Corn & Soybean News

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Martin-Gatton College of Agriculture, Food and Environment

Grain and Forage Center of Excellence

Grain Storage Expected to be in High Demand

Kentucky grain producers are poised to harvest a considerably larger corn and soybean crop than last year. Combined with the increased wheat crop, the total anticipated production is more than 2022 and even 2021 and sets a new record. Add the negative basis for most grain crops in many areas of the state, and there is considerable pressure on the storage capacity at farms and elevators. Conventional storage bins and silos will be filled soon and alternative structures will likely be needed to handle the extra bushels as harvest continues and producers wait for improved prices in early 2024.

More specifically, the USDA-NASS pre-harvest prediction for this year's corn and soybean crops coupled with the wheat crop will approach 74.6 million more bushels than in 2022 (a 22% increase). Equipment storage buildings, grain bags and covered outdoor piles are some of the more common alternative storage structures that can be used to handle this increased capacity. And as always, it's important to keep a safe and watchful eye on stored grain, especially in alternative structures because the job isn't really done until the grain has passed grade and sold at the elevator, feed mill or distillery.

Grain that is properly dried and cooled, protected from mold and insect pests, and regularly inspected safely should store well with little chance of spoilage, which will help prevent potential price docks at the elevator/buyer. Clean, undamaged grain is best for temporary storage when using less-than-ideal facilities.

Aim for 14% moisture for corn and 12% for soybeans that will be stored through February. If damaged by insects or mold in the field or held through May, reduce moisture levels by 0.5% to 1% to compensate for these conditions. Storage sheds should be thoroughly cleaned before putting grain in them and all short-term use facilities should be filled last and emptied first.

A properly designed aeration system is essential for successful grain storage in buildings and piles

and is the key to maintaining uniform temperatures, which control moisture accumulation and subsequent grain spoilage. Run aeration fans to cool grain below 60 degrees in October and at least once a month in the Fall on bins and flat storage buildings to further cool grain to 50 degrees in November, and 35-40 degrees in December. Fans should be run continuously in covered piles to hold down the cover.

Monitor grain safely and frequently in all systems and look for wildlife, rodent, bird and insect activity in non-conventional structures. Grain in these units are at greater risk for damage due to inherent exposure. Stored grain managers should address any issues quickly with approved pest control methods.

Alternative storage costs vary widely depending on the type of structure, its original condition and holding capacity. A spreadsheet is available on the UK Department of Biosystems and Agricultural Engineering website to estimate the amount of grain these types of structures can hold (https://www.uky.edu/bae/grain-storage-systems/). Simply enter the dimensions of the structure, pile or bag to calculate storage capacity in bushels. For example, to hold 10,000 bushels, you'd need a 30-ft bin with a 16-ft wall; a 40 x 64-ft shed with a 2-ft wall; a 50-ft diameter pile with a 3-ft wall; or a 10-ft by 160-ft grain bag.

The Martin-Gatton College of Agriculture, Food and Environment has recent publications on storing corn, soybeans and wheat (ID-139, ID-249 and ID-125, respectively) that are available on the publications link at www.ca.uky.edu.

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KENTUCKY YIELD CONTESTS

The Kentucky Extension Yield Contests are administered by the University of Kentucky Cooperative Extension Service. Funding for the contest comes from the Cooperative Extension Service, the Kentucky Corn Growers Association, Kentucky Soybean Board, Kentucky Small Grain Growers' Association and numerous Agribusinesses.

To enter click the link and **please read the rules carefully.**

Kentucky Corn Yield Contest Rules

Kentucky Soybean Yield and Quality Contest

A Dry Fall: Let's Do Our Subsoiling (If Needed) Now

We try to avoid soil compaction during field operations, but this is not always possible. Areas that stay wet longer exist in many fields and traffic that doesn't damage the soil in most of a field will cause compaction in these spots. A poorly predicted rainfall can play havoc with plans and necessary traffic (just trying to get done with that field) results in compaction in that last field portion. The crops growing in fields/parts of fields with compaction show symptoms (usually stunting or a nutrient deficiency) and often exhibit patterns in those symptoms which often match one or more traffic events. The wet spring this year contributed to compaction problems. John has corn-nitrogen trials at six locations this year and two of those fields were showing crop stunting patterns related to compaction by mid-season. Fall, especially when dry, is the best time to break up these soils so that compaction does not persist into the next season.

