North Central Ohio Agronomy Report
Erie Basin Extension Education & Research Area
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THE OHIO STATE UNIVERSITY EXTENSION

INSIDE THIS ISSUE

Dear Agricultural Producer:

Fall harvest continues to move along at an unprecendented rate. Some are finished; others will wrap up harvesst within the next ten to fourteen days. Grain moisture levels continue to contribute to a rapid harvest. Winter wheat has received enough moisture to support germination and early growth has been good. Excellent fall weather should contribute to good tiller development in wheat.

Fall tillage and field operations are in full gear in many farm communities. With the high yields that many have experienced and the high price of fertilizer products, soil testing should be a high priority prior to final decisions about fertilizer applications are made. The early end to harvest and the nice fall weather affords an unusual opportunity to get caught up on soil testing.

Best wishes for a safe wrap up of harvest.

Sincerely,

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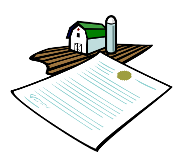

Helpful Links:
http://licking.osu.edu
http://www.ipm.iastate.edu
http://agcrops.osu.edu
http://fcn.agronomy.psu.edu
http://precisionag.osu.edu
http://www.ipm.uiuc.edu
http://www.oardc.ohio-state.edu/ohiofieldcropdisease
http://www.entm.purdue.edu/Entomology/ext/targets/newslett.htm

Soil Testing for Soybean Cyst Nematode

Dennis Mills, Plant Pathology, Program Specialist
Ohio State University Extension - OARDC

Harvesting corn and soybeans may be the only thing on the minds of Ohio growers at the moment, but they shouldn't overlook the importance of soil testing for soybean cyst nematode.

Soil sampling in the fall is the first step to a soybean cyst nematode management program and the best way to prevent potential yield losses from the pest the following growing season, said Ohio State University Extension program specialist Dennis Mills.

"The best way to manage SCN is to know which fields have nematodes and how many nematodes are present," said Mills, who also has an appointment with the Ohio Agricultural and Research Development Center. "Sampling in the fall will give an estimation of the population level on which to base management decisions for planting next spring."

Mills said soil sampling is inexpensive, quick and easy, and is an accurate representation of any SCN activity in a grower's field. In order to prepare a soil sample, growers should follow these guidelines:

•Use a 1-inch diameter soil probe to collect soil samples (6-8 inches in depth).

•Following a zigzag pattern, collect 10-20 soil cores per 10-20 acres.

•Collect cores from areas of similar soil type and crop history.

•Dump cores from each 10- to 20-acre area into a bucket or tub and mix thoroughly.

•Place 1 pint (2 cups) of mixed soil in a soil sample bag or plastic zippered bag and label with a permanent marker.

•Store sample in cool, dark place until shipping.

•Send the composite sample to a lab doing SCN analysis, such as the C. Wayne Ellett Plant and Pest Diagnostic Clinic (http://ppdc.osu.edu).

Mills said that growers should take great care when preparing soil samples. Several environmental and biological factors exist that can cause variability of SCN populations and yield inaccurate sampling results. Such factors include SCN population patterns, soil structure, cropping history, timing of egg hatch, survival tactics, tillage, and the presence of alternate hosts.

Yield loss threshold of SCN in Ohio begins at 200 eggs per cup of soil. At 2,000 eggs per cup of soil, most susceptible soybean varieties suffer significant economic losses. At 5,000 eggs per cup of soil, growers should avoid growing soybean varieties altogether, even resistant varieties.

"The take-home management message is rotation, rotation, rotation," said Mills. "It's the most effective way of controlling SCN."

Currently, SCN is present in the majority of Ohio counties. Once infestation takes hold, it's almost impossible to rid the pest from a soybean field without intensive management practices.

Deemed the "silent robber of yields," SCN is the No. 2 soybean pest in Ohio, behind Phytophthora sojae, which causes Phytophthora root rot. Soybean cyst nematodes feed on the roots of young plants, which prevents the roots from taking up vital nutrients. The result is a drop in yields and subsequent economic losses.

For more information on SCN management, refer to the Ohio State University Extension fact sheet, "Soybean Cyst Nematode," at http://www.oardc.ohio-state.edu/ohiofieldcropdisease/soybeans/AC_39_08.pdf .

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Fall Tillage Often Expensive Entertainment

Tony Vyn, Professor of Agronomy
Purdue University

Farmers with extra time on their hands following a swift harvest should think twice before tilling more crop fields this fall, said a Purdue University agronomist.

As much as they might want to turn over black earth during what has mostly been a dry, sunny autumn, producers could find late-season tillage offers few benefits for the 2011 crop year, said Tony Vyn.

"Whenever you do recreational tillage, it is expensive entertainment," said Vyn, a cropping systems specialist.

Except in certain situations, the potential negatives of fall tillage outnumber the positives, Vyn said. The downsides include a greater vulnerability to soil erosion, little to no crop yield improvement the following year and added expense.

