



Agronomy Update



Seed Placed Fertilizer - Part 2

Have you ever wondered exactly what is happening down in the rooting zone of a crop when you use seed placed starter fertilizer? For most of my years in agriculture it has been a standard recommendation that seed placed fertilizer should be applied; it is beneficial for easy nutrient access for the emerging crop and gives it that crop a better start in cold soils through the “pop up” effect. Yet year after year, when dealing with John Deere’s P556 drill, I could not see any difference when we decided to forego seed place any fertilizer - as long as background phosphate levels were adequate. In the July Agronomy Update, I discussed in detail the phosphate seed placement trial done at the Battle River Training Field south of Killam so I won’t go over that ground again, but in a nutshell, we seed placed 30 lbs of P₂O₅ with our wheat on strips accounting for 30 acres of the field. The rest of the field had all the phosphate go into the fertilizer trench. If you are curious, you can access the article by following this link.

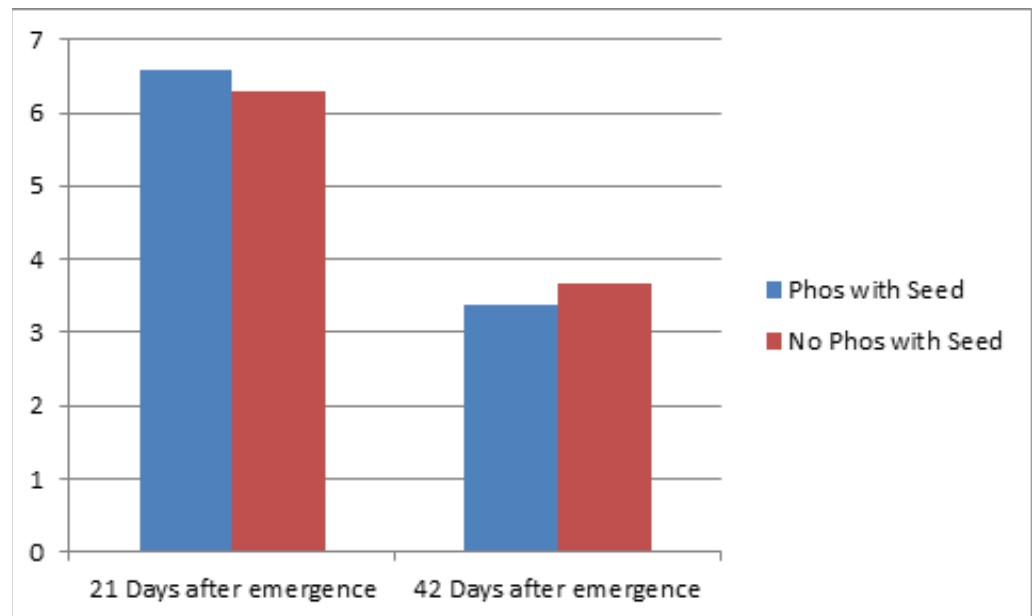
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Tissue Testing

