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NOT ALL FERTILIZER BANDS PLAY THE SAME SONG

The often used expression, “Same song, different verse,” refers to something that is practically the same as something else. So often, P and K are used in the same sentence when people talk about banded fertilizer applications, as if both were different verses of the same song. Actually, P and K fertilizer bands play different “songs” because they behave differently in soil.

One of the primary reasons fertilizer is banded is to increase short-term efficiency of use by the plant. Bands of P are known to cause an increase in root proliferation, as are bands of N. Bands of K, however, do not have this effect. This means that bands of P will be explored more thoroughly by root systems than bands of K. The implication, of course, is that applying P and K together in a band will help make better use of the concentrated K supply, due to the increased root growth caused by P.

Bands of K may not remain as concentrated in soils over time as bands of P. There are a couple of reasons for this. First, crops like corn and soybean take up more K than P during the season. Corn takes up about two-and-a-half times as much K as P while soybeans take up about twice as much (expressed as K_2O and P_2O_5). Secondly, K moves more in soils than does P, causing bands of K to become more diffuse over time relative to P. So, greater uptake combined with greater mobility limits the longevity of concentrated bands of K.

In the short-term, corn and soybean plants themselves redistribute K in soils to a greater extent than P. This occurs for a couple of reasons. First, K leaches from plant residue and unlike P, does not require microbial decomposition to be released. This means that K in the plant is returned to the soil more quickly than P. Secondly, a greater proportion of the K taken up by the above-ground plant biomass exists in the plant residues returned to the field. For corn, about 80% of the total K taken up is in the stover, compared to only about 30% for P. For soybean, the percentages are 45% for K and 20% for P. A lot of the K leached from plants occurs during senescence, before crop harvest, meaning that most of the K is redistributed into the crop row. Consequently, plants become effective redistributors of K in the soil, moving it from throughout the root zone and concentrating it to the row, particularly at the soil surface. While P is also redistributed in this manner, it is not done so to the degree that K is.

Just how long P and K bands will last in soil depends upon many factors. Soil mineral composition, rooting depth, environmental conditions, and soil wetting and drying cycles are but some of the many factors at play. To gain an idea of how long bands will last under a specific set of conditions, on-farm monitoring through soil testing is suggested. Select areas can be monitored frequently to gain a sense for band longevity, remembering that if bands are placed near crop rows, concentration of K by the plant may overwhelm detection of lower rates of banded K.

So the next time P and K bands are assumed to be the same, remember that they really have very different characteristics, both in the soil and in the way they interact with plants. Bands of P and K really do play different songs.

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Abbreviations: N = nitrogen; P = phosphorus; K = potassium.