"Substantially enhanced erosion susceptibility has a long-term cost," Vyn said. "In the short term, with the combination of fuel prices, equipment costs and other expenses, a producer really has to analyze whether a tillage operation will contribute something positive to the bottom line of corn and soybean production on a given field."

Purdue research indicates it does not. Studies conducted since 1975 on dark prairie soil near West Lafayette show that chisel and moldboard plowing provides no substantive yield advantage for corn following soybeans when compared with no-till systems.

Researchers recorded average yields for corn following soybeans from 2000 to 2009 after fall chisel plowing of 204 bushels per acre. Yields following fall moldboard plowing averaged 202 bushels an acre, while untilled ground yielded an average of 201 bushels of corn per acre. Purdue researchers also recorded small yield differences for corn following soybeans this year, Vyn said.

There also is little rationale for fall tillage on fields being planted to soybean the next year, Vyn said. Between 60 percent and 70 percent of soybean acreage in Indiana each year is already grown in a no-till system.

Fall tillage might make sense in a few cases where corn follows soybeans, Vyn said.

"About the only justification you can make for tillage when corn follows soybeans is if it enables an earlier planting opportunity on poorly drained fields," he said. "If you need to do some tillage in order to have the soil warm up or dry out faster, you need to ask yourself, 'What is the minimum amount of tillage that I need to do on that field, with the residue and drainage situation I've got?' Some of the minimum tillage systems that might accomplish that goal with lower cost and less incorporation of protective residue cover include strip tillage and shallow vertical tillage."

For corn following corn, fall tillage can noticeably increase yields in fields with medium- or fine-textured soil, Vyn said.

"It doesn't need to be very intensive tillage or tillage that goes down to depths of 12-13 inches," he said. "It can be as simple as a single pass of strip tillage, where it reaches a depth of 8 or 9 inches and forms berms between corn rows from this year so that it enables a stale seedbed planting system next spring."

The average yield benefit for corn following corn from fall tillage compared with no-till has been tracked at 22 bushels per acre from moldboard plowing and 17 bushels an acre from chisel plowing, in 2000-2009 Purdue research. There was almost no yield difference between tilled and untilled continuous corn acres in this year's results.

"There was, however, a huge yield reduction - about 35 bushels per acre - for planting corn after corn instead of soybean," Vyn said.

For additional observations on fall tillage, read, "Fall Tillage Decisions in 2010," which appears in the Purdue Pest & Crop Newsletter. The newsletter is available online at http://extension.entm.purdue.edu/pestcrop/2010/issue25/index.html .

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Are Super Weeds an Outgrowth of USDA Biotech Policy

Bill Curran, Weed Science, Crop Management Extension Group (CMEG)
Penn State University

This past summer, Dr. David Mortensen, professor of weed ecology at Penn State provided testimony to the Domestic Policy Subcommittee under the Committee on Oversight and Government Reform in a hearing that is evaluating USDA biotechnology regulatory policy, with particular respect to genetically engineered (GE), herbicide resistant crops and the environmental impact of the evolution of herbicide resistant weeds. This was the first of several sessions focused on this issue. At the first hearing, in addition to Dr. Mortensen, Mr. Troy Roush, a farmer from Indiana that grows non GMO crops, Dr. Mike Owen, Professor of Agronomy at Iowa State University, Dr. Stephen Weller, Professor of Horticulture at Purdue University and Mr. Andrew Kimbrell, Executive Director of the Center for Food Safety also provided testimony. Much of the testimony focused on Roundup Ready crops and the concern for glyphosate resistant weeds. Dr. Mortensen reported that during the period since the introduction of glyphosate resistant crops, the number of weedy plant species that have evolved resistance to glyphosate has increased dramatically, from zero in 1995 to 19 in June of 2010. The role of federal regulation in forestalling the further development of herbicide resistant weeds was part of the discussion and opinions certainly varied within the group, although all witnesses agreed that the problem is significant and some action is necessary. The prospects for future regulations are always controversial, but we also know that voluntary adoption of good stewardship practices may not be sufficient, particularly when time is limited. **I am personally not convinced that additional educational efforts is all that is necessary to stop the evolution of herbicide resistance.**

Dr. Mortensen suggested the following list of steps that could significantly improve the sustainability of weed management practices in American agriculture:

- The U.S. Environmental Protection Agency (EPA) and APHIS should require that registration of new herbicide/transgene crop combinations explicitly address herbicide resistance management.
- When a new GE resistance trait allows for an old herbicide to be used in new crops, at new rates, and in novel contexts, EPA and APHIS should work in a coordinated way to insure that a thorough reassessment of the herbicide active ingredient occurs in the context of its expanded and novel use. This reassessment should include explicit consideration of weed resistance and should be regionally relevant and recognize the spatial heterogeneity of fields, farms, and crops produced.
- Limit repeated use of herbicides in ways that select for resistance or that result in increased reliance on greater amounts of herbicide to achieve weed control. In the same way that Bt is regulated at the farm level, it's entirely feasible to consider farm-level herbicide management planning to limit practices that accelerate herbicide resistance.
- Provide environmental market incentives (possibly through the farm bill) to adopt a broader integration of tactics for managing weeds. Increasingly, farmers are adopting cover crops, crop rotations and novel selective methods of cultivation for weed suppression.
- Transgene seed and associated herbicides should be taxed and proceeds used to fund and implement research and education aimed at advancing ecologically based integrated weed management (IWM).

