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### **FALL-APPLIED PHOSPHORUS—WILL IT BE THERE IN THE SPRING?**

**Many fields in North America could benefit from phosphorus fertilization: 47% of the soil samples test medium or below in extractable phosphorus.** Is fall a good time to apply phosphorus, and will the applied phosphorus be available for spring planted crops?

#### **Here are some of the advantages of fall phosphorus application:**

- Potentially lower cost of fall versus spring purchase.
- Greater potential of soil incorporation with tillage, which may be difficult in spring if soils are wet. Incorporation places phosphorus beneath the soil surface and reduces risk of soluble phosphorus runoff loss.
- May enable some phosphorus to slowly move beneath the surface in no-till fields before the spring, to enhance root uptake by spring planted crops.
- Reduces risk of spring planting delays caused by waiting on applications of phosphorus alone, or in mixed fertilizers in the spring.
- Applied when field moisture is often lower and less soil compaction by application equipment is expected.
- Enhances root growth and phosphorus uptake by fall planted crops and cool season forages, and helps encourage better tillering and stand development in wheat and other cereals.
- Applied phosphorus helps enlarge and nourish root systems, which stimulates greater uptake of native soil phosphorus.

#### **There are also some potential disadvantages to consider with fall phosphorus application:**

- Risk of runoff loss of surface-applied phosphorus, or possible erosion loss of incorporated phosphorus which is bound to soil particles, especially in field areas near streams and other water bodies. However, the probability of runoff-producing rains may be greater in the spring than in the fall in many areas.
- On low phosphorus soils, more of the applied phosphorus may be rendered unavailable compared to a spring application. If the soil pH is not properly maintained through liming, potential “tie-up” or “fixation” by soil clays, aluminum, and iron compounds may decrease the availability of fall-applied phosphorus for spring-planted crops or warm-season forages.

**Where phosphorus has been applied at agronomic rates, it moves very little (less than an inch or two) from the depth of placement or tillage in most soils** within 5 to 10 years or more. It is unusual for any significant phosphorus leaching to occur unless excessive rates of phosphorus from animal wastes or other sources have been applied and the phosphorus sorption capacity of the surface soil has been saturated.

**Plants may absorb 10 to 30% of the applied fertilizer phosphorus within the year of application.** When the soil pH is maintained at proper agronomic levels for most crops (6.0 to 6.5), much of the applied phosphorus remains in forms that plants can utilize. It may take several years to “recover” the applied phosphorus, but many research studies have shown that the apparent plant recovery of fertilizer phosphorus by long-term cropping may range from 40 to 100%.

**So, fall-applied phosphorus can benefit fall crops as well as spring crops, and it will provide benefits to successive crops.** The benefits depend on several factors...including the balance of phosphorus applied versus phosphorus removed in the harvested crop...and the ability to keep phosphorus in the field where it is applied for maximum plant nutrition. Evaluate the advantages of fall-applied phosphorus and be sure to include it as a viable option in your nutrient management plan.

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