Fall tillage to break up soil compaction, whether subsoiling or chisel plowing, is expensive in time, fuel, and equipment wear and tear. An assessment of both the extent and depth of compaction should be done in order to focus your fall tillage on fields/field areas most in need of this investment. A soil penetrometer (Figure 1a and 1b) is often used to assess compaction, but that tool is best used earlier in the year, when the soil is moist (at field capacity). Currently dry conditions make the penetrometer difficult to use at this time of the year (Schwab et al., 2004). A soil probe, shovel, tile spade or tiling rod can serve the purpose when compaction is rather shallow (upper root zone). Compacted soil will exhibit 'platy' structure, with roots growing laterally (Figure 2a). Wet natured soil field areas (Murdock et al., 1995) containing old/current tillage pans and highly trafficked areas along the sides or ends of the field are more likely to be compacted to a deeper depth and should always be checked. These areas may show a more 'massive' soil structure (Figure 2b). Earlier observations of reduced plant stand, or stunted growth and development, can guide your determination whether better drained, more lightly trafficked field areas need compaction remediation. Generally speaking, fields with the greatest history of tillage should be checked first. These are more likely to become compacted – long term no-till fields have greater soil organic

Figure 1. a) Using a soil penetrometer to determine the depth and degree of soil compaction by b) following the gauge reading as the penetrometer is inserted into the soil.

Figure 2. a) Platy structured topsoil suggests soil compaction and typically limits root exploration. Note the horizontal/lateral root growth. b) Massive structure below surface field compaction due to disc/vertical tillage or excessive traffic.

matter, which contributes to stronger soil structure and greater resistance to compaction events.

The depth of tillage should be 1 to 2 inches below the depth of compaction in order to better lift, shatter and breakup the compacted soil. If the compaction depth is 10 inches or less, a chisel plow is an effective tool. In late 1980's field research (Table 1), the chisel plow was better able to restore soil productivity because the depth of compaction was confined to the upper root zone and chisel shank spacing was narrower (18 inches versus 36 inches for the subsoiler), causing better compaction shat-

	Tillage Timing	
Tillage Implement	**Fall**	**Spring**
	---corn yield (bushels/acre)---	
chisel plow	**163**	**146**
subsoiler	**151**	**141**

Table 1. Effect of kind and time of tillage on yield of corn grown on a compacted soil (Wells and Catlett, 1990).

ter. Fall tillage operations were better than spring operations (Table 1).

Modern subsoiler shank spacing will vary, but 24 to 36 inches is common (Figure 3a). Modern subsoilers are equipped to deal with no-tillage field management and will leave more crop residues at the surface for erosion protection (Figure 3b). That said, cover cropping after subsoiling will provide additional erosion protection and cover crop root growth will help maintain/preserve the greater soil porosity created by the subsoiling event.

Figure 3.

a) Subsoiler/ripper in operation.
b) Leaving residues after subsoiling/ripping

Summary/Conclusion

Fall tillage, when the soil is dry, is the most effective time to break up compacted soil. Dry soil will not 'fall back into place' – moist soil more easily reforms compacted layers/zones. Fall tillage, especially subsoiling/ripping, will take more power/fuel/black smoke but will result in greater benefit/last longer. That said, fall tillage is not a substitute for avoiding soil compaction in the first place.

References:

Murdock, L., T. Gray, F. Higgins, and K. Wells. 1995. Soil compaction in Kentucky. Univ. Kentucky Co-op. Extn. Svc. Bull. AGR-161.

Schwab, G.J., L.W. Murdock, and L.G. Wells. 2005. Assessing and preventing compaction in Kentucky. Kentucky. Univ. Kentucky Coop. Extn. Svc. Bull. ID-153.

Wells, K.L., and R.V. Catlett. 1990. The effect of fall and spring tillage of a compacted soil on corn and tobacco yields. Soil Sci. News and Views 11 (4). Univ. Kentucky Coop. Extn. Svc., Lexington, KY.

Additional Resources:

Murdock, L.W., D. Call, and J. James. 2008. Compaction, tillage method, and subsoiling effects on crop production. Kentucky. Univ. Kentucky Coop. Extn. Svc. Bull. AGR-197.

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Crop Protection Webinar Series Begins Nov. 2

Beginning Nov. 2, 2023, the University of Kentucky Martin-Gatton College of Agriculture, Food and Environment will present a series of four webinars covering field crop protection. Hosted through the Southern Integrated Pest Management Center, the webinars will feature UK extension pest management specialists discussing plant pathology, weed science and entomology topics.

The one-hour webinars will be held on Thursday mornings in November and will take place via Zoom at 10 a.m. EST/ 9 a.m. CST. Pre-registration is required for each webinar.

"We are excited to work with the Southern Integrated Pest Management Center again to offer these webinars to anyone who wants to learn about the latest University of Kentucky research on grain crop pest management. Information discussed in these webinars will be helpful as farmers and advisors make decisions on what practices to implement in 2024," said Dr. Kiersten Wise, UK extension plant pathologist.

