

Ammonium acetate, Mehlich-3, and sodium tetraphenyl-boron soil potassium tests for corn and soybean. (S08-mallarino084021-Poster)

Authors:

- D.J.Wittry - *Iowa State University*
- A.P.Mallarino - *Iowa State University*
- P.A.Barbajelata - *Iowa State University*

Abstract:

It is uncertain whether ammonium-acetate (AA) and Mehlich-3 (M3) tests provide reliable assessments of plant-available K in many soils. The sodium tetraphenyl-boron (TB) test could improve estimates of available K because it partially extracts nonexchangeable K and is less sensitive to sample drying. We assessed the efficacy of these tests in predicting yield response of corn and soybean to K fertilizer. Replicated field trials with several K rates were established in 35 Iowa fields having contrasting soil series. Soil samples (15-cm depth) were dried at 40 C. The AA and M3 tests measured similar amounts of K and were highly correlated across all soils ($r = 0.98$). Correlations between the TB and the AA or M3 tests were significant but lower. The TB test measured 3-3.5 times more K than the AA or M3 tests, and differences in the amount of K extracted seemed associated to differences in soil series. Relationships between yield response and soil K across sites were similar for the AA and M3 tests, and showed that the current Iowa optimum interpretation class for these tests (90-130 mg/kg) is too low. The TB test did not significantly improve the prediction of yield response in these fields.

Corresponding Author Information:

Antonio P. Mallarino	phone: 515-294-6200
Iowa State University	e-mail: apmallar@iastate.edu
Department of Agronomy	
Ames, IA 50011	

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