By Phil Needham

Eliminate the Weak Links

Phil Needham
writes from Calhoun, Ky.

Boosting yields doesn't necessarily require a significant financial investment. More often than not, the difference lies in addressing the weak links in the system.

For example, some producers might be dealing with poor stand uniformity, nitrogen distribution and timing—none of which usually requires much (if any) money to remedy. Sometimes, though, weak links aren't as obvious. In this case, it might help to hire a local agronomist who can compare your fields and yields to surrounding operations and help isolate and eliminate the weak links holding back yields.

The following are six of the most common weak links that exist in wheat fields.

Soil and tissue testing. The farmers I work with who achieve the highest and most consistent yields are the ones who understand fertility levels field by field and how those levels have changed over time.

If possible, I split larger fields into smaller segments, preferably 20 acres or less, for more accurate results. Sampling by soil type, topography or yield zone is an even better strategy, especially when using smaller management zones to pinpoint specific soil fertility problems and opportunities for variable rate fertilizer application. Tissue tests are another good tool, which help ground-truth soil tests and better identify transient nutrient deficiencies. I use tissue test results to compare healthier regions of a field to areas with lower standards of plant health and find the differences between the two are more important than the actual values.

Fertility management. Regardless of whether wheat prices are low or high, you can't allow fertility to limit yields. Sound and balanced fertility are both important for high yields, so once sound soil test results are gathered, carefully determine fertility requirements per field or region. We know how much of each nutrient is required per bushel of yield, so be realistic with yield goals and fertilizer applications.

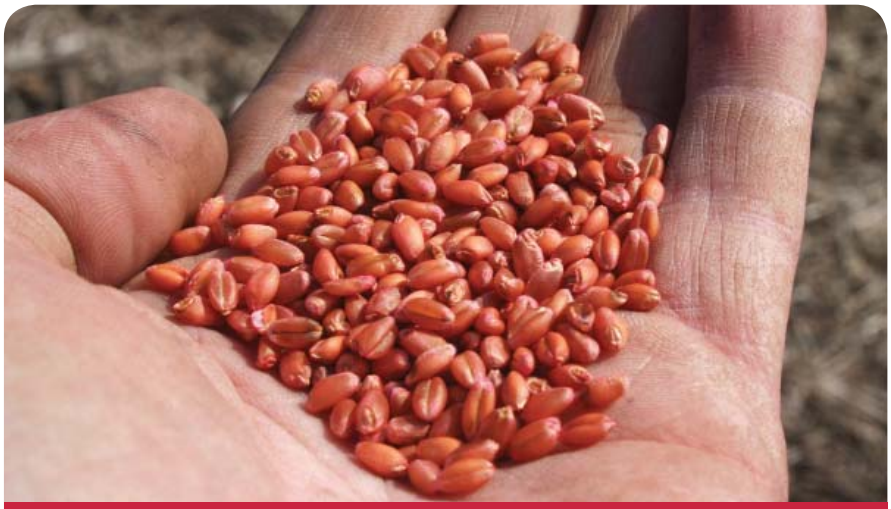
While soil tests represent most major nutrients well, they aren't necessarily accurate with most micronutrients. That's where tissue tests help stream line your nutrient application decisions, especially in regard to micronutrients such as zinc.

Once growers make the transition from conventional or minimum till to no-till, they often find that certain nutrients that were not historically limiting might become so. These nutrients often include nitrogen (N), phosphorus (P) and sulphur (S). No-till is encouraged to boost soil quality and equipment efficiency, plus reduce costs per acre, but few soil tests make fertility adjustments for the cooler soils within a no-till system. Therefore, higher nutrient levels are often required in the first three to five years of a no-till system.

Most of my clients apply a small amount of N at seeding, along with P in the row to boost early plant uptake, which is important when no-tilling into low fertility fields or planting later in the season into cool soils.

Seed quality. When selecting genetics for your fields, carefully compare what each variety brings to the table. First look for varieties with good straw strength that can stand up with higher N rates.