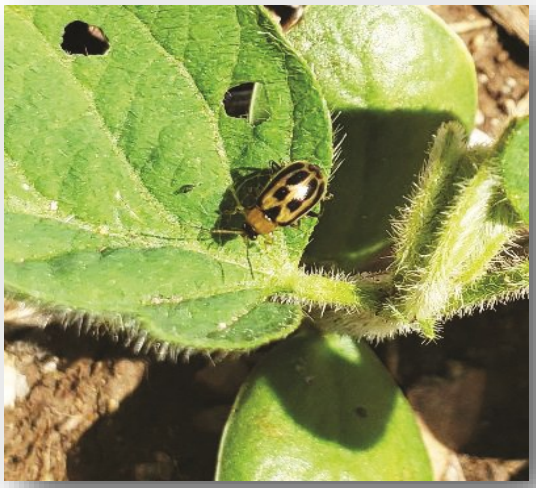

Figure 1. Damage caused by bean leaf beetle to seedlings. (Photo by Raul Villanueva, University of Kentucky Extension Entomologist)

Details and links for pre-registration are as follows:

- **Nov. 2, 2023 - Webinar #1:** ***Do multiple corn fungicide applications pay?*** with Kiersten Wise, extension plant pathologist. Pre-Registration: https://zoom.us/webinar/register/WN_CfQFt0dQSnq5ifdnaSre7A

- **Nov. 9, 2023 - Webinar #2:** ***What have we learned from nearly two decades of research on soybean with foliar fungicides?*** with Carl Bradley, extension plant pathologist. Pre-Registration: https://zoom.us/webinar/register/WN_3SvKPhEDSSWcYhnUnLrvsQ

- **Nov. 16, 2023 - Webinar #3:** ***Managing the offensive spread of weeds*** with Travis Legleiter, extension weed scientist. Pre-Registration: https://zoom.us/webinar/register/WN_SIOzGyibQiOk4A6pTRHGmw

- **Nov. 30, 2023 – Webinar #4**: ***Insects in field crops during two years of partial drought and heat wave*** with Raul Villanueva, extension entomologist. Pre-Registration: https://zoom.us/webinar/register/WN_AqvCh08TQGCAJXvKxqdwFA

The webinars are open to agriculture and natural resource county extension agents, crop consultants, farmers, industry professionals, and others, whether they reside or work in Kentucky or outside the state.

Participants may receive one hour per webinar in continuing education units for Certified Crop Advisers. Kentucky pesticide applicators can receive one continuing education unit in Category 1A (Agricultural Plant) per webinar.

For more information contact Jason Travis, UK agricultural extension associate, at (859) 562-2569 or email jason.travis@uky.edu.

Understanding Crop Management – A Key to Higher Yields

What do we mean when we use the term 'crop management'? Usually it refers to the techniques, processes and practices used to produce our crops. We seldom think deeply about this general term – we are too engrossed in the details of growing the crop to think about the overall process. I think we will all benefit if we spend a little time thinking about exactly what 'crop management' means.

Crop management has two basic objectives: to increase yield or to improve efficiency (produce the same yield with fewer inputs or higher yield with the same inputs). In recent years, a third objective has gained importance – the need to reduce the impact of crop production practices on the environment.

To increase yield, crop management practices are designed to improve the crop's environment (environment includes both the above- and below-ground components of the system) by supplying missing raw materials for crop growth or by removing negative aspects from the crop's environment. We fertilize to supply nutrients, we control weeds to reduce unwanted competition, we irrigate to minimize moisture stress, and we control insect or disease outbreaks. Population and row spacing are adjusted to maximize solar radiation interception. Varieties that are resistant to disease or insects essentially remove negative factors from the crop's environment.

Temperature and solar radiation levels affect yield, but we cannot manipulate them directly. Water also falls into this category when irrigation is not available. We can, however, manipulate planting date and variety maturity to put critical crop growth stages in a more favorable environment. Larger changes require moving production to a more favorable location.

The goal of these practices is to improve the environment the crop is growing in and move it closer to the 'perfect' environment that will maximize yield. The perfect environment sets a limit on yield gains that can be expected from management, in fact, the yield increment from additional management will be smaller as the crop's environment gets closer to the perfect environment and may not produce an economic return.

Management practices that improve yield eventually reach a saturating limit where no more yield improvement is possible. Adding fertilizer only increases yield until the needs of the crop are met. Adjusting row spacing provides no benefit once complete ground cover is achieved. This so-called saturation effect also limits the effect of management on yield.

Maximizing yield requires getting as close to the perfect environment as possible, but that may not maximize the bottom line. It seems that producers sometimes forget this important distinction as they chase higher and higher yields.

Approaching the perfect environment does not mean that no more changes in management will be needed. The environment we grow our crops in may change over time. The appearance of new diseases or insect pests, changes in temperature or moisture availability, perhaps driven by climate change, will create new opportunities for management to push the environment back towards perfection.

