

## The Role of Phosphorus in Late Season Yield Increases

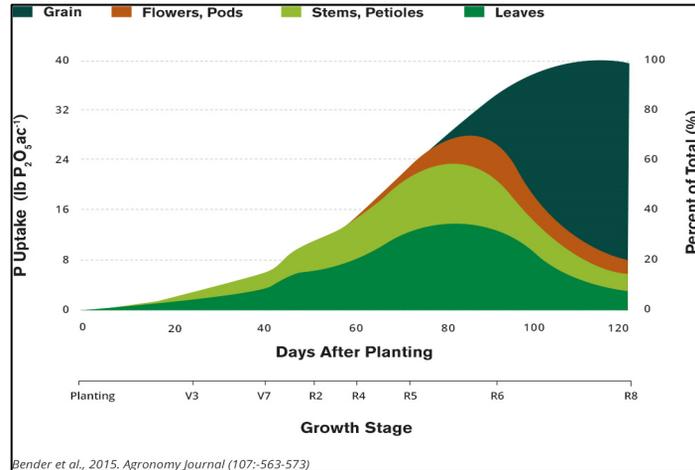


Did you know that 30-40% of yield loss occurs during the reproduction growth stage in our crops, almost regardless of the type of crop we are growing? Take soybeans for example -around 70% of its flowers abort every year. As growers, how often do we try a new product on our farm and see improvements in plant growth, increase in branching, even significant increase in pods per plant, yet when we run the combine across the field we are left feeling disappointed as these improvements in the plant didn't improve our yields. Perhaps you farm potatoes, and you target setting a certain number of tubers on each plant. However, if the plant has too many they won't size appropriately, and you take a hit at the market because they are too small. These are just two simple examples, but this occurs in virtually every crop we produce.

It is not unusual to see foliar nitrogen applied late in corn and soybeans but producing a "green" visual difference in the plant may not be the best way to drive late season yield gains. Nitrogen works great to increase vegetative growth but for developing grains and fruits our challenge is how do we improve seed and fruit development. This requires carbohydrates. When we foliar apply nitrogen we actually direct the carbohydrates to plant growth, not seed development and fruit growth. **Phosphorus**, as it plays in energy (sugar) flow within the plant, can play a key role in foliar applications that specifically target seed and fruit development.

As a plant develops it needs to manage resources and making the transition from vegetative to reproductive growth can be stressful. In the "source to sink" relationship, the leaves act to absorb sunlight through photosynthesis to produce the source energy stored in the form of sugars and carbohydrates for growth, development and reproduction. The "sink" is new and developing plant tissues, grains, and/or fruits. But how does a plant know where to direct its resources, where the energy is needed most? **This is where phosphorus comes in.** Energy flows in a plant from high phosphorus areas to low phosphorus areas. Low phosphorus is how a plant determines which "sink" has the greatest need and where the carbohydrates will go.

During grain filling and fruit sizing, plants use mechanisms called *phytate* to make the grains and fruits appear phosphorus deficient and direct the carbohydrates to reproduction.



Bender et al., 2015, Agronomy Journal (107:563-573)

ABOVE: Phosphorus uptake curve of soybean (*Glycine max*) by growth stage. KSC's Phytactyl complex aides in systemic nutrient movement, there by supporting the natural phosphorus redistribution in most all crops through grain/fruit development and filling.

The challenge plants face is that eventually phosphorus levels/reserves will begin to deplete. This drop causes the plant to pull back the amount of energy it sends to developing grains/fruits. We commonly recognize this as "denting" in corn. This is also why soybeans are so good at fooling us when we try to estimate yields, because in soybeans this shows up as reduced seed size. This physiological response happens in every crop.

As growers we can help offset this yield reduction by applying high phosphorus foliar fertilizers. Utilizing this strategy, our goal is to increase grain fill, grain size, fruit size, improve BRIX, increase grain quality, and significantly improve harvestable yield.

We have a long history of working with growers to achieve higher quality yields and profitability. **KSC Phytactyl IV (0-32-40)** is a great tool to supply late season phosphorus along with our patented Phytactyl complex to support systemic nutrient reallocation and movement, ultimately contributing to greater yields and with higher quality fruits and grains.

Contact your local Timac Agro USA representative today and to learn more about how KSC can contribute to profitability on your farm.

**Author:** Rob Jarek, Midwest and Great Lakes Product Manager  
[rjarek@timacusa.com](mailto:rjarek@timacusa.com)