Future sessions on this issue should also be posted on House Oversight Committee website and you can watch a webcast of the hearing and review the submitted documents from each witness at http://oversight.house.gov/index.php?option=com_content&task=view&id=5054&Itemid=31#

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New Weed Identification Resources

Mark Loux, Weed Science, Department of Horticulture and Crop Science
Ohio State University Extension

There is finally a weed identification book with photos that addresses weeds in our area, Weeds of the Midwestern United States and Central Canada. This weed ID book features more than 1,400 full-color photographs and 363 maps, and provides essential information on more than 350 of the most troublesome weedy and invasive plants found in this region. The guide identifies each plant at various stages of its life cycle, and offers useful details about its origin, habitat, morphology, biology, distribution, and toxic properties. The book also includes illustrations of the most common characteristics of plants and terms used to describe them, a key to plant families included in the book, a glossary of frequently used terms, a bibliography, and indexes of scientific and common plant names.

Each species account includes:

- Distribution map and up to four color photographs showing seed, seedling, plant & flower
- Scientific names, common names, and local synonyms of common names
- Vegetative characteristics for seedlings and leaves
- Notes on special identifying characteristics, reproductive characteristics, and toxic properties

We highly recommend the addition of this to your weed ID library. So far, we have found ordering through Amazon.com to be the cheapest way to buy the book, but you should be able to order it through your local bookstore. Current price on Amazon - $29.67.

Michigan State University has developed a smaller weed ID publication, "An IPM Pocket Guide for Weed Identification in Field Crops," which can be handy to carry around. This publication is available from the MSU Bulletin Office as Bulletin E-3081, for $16.00.

Link to the MSU newsletter article on this:
http://www.ipmnews.msu.edu/fieldcrop/fieldcrop/tabid/56/articleType/ArticleView/articleId/2314/New-weed-identification-guide-available.aspx

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Saving Time and Fuel During Fall Tillage

Matthew Digman, Assistant Professor and Machinery Systems Extension Specialist
University of Wisconsin

There are many ways to save fuel in the field this fall: not tilling, choosing a minimum tillage operation over a heavier one, and ensuring your tractor and implement are set up properly.

As with any farm operation, the value of tillage must be weighed against its cost. The first costs to consider are labor, fuel and machinery. These costs are estimated to range from $9 to $19 per acre, depending on the field operation and equipment used [1]. Additionally, tillage can increase costs of subsequent field operations as loose soil reduces tractive efficiency adding further cost to operations such as planting. Finally, some tillage costs are harder to quantify, including the risk of soil erosion and nutrient loss. Conversely, tillage can have many positive impacts on crop production. These impacts can include remediating soil compaction, managing crop residues and providing favorable spring planting conditions.

Tillage is one of the least fuel-efficient field operations. It's estimated that only 20% of the energy in diesel fuel is available at the tractor's drawbar depending on engine and transmission setup [2]. Furthermore, only 2% of that energy is converted into turning the soil. Combining those two efficiencies tells us that only .4% of the energy in diesel fuel is actually converted into breaking up the ground! Therefore it is important to properly manage your tractor and implement setup to get the most out of tillage operations.

The first step to improving your tractor's efficiency starts before heading out to the field. Proper ballasting and tire pressure are critical to ensure your tractor is efficiently transferring power to your implement. First, start with ballast (weight). Over-ballasting a tractor increases rolling resistance, drive train wear and soil compaction. Rolling resistance is increased as the tractor sinks into the ground and consequently must use more energy to climb out of its tracks. Under-ballasting leads to excessive tire slip as the tractor struggles to grip the soil. The amount of ballast needed depends on the draft requirement of the field operation, but a general rule is 120, 145 and 180 lb per hp for light (greater than 6 mph), moderate (5-6 mph) and heavy (less than 4 mph) draft loads, respectively for two-wheel drive (2WD) or mechanical-front-wheel-drive tractors (MFWD). This rule of thumb is logical because increased field speed generally means the operation you are conducting requires less weight [4]. Additionally, at higher speeds soil mechanical properties can withstand only so much force before giving way, leading to wheel slip.

The second part of ballasting is to have the weight distributed on the tractor properly. Each tractor design (2WD, MFWD, FWD) and implement hitch point (mounted, semi-mounted, towed) requires a different weight split between the front and rear axle. Your tractor's operator's manual will provide the split needed to get the most out of your setup [4].

