BRI Training Field Seeding – May 6, 2021

Agronomy Update

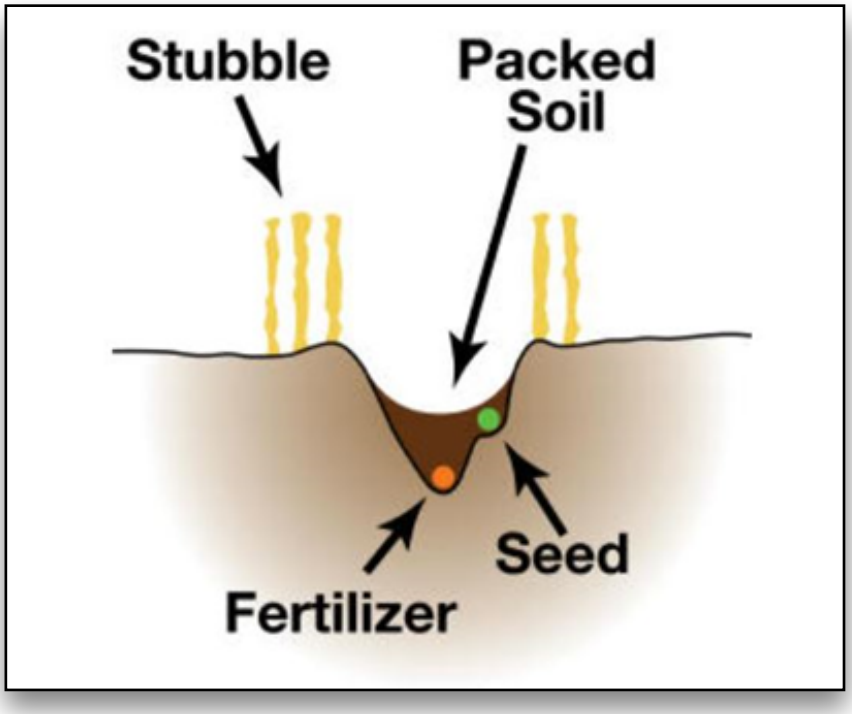
August 2021

Seed Placed Fertilizer

It has long been understood that whenever possible, nitrogen and sulphur fertilizers should be placed away from the seed row for crop safety. On the other hand, placement of phosphate and/or potassium fertilizers with the seed is a common practice, and often recommended by agronomists. How much fertilizer is placed with the seed is dependent on the crop, as well as the row spacing and seed bed utilization of the drill being used. However, starter fertilizer has always been a balancing act between the benefits of placing nutrients close to developing seedlings and the damage done to germination and emergence of the crop by that fertilizer; primarily through its salt content or via specific ion toxicity.

Yet with the John Deere P556 drill (formerly known as the 1870), I usually tell customers that I see no need to seed place fertilizer. This is an opinion that I have come around to after years of observing many fields and seeing both methods in action. As long as the field has adequate background soil test levels of phosphate, there does not seem to be any yield advantage to placing fertilizer with seed. The reason for that seems to be tied to the configuration of the P556's independent opener.

With this system, the fertilizer is placed to a depth of about 4 inches, generally into very good soil moisture that will help the nitrogen quickly dissipate into the soil. This minimizes some of the problems created by the fertilizer band "hot zone" that burns off root hairs reaching towards it. As a rule of thumb, the phosphate in that band is inaccessible to the seedlings until the nitrogen diffuses out into the soil. This issue will still happens when seeding with the P556 drill - one of the many reasons why it is important to have healthy background soil phosphate levels. But unless you are dealing with extremely dry soil conditions, it would be very unusual not to have enough moisture at the 4 inch depth to move nitrogen out of that band relatively quickly, allowing quick root access the phosphorus within. This spring is a prime example of that. At our training field we had to seed our wheat about ½ inch deeper than normal to find seedbed moisture, yet our soil moisture probe showed around 30% moisture at 4 inches; more than enough to move the banded nitrogen into the surrounding soil.



The fertilizer trench also serves the secondary function of encouraging the plants to root downward immediately. Plant roots will follow the path of least resistance in their search for soil nutrients, and even under cold soil conditions, that trench will be the first place the roots explore after the plants germinate on the seed shelf on the side. We use readings on a soil moisture probe to infer root growth and development; and this spring that probe was indicating that the crop was drawing water from a depth of 30 cm only 29 days after seeding. This doesn't necessarily mean that the roots had physically penetrated to 1 foot by then, but it does show that the crop already had roots deep enough to draw water from that depth through capillary action.

So for several years now, I've been telling growers that I am completely comfortable with either putting starter fertilizer with the seed or leaving it out.I didn't see where it mattered. But I have never actually documented what is happening in a field throughout the growing season to validate my opinion. So this year, we decided to test the theory that starter phosphate is not necessary when using the John Deere P556 drill. Starting in 2021 we began what I hope will be a 4 year trial on starter fertilizer and the drill. I want to see what happens to a crop as it grows through the early stages in terms of seedling survival, root growth and nutrient uptake.


BRI Training Field June 4th

This year, the trial consists of about 30 acres of wheat with seed placed phosphate in 2 strips running north and south on the north quarter. The remainder of the field was done as we would normally do at the training field; all of the fertilizer down in the trench and none with the seed. As expected, there were no visual differences based on fertilizer placement. Also as expected with the rate of P2O5 applied (about 30 lbs) there was no statistically significant impact in germination and emergence of the wheat that was in close proximity to the fertilizer. However, we are also interested in finding out what is happening with nutrient uptake as the plants grow, so we took tissue tests both 21 days and 42 days after emergence.

Given the extreme growing conditions we have had to deal with this year, we will be lucky to harvest 50% of our expected yield. Given that, I am not sure how much stock we can put into these results. But future trials will tell us if the results seen in a very atypical 2021 are typical of what we can expect from this drill under a wide variety of conditions or not. Much of what we discovered initially this year was about what we should have expected, but the follow up tissue test provided a couple of surprises as well as a possible trend. I plan on discussing all of this in greater detail in the September newsletter.

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