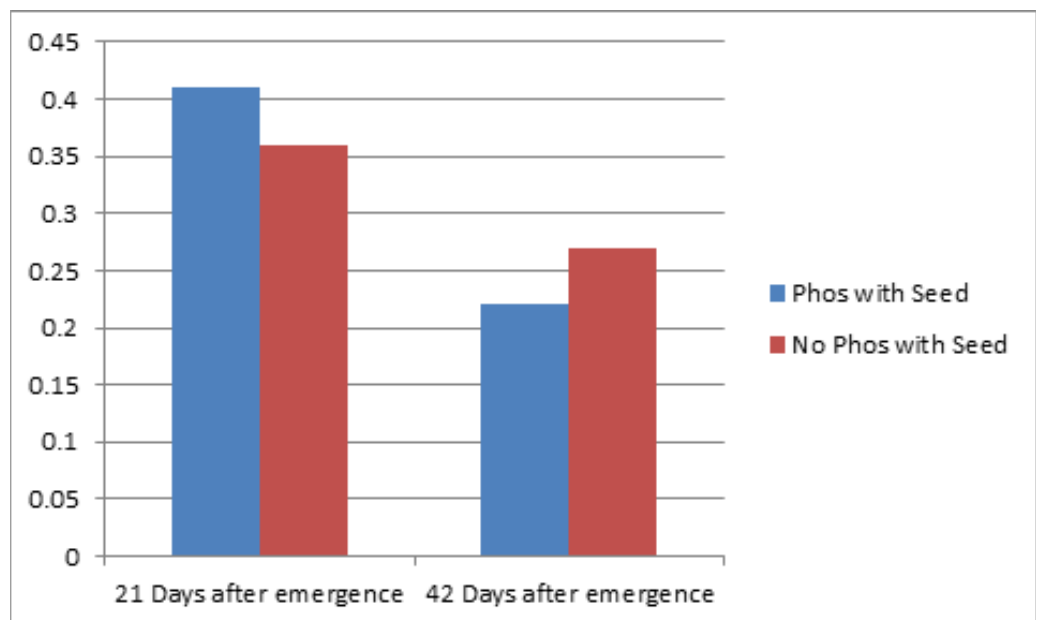
This month, I want to discuss what we found when we did tissue testing at 21 and 42 days after emergence. First off, tissue testing needs a soil test to give it context, so we started the process by taking soil samples on October 19, 2020. The samples were sent to Element Soil Testing Services in Edmonton. The lab analysis showed both P and K on the line between marginal and optimum; estimating phosphate levels at 53 lbs/acre and potassium at 330 lbs/acre.

Calcium, Magnesium and Manganese were at optimal levels, and all the remaining nutrients tested were shown as marginal. So with that in mind, let's look at a sample of what the tissue tests showed.

Total Nitrogen



Phosphorus



The graphs shown here represent the pattern seen on the majority of the nutrients tested. The seed placed phosphate definitely appeared to give the plants an early edge in nutrient uptake. But not only did that edge evaporate over the following three weeks; it appears that the plants without the seed placed phosphate generally had the higher nutrient levels just as the plants were going into the flag leaf stage. There were 3 nutrients that did not follow this pattern; copper, potassium and boron. There are reasons for this, but that is a discussion for another day.

A couple of things should be noted here; soil moisture in the top 30 cm dropped from roughly 28% after 21 days to 18% after 42 days. In a loam soil, once this number drops below 20%, the plants have to start working hard to extract water, and subsequently nutrient uptake starts to become limited. Those nutrients that depend on osmosis or mass flow to get to the roots start to have a particularly tough time. After 21 days, only magnesium, copper and boron were reporting low levels in the plant tissue. By the time the second set of samples was taken at the end of June, most nutrients were reporting on the low end – a typical response in a dry year.



The second thing that caught my eye was that the early tissue readings on phosphorus reflected the soil test results very well. The 0.36% phosphorus concentration in the leaves of the wheat that had no phosphate placed with the seed is considered just on the line between low and medium, mirroring the soil test analysis showing phosphate hovering just above marginal levels. This emphasizes my earlier point that removing phosphate from the seed row should only be done if you are sure you have adequate phosphate soil test levels. Otherwise you run the risk of depriving the seedlings of adequate phosphate at a time when they need it for good stand establishment.

I am reluctant to draw many conclusions from a single year of observations, especially in a year such as this. And of course we are still missing the biggest piece of the puzzle – is there a yield advantage associated with either practice? However, there are some things to keep an eye on and see if different years and different crops will continue to show the same trends;

- 1) *Does seed placed phosphate consistently give better overall nutrition to the plants in the first 3 weeks?*
- 2) *Does the crop that has no seed placed phosphate consistently catch up and surpass the nutrient levels after 6 weeks?*
- 3) *Is there a difference in the speed with which the root systems explore the soil that can account for the pattern of nutrient concentration and can we measure it in the field using soil moisture probes?*
- 4) *Can we remove seed placed fertilizer from our program to make seeding logistics smoother without compromising yield or quality?*

I am looking forward to finding out if the canola crop planned for the field next year follows the same pattern that the wheat did in 2021.



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