After the tractor is completely ballasted and hooked up, it's time to check tire pressures. Lower pressures can increase tractive efficiency but can also lower the load rating of the tire. Follow the load and inflation tables provided by your tire manufacturer to ensure you meet their specifications. If you're considering running on the minimum pressure, weigh each axle and divide by the number of tires to be sure the actual weight per tire is what you expect.

Wheel slip is a good measure of how well your tractor is set up for tillage conditions. Optimal wheel slip ranges from 10 to 15% depending on soil conditions [5]. The optimal slip is on the low end of that range for firm soils and higher for tilled and sandy soils. For a quick check in the field, observe that a properly-ballasted tractor will show deformation in the center of the lug track.

Fuel can be also conserved by matching the power output of the tractor's engine to the power needed by the tillage operation. This is known as the "gear up throttle down" practice [3]. The idea is to select the gear and throttle position that will load the engine sufficiently while maintaining the desired speed for the field operation. This technique is useful where the implement doesn't demand too much power from the tractor, such as disking or situations where the tillage tool is undersized for the tractor. One must take care not to overload the engine when practicing this technique. Most diesel engines can operate efficiently at 20 to 30% of their rated engine RPM, but consult the operator's manual for your specific machine. Black smoke and poor engine response to changes in throttle position are common signs of an overloaded engine.

The final strategy for conserving fuel is to minimize overlapping passes. Strategies for minimizing overlap can range from taking breaks so that you can be more attentive as an operator or employing a guidance (e.g., lightbar, automatic steering) system.

I hope these strategies, (1) only till when necessary, (2) optimize ballast and tire pressure, (3) gear-up throttle down, and (4) stop covering the same ground, can save you time and fuel this fall!

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Hybrid Selection: Where's the Beef?

R.L. (Bob) Nielsen, Agronomy Department
Purdue University

I can remember the excitement as a kid when the first Christmas mail-order catalogs would arrive in the mail from Sears, JC Penney, or Montgomery Ward. I think some of that excitement lingers today when the seed corn company sales literature arrives in the mail or when I attend a seed company field day in late August or early September and listen to the enthusiastic sales pitches. All the hopes of a record, bin-busting crop for next year are represented in those glossy multi-color pages that extol the virtues of the latest and greatest hybrids with every imaginable biotech trait that promise to beat last year's hybrid performance by 20 or more bushels per acre.

The reality of hybrid selection today is that pressure to place seed orders comes earlier and earlier than ever before. In the "old days", a guy would wait until January or February to place a seed order. By then, you would have had the time to peruse yield reports from your local land-grant university variety trials or those from the seed companies to identify the hybrids you wanted to purchase. Today, more and more sales pressure occurs before the current year's variety trials have even been harvested. What's a guy to do?

Documented consistency in yield performance is still the key to success in selecting hybrids that will perform well in your farming operation. Sales pitches at field days or in farm magazine advertisements should serve only to heighten your awareness of seed companies, their hybrid traits, or specific hybrids and should NOT take the place of meaningful yield data from well-designed hybrid performance trials.

When you are pressured to choose this hybrid or that one because the sales rep assures you it will perform well, don't hesitate to ask for the performance data that backs up the recommendation. Be like the little old lady in the 1984 Wendy's™ hamburger TV commercial who demands to know "Where's the beef?".

Before you lock next year's hybrid choices in place, take the time to peruse the results of variety trials from the previous year. Except for the newest of hybrids, performance data from the previous year are useful for identifying consistent performers for your operation next year.

How do you identify consistent performers that will likely perform well for you? The secret lies in looking for trials that evaluate hybrids over multiple locations. Multiple testing locations in a single year represent possible weather patterns your farm may encounter in the future. Weather variability influences hybrid performance more than any other variable, because

weather interacts with most of the other yield limiting factors. If a hybrid performs consistently well over many sites (i.e., weather patterns), then it will likely perform well on your farm in the future.

(Please, re-read the last paragraph. It is the most important message in this article!)
Do not allow yourself to be distracted by the maze of "flavors" of transgenic (biotech) traits available in the marketplace today. If a sales rep tells you that the latest, greatest "flavor" of a transgenic trait package is the next best thing to sliced bread, demand that he / she show you the evidence that it is CONSISTENTLY superior to other available hybrids. In other words, "Where's the beef?"

Most university hybrid performance programs evaluate hybrids over multiple locations plus multiple years within select maturity zones. Several third-party testing groups also evaluate hybrids over multiple sites. Seed companies obviously evaluate hybrids over hundreds if not thousands of sites each year. Seek out summaries over many locations and avoid concentrating on single site results. Online links to some of these testing programs are listed below.

