

High Yield Wheat!

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March 12, 2018

Can we grow record-breaking wheat here in the Great Lakes Region? NO! will be the resounding answer from most, but don't give in so quickly. The world record set by Eric Watson of New Zealand stands at 249.7 bu/ac. In 2016, a well-calibrated yield monitor in Ontario touched 240 bu/ac in the best area of a great wheat field! We have the solar radiation, we have the great lakes to moderate temperature, we should definitely be a high yielding wheat area. But we need to manage the wheat crop in order to achieve this!

There are many building blocks to get to high yield wheat. Let's take a stab at trying to identify the most important ones:

- **Drainage!** Wheat hates wet feet. Well-drained soils are a must. The old adage "you pay for drainage whether you have it or not" is especially true for wheat, so whatever it takes, have good drainage.
- **Residue spread:** Poor residue spread behind the combine from the previous crop makes it impossible to have a uniform, easy to manage wheat crop. Poor residue spread results in soil moisture and temperature differences, which impacts drill performance, nutrient distribution, crop growth and uniformity. Seeding the wheat crop starts with the back of the combine harvesting the previous crop!
- **Fall weed control:** Annual weeds that germinate in May have virtually zero impact on winter wheat yields. Conversely, perennial and winter annual weeds growing with or even before the wheat crop in early spring can reduce yields dramatically. Spring control of perennial or winter annual weeds simply cannot be accomplished in time. Weed control in winter wheat should be done in the fall, not in the spring.
- **Seeding date:** Seed early! Early seeded wheat has much higher yield potential. While it is possible to seed too early, years of research and experience have shown that the risk of low yield from planting too early is far less than the risk of low yield by planting too late. Early planting is a key focus of all high yield wheat growers.
- **Seeding rate:** There is no one size fits all for wheat seeding rates. Seeding rate needs to be varied by seeding date, and by soil type. Heavy clay soils need 25% higher seeding rates than other soil types. Early seeded wheat will develop strong fall tillers, which have almost as much yield potential as the main head. These tillers allow lower seeding rates at early seeding dates to be the highest yielding. If wheat is seeded early at high seeding rates, lodging will be an issue. Late seeded wheat will tiller very little, has little lodging risk, and thus needs much higher seeding rates: up to 3 times the seed rate of early seeded wheat. Pick your seed rate by soil type and planting date, don't just set the drill and leave it there all season!
- **Seeding depth:** Aim for 1.25" deep, unless it is dry. Always seed to moisture if possible, to get the wheat crop growing. Never seed shallow and hope for rain if

you can seed into moisture. When moisture is not an issue, seed at 1.25". This allows for rapid emergence, maximum crown depth, and good root growth to anchor the plants.

- **Phosphorus Phosphorus Phosphorus:** Use a high phosphorus starter fertilizer. Seed placed or banded is preferred: it takes 4 times as much fertilizer if you broadcast. Make sure your background soil fertility levels are in the medium range. There is a 10 bu/ac yield response to having medium testing soils that cannot be gained back with starter fertilizer only.
- **No fall nitrogen required:** In warmer climates fall nitrogen is a standard recommendation, as the wheat continues to grow slowly during winter months. With the wet, cold winters of the great lakes region, fall nitrogen rarely increases yield, and about 50% of fall applied N is lost over the winter. No fall N required.
- **Nitrogen rates:** Nitrogen rates need to be specific for each farm. Two things are clear from the research: nitrogen response curves change when you use fungicides, and high yields take more N. In Ontario research, 150 lbs N/ac was the most economic rate 58% of the time, with 120 N being the optimum the balance, with fungicides applied. Without fungicides, 90 N was the optimum rate in the majority of cases.
- **Nitrogen timing:** Split N applications are environmentally friendly, and can significantly reduce lodging. However, yield increases from split N applications are rare. Nonetheless, almost every high yield grower splits N, to avoid lodging and as insurance against warm wet periods when denitrification could limit yields.
- **Fungicide timing:** Fungicides are a must to manage fusarium risk and allow wheat crops to fully utilize applied N. However, the later fungicides are applied, the more they increase yield. Thus the common "half rate Tilt at weed control timing" is essentially worthless. Yield gain from the fungicide is 1.5 bu/ac, and it is the wrong timing for weed control. There is one exception to the "later is better" for fungicides: when a severe disease outbreak occurs early, such as stripe rust in 2016/17. When that happens, an earlier fungicide application is required. Scout!
- **Harvest early!** Nothing good happens to wheat once it reaches physiological maturity (30% moisture). The more quickly you can get it harvested, the higher the quality will be. Test weight drops ~1 lb/bu for every time the wheat re-wets, toxin levels can increase whenever wheat moisture is above 19%, and birds, mice and bugs all take their toll. Often referred to as "phantom" yield loss, these impacts are real. The highest yields and best quality inevitably come from the earliest harvested fields.

High yield growers would add even more to the list above. The one consistent message from high yield growers is "attention to detail". What many would consider as trivial, these growers make sure to have right. No worn out or dull blades are allowed on drills, nitrogen application is perfectly uniform, and scouting is paramount. While we may never break the world record for wheat here in the Great Lakes area, someday a grower in our region will break 200 bu/ac on a field basis. When they do, you can bet that every one of the items above was a part of the management package they employed. Hopefully these thoughts will help you to grow better (RECORD!) wheat!