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ONLY PROPER SOIL TESTING FOR PHOSPHORUS AND POTASSIUM HAS VALUE

Proper soil testing is the best means of establishing phosphorus and potassium supplying capability of a soil. However, if samples are improperly collected, soil test results are worthless. Unlike nitrogen and sulfur, where residual levels are determined, phosphorus and potassium soil analyses provide an index of the soil's ability to supply nutrients to a growing crop. A low soil test level for phosphorus or potassium indicates a high probability of improving crop development and yield with nutrient addition.

The strong association of phosphorus supply with the soil mineral complex results in little year-to-year variability. Soil test phosphorus is said to be well buffered. That is, a soil testing high in phosphorus has the ability to maintain high soil phosphorus for several years, even with crop removal. However, in the absence of crop fertilization, soil phosphorus supply rate will gradually decline with cropping and be reflected in lower soil test levels.

Many Great Plains soils test high in potassium. This is a distinct advantage for farmers of this region, given that potassium is the only nutrient taken up by most crops in amounts equal to nitrogen. Having an abundant soil supply ensures that crop demand for potassium is met. Some farmers apply removal rates of potassium as a means of maintaining these high soil test levels, as well as supplementing soil chloride. The majority of potassium fertilizer sold is potassium chloride, providing two essential nutrients in one package.

When sampling for phosphorus and potassium, a good understanding of the field history is critical. A clear understanding of where not to collect soil cores for a composite sample in a field can be as important as selecting representative locations. Old barnyard sites, pastures, or manured portions of fields can lead to soil test levels which may not be representative of the majority of the field. Asking the farmer to ride with the soil sampling truck can help the operator steer clear of these potentially problem areas. All the technology in the soil testing laboratory cannot compensate for a sample collected from an inappropriate location.

Remember to keep the fertilizer management practices of the farmer in mind when sampling. Research has shown that sampling in the row of a harvested crop, where starter phosphorus was applied at seeding, can cause an excessively high reading for the field. Similarly, knowing whether the farmer used side and mid-row band applied phosphorus or potassium fertilizer can be important in determining where soil cores should be collected. Mobile nutrients such as nitrogen and sulfur are less subject to localized variability than the less mobile nutrients like phosphorus and potassium.

In regions where soil potassium levels are low, crop residue management can play a significant role in how soil samples are collected. Of the potassium taken up by a crop, 70 to 80 percent remains in the straw, chaff, and other crop residue. Potassium can become concentrated where windrowed crops remain in the field for an extended period of time before harvesting, or straw rows are burned. Soil samples taken from such areas could lead to a nutrient recommendation that is only representative of a small portion of the field.

Given the important role soil testing plays in our nutrient management planning, collection of a representative sample is critical. This means ensuring that the land owner clearly describes the representative areas of each field to be sampled, and identifies where manure was applied and how fertilizer phosphorus and potassium have been placed in the past. Representative soil tests can help take the guess work out of crop nutrient management.

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Note: *Agri-Briefs* are available online at the PPI website: ppi-ppic.org/agri-briefs