For multiple site trials where the data have been statistically analyzed, consistent performers are mostly likely found within the upper group of similar-yielding hybrids as determined by a trial's L.S.D. value. For multiple site trials for which statistical analysis of the data has not been performed, you can identify consistent performers by evaluating hybrid performance relative to the average yield of the trial or relative to the maximum yielding hybrid in a trial.

For example, look for those hybrids that consistently yield 5% above the average yield of trials in which they are entered. If the trial average yield is 180 bpa, look for hybrids yielding 189 bpa or greater (180 x 1.05).

Another way to look for consistent performers is to identify hybrids that consistently yield at least 90% of the maximum yielding hybrid in a trial. If the highest yield in a trial is 225 bpa, look for hybrids that yield 203 bpa or greater (225 x 0.90).

Remember, the key factor in choosing one or more hybrids for your farming operation next year is their documented performance against a range of competitors, not simply specific head-to-head comparisons. Once you have identified a group of otherwise consistent high-yielding hybrids, further filter them for traits important to your situation. For example, corn following corn demands hybrids with superior resistance to important foliar diseases such as gray leaf spot or northern corn leaf blight.

Variety Testing Programs

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Pressured to Place that Corn Seed Order? Remember the Basics

Joe Lauer, Corn Agronomist
University of Wisconsin

This time of year growers are under a lot of pressure to buy seed. Seed salesmen pursue seed commitments through volume pricing and early purchase incentives often before the current year's yield trial results are available. Growers often respond by putting a "hold" on seed orders, but not committing to specific hybrids until yield results are published. This time of year is difficult because seed salesman must balance supply with demand.

Do not be "sold" hybrids through commercial advertising (radio, TV, magazines, and newspapers), sales literature, sales pitches from seed dealers, testimonials, or simply because it is "cheap" or "new" or "transgenic" or "available" or "different." **Choose hybrids wisely by using comparative yield performance data.** Remember the basic principles of hybrid selection:

1. Use multi-location averages to compare hybrids
2. Evaluate consistency of performance
3. Buy the traits you need
4. Every hybrid must stand on it own
5. Pay attention to seed costs

Use multi-location averages to compare hybrids: Use multi-location information to evaluate grain yield, grain moisture, and standability. Today, most universities compile hybrid yield data over multiple locations. They do this by testing the same set of hybrids at numerous locations. Begin with trials that are nearest to you. Compare hybrids with similar maturities (harvest grain moisture) usually within about a 2% range in grain moisture. To ensure genetic diversity on your farm, divide the trials into two or three groups based upon grain moisture.

Consider single location results (even if the trial was conducted on your farm) with extreme caution. Use single location information (your own on-farm trial) to evaluate test weight, dry-down rate, grain quality and ease of combine-shelling or picking. The way you approach the hybrid selection decision, e.g. single-location versus multiple-locations, makes all of the difference in subsequent profitability. For more information regarding selection strategies and predicted yield increase (see http://corn.agronomy.wisc.edu/AA/A012.aspx). There are many possible sources of comparative yield performance data including strip-trials (seed company and independent) and replicated-trials (F.I.R.S.T. and university). Each source of data has it's own strengths and weaknesses.

What criteria should you select for? In Wisconsin the two major uses of corn are grain and silage. There has been enough breeding progress, especially in corn silage, that the criteria for grain versus silage are different. The most important consideration regardless of use is yield. For grain, moisture at harvest can often mean the difference between profit and loss in the northern Corn Belt. For corn silage hybrids, large differences exist for quality parameters such as starch content and NDFD.

Criteria for Grain Hybrids	Criteria for Silage Hybrids
Grain yield	Forage yield
Grain moisture	Forage quality (i.e. Starch content, NDFD, and NDF)
Plant lodging	Insect resistance
Insect resistance	Disease resistance
Disease resistance	Plant lodging
Grain quality (i.e. Test weight, kernel breakage susceptibility)	Forage moisture
Other factors	Other factors

Evaluate consistency of performance: Look for hybrids that yield consistently across a diverse set of conditions. Be wary of any hybrids that finish in the bottom half of any trial. Seed companies benefit greatly from all those on-farm trials that farmers participate in (numerous weather patterns and pest situations per year). So if you concentrate on your on farm results (or the local area results), you miss out on the benefits of all the testing that goes on nationally. Corn breeders define hybrids as "stable" when they have a minimum of interaction with environments. Most hybrids are stable, but a few get reputations as "racehorse" or "workhorse" hybrids. These are difficult to characterize because it takes numerous environments to determine.

Buy the traits you need: Remember that transgenic "traits do not increase yield, they protect yield." There are pros (safety, efficacy, and insurance discounts) and cons (expense and resistance potential) to using transgenic traits. Wisconsin is fortunate in that our landscape often includes alfalfa and pasture as part of our crop rotations. We can use these crops to help control pest outbreaks and slow development of resistance to transgenic events. Unfortunately up to this time, it was often difficult to buy the specific traits that you need. However, this is changing and in the near future there will be more opportunity to purchase specific traits.

