Session 45

Wheat – Raising the Bar

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Some Ontario wheat growers have already broken the 100 bu/ac barrier using intensive wheat management practices, in fact field averages of 120-140 bu/ac have been recorded and 160+ bu/ac regions have been observed on calibrated yield monitors, which all illustrate the yield potential of wheat in the province. While there have been increases in wheat yields over recent years (mainly as a result of OMAFRA and private sector research), Ontario yields still fall short of other areas and many opportunities exist to raise yields and boost profits; often without significant increases in production costs. Take England for example, a country where the national wheat yield average is around 125 bu/ac (source: fas.usda.gov), with top producers pushing field averages over 200 bu/ac. While there are obviously growing season differences between the two countries, rainfall and soils are often quite similar within the major wheat producing regions.

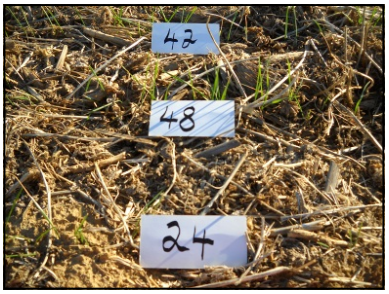
Phil Needham, a native of Lincolnshire, England joined Miles Farm Supply, (headquartered in Kentucky) as a wheat consultant in 1990, helping Kentucky and surrounding state producers introduce and expand European wheat management practices. In fact, over a 20 year period, Miles Farm Supply brought over about 10 agronomists skilled in wheat management (mainly from England and Ireland) to further research and expand the wheat system). This system has had a significant impact on wheat production, for example it contributed to a doubling of the Kentucky state yield within a 20 year period (source: USDA data). In 2006, Phil started his own crop management company, Needham Ag Technologies, LLC., where he now works with wheat producers across the US, Mexico, Canada, Russia, Ukraine, England, Sweden, France, Germany, Australia and more recently the United Arab Emirates.

Based upon Phil's experience and research, he firmly believes many producers in Ontario are not taking advantage of the latest wheat management technologies, to help increase wheat yields and profits. Some of these technologies may include:

Improved Soil Testing. Producers need to soil sample regularly, to better understand major and micronutrient levels, plus how their levels change over time. Some of the better farmers Phil works with have sampled every field annually for the last 30 years, documenting yields, nutrient applications and cropping histories, to be better able to make more informed crop input decisions in the future.

Better Seed: High yields always begin with good seed. Growers need to select varieties which have been found to offer a high yield and strong disease resistance package which is appropriate for their soils and management. Phil's larger clients raise at least 4-6 different varieties each year, both to spread the risk and also help understand which ones are most suitable. Seed needs to be well cleaned (ideally with a gravity table) and treated uniformly with a fungicide seed treatment. Professional seed treatment units are preferred, because treating wheat through an auger frequently does not provide uniform standards of coverage. When it comes time to seeding rates, Phil says many producers need to change their thinking. Before intensive wheat management, it was common for Kentucky producers to sow around 2 bushels of wheat per acre, but Phil soon trained his clients to plant by live seeds per square yard. Seed sizes vary too much, so you can't plant seed by lb/ac.

Residue Management: Poor wheat emergence uniformity can frequently be traced back to poor residue distribution with the combine. Heavy streaks of residue result in delayed or uneven emergence, and wheat stands within these areas tend to remain thin all the way to harvest, reducing head counts and final yields. So residue must be distributed uniformly with the combine at harvest time.



Uniform Stands. Phil wants to see a consistent number of plants per square yard emerge, plus he looks for consistent emergence across the field. Even with different soil types and topographies, variations in emergence should be minimal. Plant populations should be calculated soon after emergence, in preparation for making spring nitrogen rate and nitrogen timing decisions. Phil has seen fields in Ontario which had 40-50 plants per yard of row in one area and 20-25 plants per yard of row in another. Upon closer examination, some of these differences were as a result of the drill/air-seeder not metering seed consistently, others were as a result of seeding depth differences or other soil specific differences. While it's not easy to get perfectly consistent stand counts everywhere across the field, big improvements are often required to generate stands capable of producing 100 bu per acre.