Next look for varieties that consistently yield within the top 10% to 20%. It's best to spread risk by selecting a range of varieties with different maturities and good disease resistance. Be sure all seeds are uniformly



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Choose seed varieties that are uniformly treated with a fungicide to protect against early season root, shoot and leaf diseases.

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treated with a fungicide; any seeds without treatment will be unprotected from early season root, shoot and leaf diseases. Insecticide seed treatments are gain in popularity too, especially in areas that see early-season aphid or wireworm pressure on a regular basis.

Stand uniformity. Like most projects, a successful finish begins with a solid foundation. However, some growers stumble at the starting gate by not establishing a uniform wheat stand that is able to capture all available sunlight, moisture and nutrients.

The only way that we can determine the standard of emergence uniformity for each field is to conduct plant counts per yard of row when plants have fully emerged and again later in the growing season to determine if any plants were lost. Depending on the production region and planting date, we generally look for 200 to 300 emerged wheat plants per square yard (22 to 33 per square foot).

When conducting stand counts, it's also a good time to evaluate plant spacing and seeding depth consistency across different soils types. Don't forget to compare plant development while you're at it. Every plant should emerge consistently and ideally be a carbon copy of the next to achieve maximum yields.

Postapplied spring nitrogen. Many growers can do a better job of scouting their fields, quantifying their stands and applying N according to tiller density and plant health. Of all the nutrients, N most frequently provides the greatest return on investment.

As expensive as this nutrient is, though, some producers still struggle with uniform application. Poor distribution across a field often results in streaked fields, poor standability at harvest and reduced yields. I prefer air trucks for dry fertilizer and strongly discourage using spinning disc fertilizer spreaders unless they have been pattern tested for the product being applied. Even then subtle differences in slope, side winds or product quality can change the distribution characteristics and reduce yields.

I recommend splitting N applications in early spring in most environments, based on the health of the crop and the number of tillers. Tiller populations can be manipulated using N rates and timings to achieve 500 to 600 good heads per square yard at harvest. Sprayers equipped with auto-steer and boom control systems to minimize overlap accurately apply liquid N. The addition of stream bars that uniformly dribble N down into the crop basically eliminate leaf scorch and deliver N in the nitrate and ammonium forms. This combination helps reduce losses while providing part of the N in a readily available form, with the balance becoming available seven to 10 days later.

Disease control. The crop has been established with a uniform stand and fertilizer management, a final push can be achieved with one or more well-timed and properly applied foliar fungicides. Regular field scouting, a good understanding of each varieties specific susceptibility ratings and perhaps the use of disease forecasting models can help make the best product and timing decisions.

Research suggests that 70% of the total wheat yield comes from maintaining a clean grain head and flag leaf, but that still leaves 30%. To bridge that gap, early-season fungicides can help maintain healthy lower leaves until later fungicide applications are made to protect the flag leaf and grain heads.

Payback from a foliar fungicide is obviously determined by the variety and the disease you're targeting, but I have seen as much as a 30 bu. to 50 bu. per acre yield responses to well-timed, late season foliar fungicide, especially in a higher N rate environment.

Some producers still use flat-fan or air-induction nozzles to apply their late-season fungicides. In most cases, producers would profit from investing in forward and rearward orientated nozzles, which have been found to double coverage standards on the upper leaves and grain heads. These nozzles should ideally deliver droplets within the 300 to 350 micron range to help achieve a balance of canopy penetration and coverage, which is especially important if targeting diseases such as fusarium head scab.

Each link in the yield chain increases the opportunity for higher returns.

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Nitrogen is often the most cost-effective element applied to a wheat crop. Do everything in your power to accurately apply the nutrient.

Mail questions to Phil Needham, Farm Journal, P.O. Box 958, Mexico, MO 65265 or e-mail *wheatcollege@farmjournal.com.* Questions will be answered on this page. Individual replies are not possible. The information provided here is not considered a replacement for personalized agronomic consulting.