Every hybrid must stand on its own: Every hybrid must "stand on its own" for performance. You don't know what weather conditions (rainfall, temperature) will be like next year. Just because it is transgenic and you pay extra for traits does not mean it will be high performing. We see transgenic hybrids ranked at the top and bottom of a hybrid trial. Therefore, the most reliable way to predict hybrid performance next year on your farm is to consider past performance of individual hybrids over a wide range of locations and climatic conditions. We see large difference among hybrids within a family (see Table 5 of http://corn.agronomy.wisc.edu/AA/A060.aspx).

Pay attention to seed price: A major change in extension recommendations has occurred recently due to corn seed costs that have dramatically increased. It is not unheard of for seed of high-performing premium hybrids with transgenic traits to cost over $250 per bag, whereas 10 years ago, premium seed would cost about $80-$100. It is important to compare the "difference" between any two hybrids. A price that is different by more than $50-$100 per bag must be carefully considered because it is difficult to make up the bag price difference with increased yield.
For a further discussion of this principle, please see http://corn.agronomy.wisc.edu/AA/pdfs/A073.pdf.
Also a seed cost calculator is available at http://corn.agronomy.wisc.edu/Season/DSS.aspx.

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Missouri Soybean Yield Record Broken Again

Chad Lee, Extension Agronomist
University of Kentucky Extension

The Missouri Soybean Association announced that Kip Cullers has broken the record again with a soybean yield of 160.6 bu/acre in the 2010 Missouri Soybean Yield and Quality Contest. To make this valid entry, Kip had to harvest at least two (2) acres and then harvest a re-check of at least (2) acres. This contest field had to be in a field of at least 10 acres in size. A person approved by the Missouri Soybean Association monitored both the check and re-check.

Kip is no stranger to winning the Missouri Soybean Yield and Quality Contest, having recorded yields near 155 and 139 bu/acre in 2006 and 2008, respectively. He is a very intelligent producer and really works hard at finding ways to boost yields.

There is no doubt that each producer reading this is curious as to just how Kip is doing this. What are his production secrets? There is no doubt that if I worked for a company with a product that was used in Kip's fields, I would advertise it like crazy this fall and winter. Since I work for the university, let me caution against getting extremely excited about any one product by itself. As Kip says, there is no silver bullet to high yields.

Kip is employing a very unique system in his operation. It is that overall system that is generating phenomenal yields. Weather is a major player as well. Kip isn't getting these record-breaking yields every year and weather is a major factor in that.

So, as you look at some of the products used on Kip's fields, remember that these products are being used in a very unique system. . . your challenge and mine is to determine what components of his management system might apply to a non-irrigated Huntington, Pembroke or Crider soil in Kentucky.

I am sure there will be more to come on this topic as the fall and winter sales season unfolds.
Click here to see the original press release from the Missouri Soybean Board.
Click here to see the Missouri Soybean Yield and Quality Contest rules.

Bt Corn Benefits to Farmers, Including non-Bt Corn Farmers

Chad Lee, Extension Agronomist
University of Kentucky Extension

Researchers just published an article on the impact of Bt-corn in the corn belt in the October 8, 2010 edition of Science. They specifically examined Bt-corn with resistance to European (and Southwestern) corn borer. By examining insect counts in Bt and non-Bt fields along with production statistics, etc. the authors concluded that the benefits for using the Bt-corn was $6.9 billion to growers in Illinois, Minnesota, Wisconsin, Nebraska and Iowa over 14 years. Of that total, they estimated that $4.3 billion was for growers with non-Bt corn hybrids.

The benefits come with reduced European corn borer populations in Bt corn fields as well as nearby non-Bt corn fields. For example, in Minnesota, when only 40% of the corn acres were planted to Bt corn, European corn borer larvae declined by 73% over all corn acres. After calculating the estimated reductions in European corn borer larva, the authors also included the estimated yield losses from corn borer damage and the resulting yield increases from reducing the corn borer populations. The authors also included the difference in seed costs between Bt and non-Bt corn hybrids. A larger share of the economic benefit goes to growers of non-Bt corn because they are paying less for seed, but reaping similar benefits to their neighbors who raise Bt corn.

The authors did not include the cost of spraying an insecticide on non-Bt corn when corn borer populations warrant such an application. Once the cost of spraying an insecticide is considered, the economic benefits of Bt corn with corn borer resistance might be even higher to the producer.

The original article in Science is titled: Areawide Suppression of European Corn Borer with Bt Maize Reaps Savings to Non-Bt Maize Growers.

