat varieties was studied in a greenhouse experiment. Exchangeable Na levels ranging from 1.1 to 56.4% were developed by treating soil with $NaHCO_3$. Urea nitrogen was applied @ 0, 80, 160 mg/kg soil. Grain and straw yield and K concentration of leaves decreased and that of Na increased in both varieties with increasing sodicity. Reduction in grain and straw yeilds at ESP 38.5 and above was more pronounced in Rawal-87 than Pak-81. Nitrogen levels increased dry matter production by partly alleviating the adverse effect of sodicity. Gradient in term of Na and K and Na/K ratio was low in yound leaves and high in older ones. Nitrogen application in wheat helped in maintaining high K concentration in young leaves of wheat.

INTRODUCTION

Excessive quantity of soluble salts and exchangeable Na are the chief causes, limiting crop yields especially in arid and semiarid regions like Pakistan. Development of salt tolerant genotypes constitute an important strategy for profitable exploitation of saline and saline-sodic soils. The salt tolerance of crops is usually and N fertilization on growth and nutrient concentration in two recommended wheat varieties of Pakistan.

MATERIALS AND METHODS

Wheat varieties Pak-81 and Rawal-87 were grown in plastic pots containing 5 kg of loam soil. The original soil had pH 7.9, ECe 1.25 dS/m at 25°C, soluble Ca 6.5 mc/l, total N 0.03%, extractable K 105 mg/kg, $NaHCO_3$ extractable p 3.5 mg/kg, and CEC 11.5 cmol/kg.

Predetermined quantity of $NaHCO_3$ was sprayed on thin layer of soil (ESP = 1.1) to artificially create different levels of sodicity, viz. ESP 20, 40 and 60 (Bains and Fireman, 1964). The actual ESP and EC_e (dS/m) values developed after addition of $NaHCO_3$ were 18.5, 38.5 and 56.4 and 1.55, 2.46, 3.6 and 4.45, respectively. Three levels of N, viz. o, 80 and 160 mg N/kg soil were applied as urea at each ESP level. One-half N was applied before sowing and the remaining half was applied 30 days after sowing. A basal dressing of 100 mg P_2O_5/kg soil as single super phosphate and 70 mg K_2O/kg soil as K_2SO_4