



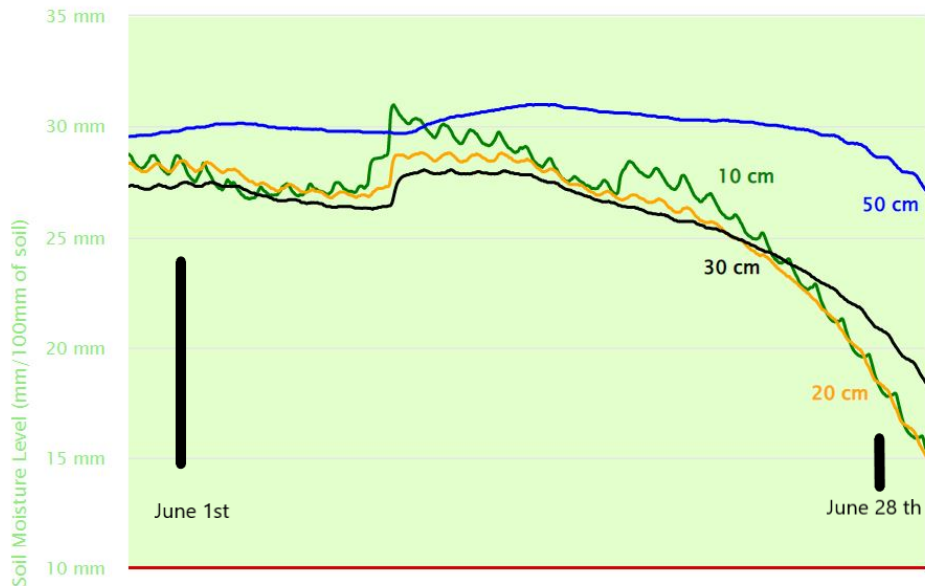
In Season Management Decision Tools

January Agronomy Update

Anybody who has been reading this newsletter for a while is likely aware that we have been using soil moisture probes and the associated Crop Intelligence App at our Training Field for several years now. And while it is cool to look at the yield potential rise and fall with the environmental conditions, there is more information to be gleaned from these probes beyond seeing what the water driven yield potential of a crop is. With that in mind, I would like to share a management decision made in 2021 on the field based on the information I had from the soil moisture probe, soil tests and tissue tests. In the end, the environmental conditions went against us and we did not get the result we wanted; but I would still do the same thing again if faced with the same set of circumstances. After all, farming is a game of playing the odds and more normal July temperatures would have made this the correct decision.

We seeded Brandon wheat on May 6th that year into excellent moisture. The fertilizer blend was just an N/P mix as soil testing said everything else was adequate. The only question mark was the marginal copper reading, but those levels were still enough to support an average crop of 70 bushels. However the moisture situation did not remain excellent for very long. By the end of June, the top 4 inches of soil was below the permanent wilt point and the wheat roots in that zone had gone dormant. Yet there was still very good moisture further down in the soil.

Soil Moisture By Depth



Tissue testing done on June 7th, showed that copper levels were already lower than expected and as the roots shut down in the top layer of soil where all the copper is, I was afraid that outside of moisture, copper was now my largest yield limiting factor. On June 28th, I did a second round of tissue testing. I still had a decent looking stand at that point, but I could already see isolated instances of “pig tailing” on emerging flag leaves, a sign of severe copper shortage.



I felt that if the crop could get roots down to the 50 to 70 cm depth where moisture was good, I could still salvage a 60 bushel crop. But it wasn't going to happen if the copper levels were holding the crop back. Meanwhile the forecast was calling for rain, so I decided to apply a foliar copper for about \$4 per acre to the field, which was done on June 29th. The June 28th tissue tests would later show copper critically low in the new leaves, but I didn't know that for sure at the time of application.

Between July 2nd and July 6th, the field received an inch of moisture and I was feeling pretty good about my decision. Unfortunately, Mother Nature had another trick up her sleeve, and between June 29th and July 12th we saw an extended period of extreme heat, hitting as high as 37 C on 4 of those days. The crop shut down as a response and by the time the heat wave had passed, so had the moisture in the top 4" of soil again. The wheat never did tap into the moisture reserves from the 70 to 100 cm levels (something it would normally be accessing by the 3rd week of July) and the field yielded just under 40 bushels/acre.

The point I wanted to make though is not that I didn't get the result I wanted, or that technology led me astray. In a dryland farming system, weather is always going to have the ability to trump our management decisions. The point I wanted to make was how much information is available to us to make these in season management decisions. I had a good grasp on my fertility situation; not only in the soil, but in the plants. I also had a good grasp on my moisture situation; I knew how much I had and where it was situated in the soil profile. And finally, I had weather forecasting. Admittedly it is a flawed source of information, but at least can act as an indicator of likely upcoming weather. And I used all these information sources to take a calculated risk that a \$4 investment could net me an additional 5 or 6 bushels of production. As 4R nutrition continues to become a bigger part of farming, these are the types of tools that may help us maintain our yield goals in the face of regulatory challenges in the coming years.

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