Another summary of the article can be found at: http://www.usnews.com/science/articles/2010/10/12/new-study-shows-benefits-of-bt-corn-to-farmers.html

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Weight of Soybeans Equal to One Bushel at Standard Moisture

Howard Siegrist, Extension Educator
Ohio State University Extension

Moisture (%)	Weight (lbs/bu)
8	56.74
9	57.36
10	58
12	59.32
13	60

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Aboveground Crop Nutrient Content and Nutrient Removal in Harvested Portion

Corn & Soybean Field Guide
Purdue University Extension

Weight per Unit of Production	Aboveground Nutrient Content[1]			Crop Removal in Harvested Portion		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Corn Grain (lbs./bu.)	1.33	0.57	1.33	0.75	0.37	0.27
Corn Silage (lbs./ton wet)				8.30	3.30	8.00
Soybeans (lbs./bu.)	5.40	1.07	2.37	4.00	0.80	1.40
Wheat (lbs./bu.)	1.88	0.68	2.03	1.50	0.63	0.37
Alfalfa (lbs./ton)	56	15	60	56	13	50
Grain Sorghum (lbs./cwt.)	1.37	0.59	1.91	0.84	0.39	0.39

[1] These values multiplied by yield = total amount of nutrients. Fertilizer recommendations may be higher or lower than crop uptake or removal depending on the soil nutrient contribution and the efficiency of fertilizer nutrient utilization.

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Soil pH Recommended for Various Crops on Various Soils

Corn, Soybean, Wheat, and Alfalfa Field Guide
Ohio State University Extension

Crop	Mineral soils with subsoil pH > pH 6	Mineral soils with subsoil pH < pH 6	Organic soils
	pH		
Alfalfa	6.5	6.8	5.3
Other forage legumes	6.0	6.8[1]	5.3
Corn	6.0	6.5	5.3
Soybeans	6.0	6.5	5.3
Small grains	6.0	6.5	5.3
Other crops	6.0	6.5	5.3

[1] Birdsfoot trefoil should be limed to pH 6.0.

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Desired pH Levels

Corn, Soybean, Wheat, and Alfalfa Field Guide
Ohio State University Extension

Tons of aglime (Effective Neutralizing Power (ENP) of 2000lbs/ton) needed to raise the soil pH to the desired pH level based on the Shoemaker-McLean-Pratt (SMP) buffer pH and an incorporation depth of 8”. For no-till application, the rate should be divided by 2 (soil samples should only be collected to a depth of 4”).

Buffer pH*	Desired pH levels: Mineral soils 6.8	Mineral soils 6.5	Mineral soils 6.0	Organic soils: Soil pH	Organic soils: 5.3
	tons agricultural limestone/acre			tons/acre	
6.8	0.9	0.8	0.7	5.2	0.0
6.7	1.6	1.4	1.1	5.1	0.5
6.6	2.2	2.0	1.6	5.0	0.8
6.5	2.9	2.5	2.0	4.9	1.3
6.4	3.6	3.1	2.5	4.8	1.7
6.3	4.2	3.6	3.0	4.7	2.1
6.2	4.9	4.2	3.4	4.6	2.5
6.1	5.6	4.7	3.9	4.5	2.9
6.0	6.2	5.3	4.4	4.4	3.3
5.9	6.9	5.9	4.7		

*Lime test index (LTI), which may be reported in place of buffer pH, is buffer pH times 10.

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Critical Soil Test Levels (CL) for Various Agronomic Crops
Corn, Soybean, Wheat, and Alfalfa Field Guide
Ohio State University Extension

Crop	Critical Soil Test Levels				
	P	K at CEC[1]			
		5	10	20	30
	ppm (lb/acre)	ppm (lb/acre)			
Corn	15 (30)[2]	88 (175)	100 (200)	125 (250)	150 (300)
Soybean	15 (30)	88 (175)	100 (200)	125 (250)	150 (300)
Wheat	25 (50)	88 (175)	100 (200)	125 (250)	150 (300)
Alfalfa	25 (50)	88 (175)	100 (200)	125 (250)	150 (300)

1 Critical level for ppm K = 75 + (2.5 x CEC) for all crops
2 Values in parenthesis are lb/acre.

Note: A CEC of 15 is used to calculate the K_2O recommendation for calcareous soils (soils with pH equal to or greater than 7.5 and a calcium saturation of 80% or greater) and organic soils (soils with an organic matter content of 20% or greater or having a scooped density of less than 0.8 grams per cubic centimeter).

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Approximate Fertilizer Nutrient Values of Animal Manure at Time Applied to Land-Solid Handling Systems[a]
Corn, Soybean, Wheat, and Alfalfa Field Guide
Ohio State University Extension

Type of Livestock	Bedding vs No Bedding	Dry Matter (%)	Total N[b]	NH_4[c]	P_2O_5[d]	K_2O[e]
			Nutrient Content (lb/ton)			
Swine	Without Bedding	18	10	6	9	8
	With Bedding	18	8	5	7	7
Beef	Without Bedding[f]	52	21	7	14	23
Cattle	With Bedding	50	21	8	18	26
Dairy	Without Bedding	18	9	4	4	10
Cattle	With Bedding	21	9	5	4	10
Sheep	Without Bedding	28	18	5	11	26
	With Bedding	28	14	5	9	25
Poultry	Without Litter	45	33	26	48	34
	With Litter	75	55	36	45	34
	Deep Pit (compost)	76	68	44	64	45
Turkey	Without Litter	22	27	17	20	17
	With Litter	29	20	13	16	13
Horses	With Bedding	46	14	4	4	14

a Manure spreader capacity: 1 bu = 40-60 lb
b Ammonium N plus organic N, which is slow releasing.
c Ammonium N, which is available to the plant during the growing season.
d To convert to elemental P, multiply by 0.44.
e To convert to elemental K, multiply by 0.83
f Open dirt lot.

