



AGRI-BRIEFS

AGRONOMIC NEWS ITEMS

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WHAT ABOUT PHOSPHORUS LOSS?

Agriculture is increasingly being blamed for the deterioration of surface water quality in the U.S. The Environmental Protection Agency has stated that agriculture is the leading source of water quality impairments in rivers and lakes. Algal blooms, low dissolved oxygen, and other water quality problems have been associated with elevated levels of nitrogen and phosphorus. Fresh water quality impairment is most often associated with elevated levels of phosphorus, while nitrogen is generally the limiting nutrient in estuaries.

While phosphorus losses do occur from farmland, most growers do a reasonably good job of keeping phosphorus in place. Where significant loss does occur, it's most often the result of mismanagement of animal waste, although mismanagement of fertilizer phosphorus may also contribute. Factors such as slope, soil type, tillage system, and application timing and placement affect loss. Phosphorus may be transported from agricultural land in particulate and dissolved forms. Dissolved phosphorus is lost in surface runoff water or, in special cases, through leaching.

The concentration of soluble phosphorus in water moving through the soil profile is usually low due to sorption by the subsoil. However, leaching losses may occur in soils with unusually high soil phosphorus levels resulting from excessive manure or fertilizer application, in organic soils, or in deep sandy soils with little sorption capacity. Regardless of the method of transport, the adoption of best management practices (BMPs) can help minimize loss of phosphorus and other nutrients from farmer fields.

Soil testing is an indispensable tool in responsible nutrient use and planning. A soil test report provides an estimate of available soil phosphorus and other nutrients. This information is necessary to make sound fertilizer rate application decisions and to avoid soil build-up to excessive levels.

Method of phosphorus fertilizer and manure application is another important factor affecting loss. Subsurface application, or some form of banding, generally results in reduced phosphorus levels in runoff. For example, a recent east central Kansas study has shown that in a no-till system subsurface banding of fertilizer phosphorus for three years reduced soluble phosphorus in runoff water by an average of 50 percent when compared to the same rate surface broadcast. Where phosphorus is broadcast, it should be incorporated through tillage before the first runoff event. If soil phosphorus is highly stratified and concentrated in the upper few inches, inversion by cultivation is usually advisable to minimize the potential for transport in runoff.

Depending on the specific conditions, several other BMPs may be important in reducing phosphorus and other nutrient losses from cropland. These include the use of vegetative buffer strips, terracing, contour tillage, cover crops, and conservation tillage.

One of the most important BMPs to reduce nutrient loss is a balanced and complete fertility program based on realistic yield goals. Balanced fertility, where the need for all nutrients is addressed, is important in maximizing nutrient use efficiency and ensuring that phosphorus, nitrogen, and other nutrients are kept in place for crop uptake.

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