Genetic improvement of our crops provided the basis for the large historical increases in yield. Some aspects of variety selection (e.g., disease and insect resistance) fit into the 'perfect' environment scenario, but others (e.g., improvement in the plant's fundamental capacity to produce yield) don't. This exception does not negate the value of the 'perfect environment' concept.

A second objective of crop management is to improve the efficiency of production (the same yield with fewer inputs, for example). Efficiency is important because it directly effects the producer's bottom line, even though it does not necessarily increase yield. After all, a cropping system can survive only if the producer makes a profit (in the marketplace or from government subsidies).

Improvements in efficiency are often the result of new technologies that make new production practices possible. Current examples include variable rate equipment that may reduce inputs, and the new see-and-spray sprayers that claim reduced herbicide inputs while maintaining weed control. These and other technological advances may lead to increased efficiencies by reducing inputs while maintaining yield.

The limitation to constantly improving efficiency is the availability of new technology or finding new ways to use old technology. Selling efficiency is not as glamorous as selling high yields (how many efficiency contests are there?), but the rewards to the producer can be substantial.

And then there are management practices that don't increase yield or efficiency; they simply reduce the negative effects of agricultural production systems on the environment. Management practices in this category are important today and they may become more important as societal concerns about the environment increase. Unfortunately, they are not always popular because the yield or efficiency payoff often comes in the distant future, if at all.

Identifying our goals when researching or modifying our crop management systems will make us better (and richer) managers. Are we chasing higher yields or improved efficiency? Evaluating a production practice for improvements in efficiency requires a different research approach and data collection than simply evaluating its effect on yield. If yield is the only focus, useful practices may be abandoned because they did not significantly increase yield, even though they may have improved efficiency and the producer's bottom line or reduced environmental damage.

In reality, crop management practices don't always fit neatly into these three categories. Crop management, unfortunately, is not that simple. The fact that a single management practice fits into two or three categories (e.g., increases yield and increases efficiency) does not negate the value of using the three separate categories when we think about crop management.

The primary message of this article is that we will do a better job of managing our crops and researching management practices if we think a little bit more about the three categories of crop management when determining our objectives – are we trying to increase yield (which will get more difficult as we approach that perfect environment), to improve efficiency (may depend on new technology), or save the environment? Our love affair with silver bullets and higher yields often overshadows any considerations of efficiency or saving the environment; perhaps a little more balance may lead to more profitable and sustainable crop management systems.

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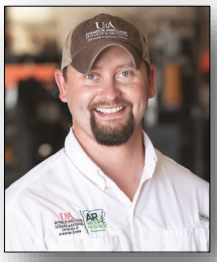
SAVE THE DATE

KCHC
Kentucky Crop Health Conference

Feb. 8, 2024 - National Corvette Museum - Bowling Green, Ky.

Speakers include University of Kentucky Extension Specialists
and invited nationally prominent Extension Specialists from across the United States



Thomas Butts
University of Arkansas

Topic: Drone Herbicide Applications: What Do We Need to Know for Success?

Nicholas Seiter
University of Illinois Urbana-Champaign

Topic: Above- and below- ground traits for insect management in corn – new tools, old pests, and resistance

Gregory Tylka
Iowa State University

Topic: Soybean Cyst Nematode: Past, present, and future

Carl Bradley
University of Kentucky

Topic: Red Crown Rot of Soybean: Disease Management and Potential Impacts of this New Disease on Soybean Production in Kentucky

Travis Legleiter
University of Kentucky

Topic: Dealing with the Stretch - Early Planted Soybean and Weed Control

Raul Villanueva
University of Kentucky

Topic: Abundance of Emergent Pests in the 2022-23 Corn and Soybean seasons in Kentucky

Kiersten Wise
University of Kentucky

Topic: It's always something! New corn disease concerns for Kentucky

Martin-Gatton College of Agriculture, Food and Environment
University of Kentucky

National Corvette Museum

Tickets on sale Nov. 1, 2023
Scan QR Code or visit: https://kchc2024.eventbrite.com
(non-refundable after Jan. 25, 2024)
Lunch included - CCA and pesticide applicator CEUs will be available

UK Winter Wheat Meeting

James E Bruce Convention Center
Hopkinsville, KY

Save the Date

02-01-24

Martin-Gatton
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UPCOMING EVENTS

2023 Fall Crop Protection Webinar Series

#1 Dr. Wise	*November 2, 2023*
#2 Dr. Bradley	*November 9, 2023*
#3 Dr. Legleiter	*November 16, 2023*
#4 Dr. Villanueva	*November 30, 2023*

2024 Winter Wheat Meeting

February 1, 2024

Kentucky Crop Health Conference

February 8, 2024

Wheat Field Day

May 14, 2024

Corn, Soybean & Tobacco Field Day

July 23, 2024

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Disabilities accommodated with prior notification.