Refer to OSU Extension Bulletin 604, Ohio Livestock Manure and Wastewater Management Guide

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Approximate Fertilizer Nutrient Values of Animal Manure at Time Applied to Land-Liquid Handling Systems[a]

Corn, Soybean, Wheat, and Alfalfa Field Guide
Ohio State University Extension

Type of Livestock	Bedding vs No Bedding	Dry Matter	Total N^b	Nutrient Content $NH_4{}^c$	$P_2O_5{}^d$	K_2O^e
		(%)	(lb/1,000 gal)			
Swine	Liquid pit	4	36	26	27	22
	Lagoon	1	4	3	2	4
Beef	Liquid pit[f]	11	40	24	27	34
Cattle	Lagoon	1	4	2	9	5
Dairy	Without Bedding	8	24	12	18	29
Cattle	With Bedding	1	4	2.5	4	5
Veal calf	Without Bedding	3	24	19	25	51
Poultry	Without Litter	13	80	64	36	96

[a] Application conversion factors: 1,000 gal = 4 tons; 27,154 gal = 1 acre-inch

[b] Ammonium N plus organic N, which is slow releasing.

[c] Ammonium N, which is available to the plant during the growing season.

[d] To convert to elemental P, multiply by 0.44.

[e] To convert to elemental K, multiply by 0.83

[f] Includes feedlot runoff water and is sized as follows: single cell lagoon - 2 cu ft/lb animal wt; two-cell lagoon - cell 1, 1-2 cu ft/lb animal wt and cell 2, 1 cu ft/lb animal wt.

Refer to OSU Extension Bulletin 604, Ohio Livestock Manure and Wastewater Management Guide
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Wheat

Ohio State University Extension

Pest	Product Name (Common Name)	Amount per Acre	Pre-Harvest Interval (days)	When to Treat
Aphids	Baythroid * XL (ß-cyfluthrin)	1.8 - 2.4 fl. oz.	30	Of the various aphid species that occur on small grains, only the greenbug causes damage that may warrant rescue treatment. Rescue treatment is warranted if an average of 50 greenbugs is found per linear ft of row on small plants in the fall or 100 per linear ft of row in the spring.
	CruiserMaxx (thiamethoxam) + Cruiser 5FS (thiamethoxam)	5 fl oz./cwt seed+ 0.48 - 1.00 fl. oz./cwt seed (commercial seed treatment)	AP AP	
	Dimethoate (dimethoate)	½ - ¾ pt. 400, 4EC or Dimate 4E 0.75 - 1.13 pt. 2.67	35 35	
	Grizzly Z* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	30	
	Kaiso* 24WG (lambda-cyhalothrin)	1.33 - 2.0 oz	30	
	Lambda* (lambda-cyhalothrin)	1.28 - 1.92 fl. oz.	30	
	Lambda-Cy* EC (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	30	
	LambdaStar* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	30	
	Lambda-T* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	30	
	Lannate* (methomyl)	¼ - ½ lb. SP or ¾ - 1½ pt. LV	7	
	Malathion (malathion)	1½ pt. 5EC or 1 - 1¼ pt. 8-E 1½ - 2 pt. 57 EC	7 7	
	Mustang MAX* (zeta-cypermethrin)	3.20 - 4.0 oz.	14	
	Mystic Z* (lambda-cyhalothrin)	1.92 fl. oz.	30	
	Penncap-M* (methyl parathion)	2 - 3 pt.	15	
	Proaxis* (gamma-cyhalothrin)	3.84 fl. oz.	30	
	Prolex* (gamma-cyhalothrin)	1.02 - 1.54 fl. oz.	30	
	Respect* EC (zeta-cypermethrin)	3.2 - 4 oz.	14	
	Senator 600 FS (imidacloprid)	0.4 - 2.8 fl. oz./cwt seed (commercial seed treatment)	AP	
	Silencer* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	30	
	Taiga* Z (lambda-cyhalothrin)	2.56 - 3.84 fl. oz.	30	
	Tombstone Helios* (cyfluthrin)	1.8 - 2.4 fl. oz.	30	
	Warrior* (lambda-cyhalothrin) Warrior II* (lambda-cyhalothrin)	2.56 - 3.84 fl. oz. 1.28 - 1.92 fl. oz.	30 30	

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