SEEDING RATES

THE IMPACT OF SEEDING RATE ON CEREAL PRODUCTION

BATTLE RIVER IMPLEMENTS

AGRONOMY UPDATE

October 2016

Field A - Almost ready to joint: 24 plants/ft^2

Field B - Second tiller stage: 31 plants/ft^2

In dryland farming in Western Canada, we deal with three major factors that limit our ability to produce cereal crops to their full potential – water use efficiency, proper fertilizer rates and fertilizer placement. In this update, I would like to share with you two fields that I followed this summer and how the seeding rates and fertilizer used had an impact on the final yield and quality of the crops. While the two fields are several miles apart, making it hard to make head to head comparisons based on yield, both CWRS Wheat crops were seeded with a 76 ft John Deere 1870 sectional control drill with a single row seed opener on a 12" spacing. Both fields A & B were monitored using John Deere Field Connect weather stations. Based on that, we can at least assume that the seedbed and moisture received were relatively constant between the two fields. The two fields are pictured above.

I was not able to find pictures of the fields at the exact same stage, so the one on the left is almost ready to joint, while the one on the right is only in the second tiller stage. However, the point I would like to make is that at this stage of development, the two stands looks surprisingly similar - most people would not guess that there is a 7 plant/ft^2 difference in the plant density.

So what we have in this case are two fields planted exactly the same way and getting almost identical moisture throughout the growing season. The moisture received on both fields for the 90 day period following seeding was around 11 inches, almost 25% above our 30 year average for the area. Both fields had adequate weed control and both were sprayed for diseases.

Field A (left above) had a target seeding population of 25 plants/ft^2, and final plant count was 24 plants. Based on 1,000 kernel weight, this resulted in a seeding rate of 101 lbs per acre. Soil testing was done and identical samples sent to two labs. Two different blends were used on the field based on the results of the analysis of each lab. The blends used were 55-30-0-5 and 75-25-0-5 (this analysis actually called for 95 lbs but was modified). All fertilizer was put down the fertilizer boot with no fertilizer placed with the seed.

Field A Standing: 24 plants/ft^2

Field A Lodging: 24 plants/ft^2

Field B (previous page - image right) had an unknown target population, but it was seeded at 135 lbs/acre and achieved a stand that averaged 31/plants per ft^2. The fertilizer blend used on this field was 95-30-15. Most of the fertilizer went down the seed boot, but 15 lbs/per acre of the blend was applied in the seed row.

So, based on all the information on the fields, it would be logical to assume that Field B significantly out yielded Field A. There was a heavier plant count, it had excellent moisture throughout the growing season and it had access to a much higher fertility program than Field A. However, it didn't turn out quite that way.

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Lodging

Field A showed a slight tendency to lodging where the blend was 55-30-0-5, but the overall impact of lodging was minor. Where the blend of 75-25-0-5 was applied, there was excessive lodging that impacted the harvestability of the field. This validated the decision to cut back the N on the second blend instead of going with the recommendation from the second soil testing lab. We likely should have cut it even more, but we wanted to see what would happen.

This particular picture (above right) does not do justice to the level of lodging that was seen in parts of the field that received 75 lbs of N. The field averaged 69.29 bushels per acre with a protein of 13.7%. There was no significant difference in yield between the two blends.

Field B exhibited a few places in the field where there was some lodging, but considerably less than what we found on Field A where the 75-25-0-5 blend was applied.

Field B averaged 65.48 bushels per acre and had a protein of 14%.

Yields

As you can see, there is no statistically significant difference in the yields produced by these two fields, yet one had considerably more money spent on inputs. So what happened?

Field A had a soil test done and a blend tailored to the specific field. Field B was given a fertilizer rate that was designed to ensure that the crop was not short on anything, but didn't necessarily try to account for what the soil itself could provide, leading to extra money being spent. The fact that Field A had two labs give us two very different recommendations on N & P shows us that we should spend more time thinking about lab selection. A lot of producers are skeptical of soil test recommendations; because they often don't line up with what trial and error has taught us will work. In the end it is often more reliable to take the approach used in Field B, where you don't know exactly what to apply, but you are reasonably sure that if an aggressive blend is used, that fertility won't be the reason that yield potential is not achieved. The difference between labs is often not in the results, but in how they interpret them. Try different labs to find out which ones best reflect both the agronomic and economic realities of the soils in the area.

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The second thing that is different between the fields is the seeding rates and resulting plant populations. Field A had a target population of 25 plants/ft^2. This target was based on the idea that the drill being used has a narrow seed opener and a 12" spacing. This low seed bed utilization means that there are limits to the amount of seed that can be jammed into a row before it starts to impact the seedling mortality rate and the health of the plants in the row. The crowding leads to taller,

Field B: Standing 31 plants/ft^2

Field B: Lodged 31 plants/ft^2

less well anchored plants with shorter heads and less grain per stem. **Experience has shown us that the best target seeding rate for the JD 1870 with a single opener is about 22 to 24 plants per foot.** There was a small trail on Field A where the seeding rate was dropped down to 20 plants/ft^2, (which is considered the minimum amount for a target population) which was only 81 lbs per acre. The yield was comparable to the heavier seeding rate, but that was due to favourable conditions during the seedling stage of the crop that meant few plants were lost as seedlings. **There are good studies that show that yield drops off rapidly below 20 plants/ft^2.**

Field B was trying to take advantage of the agronomic benefits that can come with an increased seeding rate; those include fewer tillers and more main stems (meaning larger heads and more seed per stem), a more consistent stand in terms of maturity, a shorter time to maturity and improved weed control through enhanced crop completion. However, in this case the seeding rate used exceeded the safe limits allowed by the seedbed utilization of the opener. In my experience once you exceed 27 or 28 plants per ft on a single row 12" spacing competition the crop will suffer. Competition within the row will limit the yield, no matter how much fertilizer or moisture you have. **In Field A, where the seeding rate was lower and less fertilizer was used, there was actually a 4 bushel yield advantage.** There is a way to push the appropriate seeding rate above the 25 plant target with the John Deere 1870 drill – that would be by going to a paired row opener. That in reality changes the row spacing to two rows 3" apart every foot. This gives you the agronomic advantages of the heavier seeding rates without subjecting the young crop to the increased crowding of the single row that limits the advantages you can get from higher seeding rates.

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In conclusion, there is no blanket recommendation that is the "right" answer for seeding rate. A lot has been written in the last few years about the advantages of very high seeding rates. Ensure that you look closely at the trials being done to see where they are being done. The object is to have the heaviest stand possible to maximize the yield potential and aid in the management of the crop. But what that number is will depend on the crop genetics, the seedbed utilization provided by the implement you use, as well as by the soil and environment that you are dealing with. In a future article, I will deal with the impact that fertilizer placement had in one of these fields where we compared the 1870 to another drill.

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