

## Oklahoma

### Aluminum Speciation and Soil Solution Composition in a Phosphorus Fertilizer Band

**CULTIVATED SOILS** tend to become acidic in the surface horizon with time, due to a combination of factors including loss of organic matter and addition of acid-forming fertilizers. This has caused aluminum (Al) toxicity in emerging wheat to be a significant problem in some Oklahoma soils.

Scientists have been studying changes in soil solution composition with time following simulated banding of phosphorus (P) at rates of 0, 30, 60, and 120 lb P<sub>2</sub>O<sub>5</sub>/A on an acidic soil. Soil solution was collected by high-speed centrifugation at various times after the application of fertilizer P and analyzed for Al, sulphate (SO<sub>4</sub>), manganese (Mn), iron (Fe), calcium

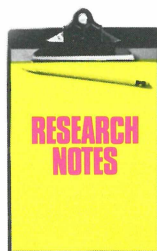
(Ca), and magnesium (Mg) as well as pH and ionic strength. Increasing levels of fertilizer P resulted in increased soil solution pH, ionic strength, SO<sub>4</sub> and phosphate (PO<sub>4</sub>) concentrations and decreased concentrations of Al, Ca, Mn, Mg, and potassium (K).

The differences were still significant 70 days after fertilizer application. The sharp decrease in Al<sup>3+</sup> in soil solution following fertilizer P application was due primarily to complexation with HPO<sub>4</sub> and H<sub>2</sub>PO<sub>4</sub> ions. In this experiment, the greatest decrease in Al<sup>3+</sup> concentration was obtained with 60 lb/A of banded P<sub>2</sub>O<sub>5</sub>. Further additions of P fertilizer did not substantially increase the amount of Al<sup>3+</sup> complexed. ■

Source: J. J. Sloan and R. L. Westerman, Department of Agronomy, Oklahoma State University. Abstract for Departmental Seminar, February, 1992.

## Saskatchewan

### Strip Trials Improve Fertilizer Recommendations



**SINCE 1990**, the Saskatchewan Soil Testing Laboratory has been using strip trials to address fertility concerns raised by producers. With the help of local fertilizer dealers and assistance from lab technicians, test strips are placed in the cooperator's field to evaluate various fertility practices. The cooperator performs all field operations, including application of the fertilizer treatments.

Results from some of the 12 trials established in 1991 are shown in the table. Field trials like these increase farmers' confidence in fertilizer practices and provide a basis for the laboratory to improve fertilizer recommendations. ■

Location	Crop	Treatment	Yield response, % of control
Leoville	canola	CuSO <sub>4</sub>	104
Prince Albert	wheat	CuSO <sub>4</sub>	125
Laporte	wheat	KCl	112
Cudworth	barley	KCl	119
Wynyard	canola	K <sub>2</sub> SO <sub>4</sub>	109
Shellbrook	canola	Elemental S	124
Brooksby	canola	Boron	119

Source: G. Kruger. January/February 1992. *The Analyzer*, Saskatchewan Soil Testing Laboratory, University of Saskatchewan, Saskatoon.