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Evaluation of the NH_4HCO_3-DTPA Soil Test for Assessing Boron Availability to Wheat

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ABSTRACT

The NH_4HCO_3-DTPA (AB-DTPA), 1 *M* NH_4HCO_3, 0.005 *M* DTPA, pH=7.6, was proposed as a multi-element extractant, for evaluating macro and micronutrients availability to plants. AB-DTPA was also evaluated as a soil test, for assessing boron availability and toxicity to alfalfa. In a pot experiment, ten soils of Northern Greece were used to assess AB-DTPA as an extractant of available boron to wheat (*Triticum aestivum* L., cv. Yecora), in comparison with hot water and saturation extract. Boron (B) was added as borax ($Na_2B_4O_7*10H_2O$) to the ten soils, at rates equal to 0, 3, and 5 mg B kg^{-1}. Wheat was grown in pots containing the boron amended soils to the stage of tillering, and dry aboveground biomass, B concentration and B uptake by wheat were determined. AB-DTPA extractable B was significantly greater than saturation extract and similar to hot water at each B application rate, and was correlated significantly with hot water (r=0.84), or with saturation extract (r=0.48). Extractable boron by all extractants, boron concentration in wheat and boron uptake were significantly affected by the soil x B application rate interaction. In assessing B availability to wheat using AB-DTPA as a soil

test, CEC should be included in the regression equation for B concentration, or pH for B uptake. However, the corresponding adjusted coefficients of determination for B concentration (adjusted R^2=0.46) and B uptake (adjusted R^2=0.48) were similar or lower to those of hot water (adjusted R^2=0.45 and 0.60, respectively) and the saturation extract (adjusted R^2=0.70 and 0.49, respectively), when the latter two soil tests were used in the regression equations without the inclusion of any soil property.