Uniform and Timely Nitrogen Application: Most growers need to do a better job scouting their fields and quantifying their stands and tiller populations. Remember, if you can't quantify it, you can't manage it. Many producers still struggle with uniform nitrogen applications, which frequently result in streaked fields and poor standability standards at harvest. Lodging must be avoided, so Phil discourages the use of spinner spreaders unless they have been extensively pattern tested for the product being applied. Phil prefers split applied liquid nitrogen applications in early spring, based upon the health of the crop and the number of tillers. Tiller populations can be manipulated up or down using nitrogen rates and timings, to achieve close to ideal head populations at harvest. Liquid nitrogen can be applied uniformly and accurately with stream bars which almost eliminate leaf scorch, plus it delivers a form of N that's both nitrate and ammonium, providing a staged release.

Monitor Weeds: If any weeds exist before no-till planting, Phil recommends applying a burn-down herbicide. If no weeds are present at that stage, but threshold levels of winter annuals do emerge in the fall, consider applying a post applied herbicide, before the wheat reaches dormancy.

Insects: Scout fields regularly in the fall and early spring for insects, as they can have a direct and indirect impact on yields and profits. Aphids for example can vector barley yellow dwarf, a virus vectored by 3 types of aphid. You have to scout for aphids to determine if thresholds have been reached. Typically Phil uses a threshold of 5 aphids per square foot in the fall to pull the trigger on a fall applied insecticide.

Diseases: A final boost for wheat yields and quality frequently comes from the use of well timed and properly applied foliar fungicides. Regular field scouting and the use of disease forecasting models really help fine tune fungicide decision making. How much payback a grower is likely to receive from a foliar fungicide is obviously determined by variety and the disease you're going after, but Phil has seen 30-50 bu/ac yield responses to a fungicide, plus 5 lb/bu increases in test weight, just from the application of a single fungicide within a heavy disease pressure environment. Producers will also need to invest in a set of nozzles specifically designed to apply foliar fungicides. Such nozzles should ideally deliver droplets within the 300-350 micron range, which help achieve good standards of canopy penetration and coverage. If producers are targeting fusarium head blight (scab), then a well timed application of a foliar fungicide using forward/backward angled nozzles is recommended to achieve maximum coverage and disease suppression.

Fine Tuning: Raising 100 + bu/ac wheat yields doesn't always mean an increase in production costs, in fact some producers can increase their yields while holding their inputs at previous levels. It simply depends where the weak links exist within the management system, for example many producers have 2-3 obvious yield limiting factors such as poor stand uniformity, poor nitrogen distribution standards or poor timing. These weak links don't cost much to improve, if anything.

Other growers may have about 10 smaller yield reducing factors, which if eliminated can provide a significant yield advantage, so growers need to start out by closely monitoring their fields to determine which weak links exist, then try to improve or eliminate them.

Building High Wheat Yield Potential - Common Weak Links

Seed Quality:
- High Yielding Varieties, adapted to your soils and management
- Tested for germination % and vigor (preferably cold-germ)
- Ideally the wheat seed will be cleaned with a gravity table
- Seed should be uniformly treated with a seed treatment fungicide, if growers intend to plant wheat early, then a seed treatment insecticide is a good investment.

Seeding:
- Planted within the ideal planting date window
- Drill/Seeder should be calibrated to deliver the correct population of seeds per acre (based on soil conditions and date).
- Planted to a consistent depth, ideally in narrow rows

Soil Fertility:
- Soil test every year to build a history of nutrient levels
- Record nutrient applications, crop yields and ideally yield maps to help formulate a sound future fertility program.
- Adjust fertility by field, or preferably regions within fields using variable rate, based on nutrient levels and expected yield potential.
- Apply all nutrients accurately, preferably using air-trucks or liquid fertilizers (spinning disc spreaders are only recommended if each product is product is properly pattern tested that season.

Uniformity:
- Uniform residue distribution at harvest is the foundation to uniform emergence of the following crop/crops.
- Uniform seeding depth is essential for high yields, so properly adjusted, maintained and ballasted drills or air-seeders are essential.

Scouting:
- Regular scouting, looking for insects, weeds and diseases early, to make sound recommendations based on thresholds.
- If you can't scout your fields regularly, find someone that can. A qualified and experienced crop consultant is a good investment.
- Stand counts are essential, if you can quantify it, you can manage it. Also, look for standards of uniformity within fields.
- Adequate sprayer, seeding equipment and combine capacity is required to conduct field operations in a timely fashion.