

# AGRONOMY UPDATE

OCTOBER 2019



## ***NITROGEN MANAGEMENT FOR HIGH YIELDING WHEAT***



Over the last 40 years, wheat yields have quietly almost doubled in Western Canada. Some of this has happened because of improved genetics, some has happened through improved agronomic practices, and some people even believe that part of it may be due to increasing CO<sub>2</sub> levels in the air. Regardless of the causes, the fact remains that we have gone from considering 35 bushel wheat as a decent yield, to expecting something closer to 70 bushels. But managing fertility for a 70 bushel crop creates a whole new set of challenges for producers. As you can see by this chart below, the impact that this increased production has on our fertility requirements has been profound.

### **MACRO NUTRIENT REQUIREMENTS FOR HARD RED SPRING WHEAT**

	N	P205	K	S
Yield (bu/ac)				
	lbs per acre required			
35	70	26	65	7
70	140	52	130	14

## When we were happy producing a 35 bushel wheat crop, a lot of what was needed to produce it was already in the soil

According to work Dr. Rigas Karamanos did when he was with Westco Fertilizer, the soil will contribute somewhere between 7 and 12 lbs of N for every percent of organic matter in the soil, depending on soil composition and moisture conditions. So a soil with 5% organic matter will contribute somewhere between 35 and 60 lbs of N to the wheat crop. A 35 bushel wheat crop also returns about 7 lbs of P<sub>205</sub> and 50 lbs of potassium back to the soil as the straw and roots degrade. Under these conditions, an application of 50 to 60 lbs of N and 20 lbs of P was more than enough to produce 35 to 40 bushels of high protein wheat without ever depleting the reserves of soil nutrients.



**Compare that to what a 70 or even 80 bushel wheat crop requires...**

## It is easy to see that soil can no longer bridge the gap between what the organic matter can provide and what a “traditional” cereal blend adds.

Take the Battle River Implements Ltd Training Field as an example. Normal rainfall on the field should lead to a yield potential of somewhere around 75 bushels per acre of wheat. But according to our **Western Ag** soil test results, producing this crop would require 110 lbs of N, 40 lbs of P<sub>205</sub>, and 10 lbs of K at a cost of over \$80 per acre. This raises a couple of red flags; one financial and the other one logistical. Spending \$80 per acre on fertilizer is a large investment to make on a wheat crop in the hopes of obtaining “normal” rainfall. Application rates this high on a cereal crop also present some logistical issues. Between seed and fertilizer you need equipment capable of putting down close to 450 lbs per acre of product. Even if you are running an 850 bushel cart, this means a lot of time spent filling instead of seeding.

## Because of issues like these, split applications of nitrogen are gaining a renewed interest among producers

Dr. Don Flaten from the University of Manitoba has been conducting nitrogen top dressing trials for the past several years, looking at different timing, rates and sources of N in southern Manitoba, where hard red spring yield goals are now around 90 bushels per acre and yields as high as 130 bushels have been recorded. I would highly recommend checking out Dr. Flaten's entire presentation from last year's the Top Crop Manager Soil Summit in Saskatoon on the subject. [https://www.topcropsummit.com/images/stories/Presentations/2019/Don\\_Flaten\\_and\\_Amy\\_Mangin\\_N\\_management\\_for\\_high-yielding\\_spring\\_wheat.pdf](https://www.topcropsummit.com/images/stories/Presentations/2019/Don_Flaten_and_Amy_Mangin_N_management_for_high-yielding_spring_wheat.pdf)

**We entered the 2019 growing season with the goal of doing split N applications on our Brandon wheat to see if his work had any application in our drier climate**



Based off of the studies being done by Dr. Flaten, we entered the 2019 growing season with the goal of doing split N applications on our Brandon wheat to see if his work had any application in our drier climate. We started with a base blend of 80-40-10 at the time of seeding, which was enough P<sub>2</sub>O<sub>5</sub> and K for our ultimate goal of 75 bushels per acre, but with a Nitrogen rate that was likely only sufficient for about 60 bushels of high protein wheat. The plan was to use soil moisture probes and an App called **Crop Intelligence** to monitor moisture conditions and give us a yield potential based on the amount of available soil water for the crop. Knowing this water based yield potential is the critical component in understanding how much Nitrogen (if any) is needed to maximize yield potential.

On June 25<sup>th</sup>, growing season precipitation was at just over the 30 year average with more rain in the forecast, and Crop Intelligence was projecting an 84 bushel wheat crop. At this time the wheat had just finished tillering and the first node was at ground level.

Armed with this information, the decision was made to go ahead and top dress the wheat with an additional 20 lbs of N. We used 2 sources of N; 46-0-0 applied using a Salford BBI spin spreader and liquid N applied through a John Deere R4044 Exact Apply sprayer, using streaming nozzles designed for fertilizer applications.

***Check back next month, when I will (hopefully) have the results from these applications!***

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