

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.

THIS ARTICLE IS ABOUT...

RIGHT SOURCE RIGHT RATE RIGHT TIME RIGHT PLACE

Highlights

- Bands of K may not remain as concentrated in soils over time as bands of P.
- Corn and soybean plants redistribute K in soils to a greater extent than P.

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 K₂O and P₂O₅). 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.



The
**Fertilizer
Institute**

Nourish, Replenish, Grow

Contact Information:

The Fertilizer Institute
425 Third St., S.W., Ste. 950
Washington, DC 20024
202-962-0490
www.tfi.org

The guidelines for the 4R principles are endorsed and supported by the International Plant Nutrition Institute, The Fertilizer Institute, The Canadian Fertilizer Institute, and the International Fertilizer Industry Association.
www.nutrientstewardship.com.

Source Material

Murrell, Dr. T. Scott, "Not All Fertilizer Bands Play the Same Song,"

IPNI Plant Nutrition TODAY, Fall 2010, No. 4,
www.ipni.net/pnt

