

## **AGRONOMY TECHNICAL NOTE – Quality No-Till Series**

The *Quality No-Till Series* provides management techniques for the successful adoption of [Quality No-till Cropping Systems](#). This information is applicable to most Indiana soils and cropping conditions and covers broad application.

The soil biology and availability (solubility) of phosphorus may be significantly higher with low or no tillage, especially in the surface zone. Repeated surface applications of phosphorus (P) in these systems can lead to P concentrations as much as 2-3 times higher in the surface (0-3") than at deeper zones. These conditions can lead to increase potential for an increase in losses of Dissolved Reactive Phosphorus (DRP). The following is a list of management steps to reduce DRP loss and increase nutrient efficiency under a no-till cropping system. Refer also to AGRONOMY Technical Note *Phosphorus Management Best Available Treatment (BAT)*.

### **Management Strategies**

1. Reducing runoff decreases the primary transport mechanism for dissolved P. Runoff can best be decreased by implementing a Conservation Cropping System with continuous no-till, cover crops, and the treatment and prevention of compaction and surface crusting.
2. Take split soil samples at 0-3" and 3-6". Be sure to let soil test laboratory know the soil test depth.
3. Do not make broadcast surface applications to frozen ground.
4. Surface application should be limited to ideal soil conditions, ahead of planting a cover crop, cash crop or into a growing cover whenever possible.
5. If surface soil tests indicate concentrations are medium to high, and sub-surface levels are sufficient, all phosphorus applications should be injected to > 2" or applied to a growing cover crop in the fall or spring.
6. If surface soil test indicate concentrations are high, and sub-surface levels are sufficient, most research suggests that no yield response is likely from an application. Consider ceasing application of P until all levels are in the medium range.
7. Consider using 2 x 2 starter fertilizer placement at planting to deliver all or part of P.
8. If soil tests indicate a need to build P levels, and broadcast is the only option, annual applications may be preferred over biennial. The best options are into an existing cover crop or just prior to seeding a cover crop.
9. For biennial applications, traditional practice, due to likely crop response, is to fertilize before the corn crop and to have soybean as a residual feeder. Under a more biologically active system like No-till, this response difference is less clear. Injection, such as in a strip-till operation may be an option to assure optimum placement and soil/fertilizer contact for heavier applications of fertilizer or manure. Broadcasting into heavier corn stover may be a good option since runoff potential is reduced. Including a cover crop seeding to these operations will further help secure these nutrients.
10. Repair old, broken down tile systems with tile blow outs and buffer tile risers that provide a direct conduit to surface waters.
11. Addressing low soil pH (< 6.0) increases the availability of soil P to plants. So applying lime in low pH situations will have a more positive response than applying phosphorus, especially if the soil test P level is at least in the medium range.
12. An increase in soil bio-diversity improves soil health and nutrient cycling. Regular soil testing, scouting for crop nutrient deficiencies, monitoring of soil compaction and soil health and tissue sampling should be part of a nutrient management plan for high residue conservation cropping systems.