Issue 753

K-STATE Research and Extension

Extension Agronomy

eUpdate

06/19/2019

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

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1. Plant analysis for testing nutrient levels in corn

Plant analysis is an excellent in-season "quality control" tool. It can be especially valuable for managing secondary and micronutrients that do not have high-quality, reliable soil tests available, and for providing insight into how efficiently you are using applied nutrients.

Plant analysis can be used by Kansas farmers in two basic ways: for diagnostic purposes, and for monitoring nutrient levels at a common growth stage. Diagnostics can be done any time and is especially valuable early in the season when corrective actions can easily be taken. Monitoring is generally done at the beginning of reproductive growth.

General sampling guidelines:

- Plants are less than 12 inches tall: Collect the whole plant; cut the plant off at ground level.
- Plants more than 12 inches tall and until reproductive growth begins: Collect the top fully developed leaves (those which show leaf collars).
- After reproductive growth starts: Collect the ear leaves (below the uppermost developing ear), samples should be collected at random from the field at silk emergence.

Figure 1. Corn sampling during different growth stage. Photos by Dorivar Ruiz Diaz, K-State Research and Extension.

Plant analysis for diagnostic sampling

When sampling for diagnostic purposes, collecting specific plant parts is less important than obtaining comparison samples from good and bad areas of the field.

Plant analysis is an excellent diagnostic tool to help understand some of the variation among corn plants in the field. When using plant analysis to diagnose field problems, try to take comparison samples from both good/normal areas of the field, and problem spots. This can be done at any

growth stage.

Along with taking plant tissue samples, it is also helpful to collect a soil sample from both good and bad areas when doing diagnostics. Define your areas, and collect both soil and plant tissue from areas that represent good and bad areas of plant growth. Soil samples can help define why a problem may be occurring. The soil sample may find certain nutrient levels are very low in the soil, helping to explain why a deficiency is occurring. However, other factors can also cause nutrient problems. Soil compaction, or saturation of soils for example, often limits the uptake of nutrients, especially potassium, which are otherwise present in adequate amounts in the soil.

Plant analysis for nutrient monitoring

For general monitoring or quality control purposes, plant leaves should be collected as the plant enters reproductive growth. Sampling under stress conditions for monitoring purposes can give misleading results, and is not recommended. Stresses such as drought or saturated soils will generally limit nutrient uptake, and result in a general reduction in nutrient content in the plant.

How should you handle samples and where should you send the samples?

The collected leaves should be allowed to wilt over night to remove excess moisture, placed in a paper bag or mailing envelope, and shipped to a lab for analysis. Do not place the leaves in a plastic bag or other tightly sealed container, as the leaves will begin to rot and decompose during transport, and the sample won't be usable. Most of the soil testing labs working in the region provide plant analysis services, including the K-State testing lab.

What nutrients should be included in the plant analysis?

In Kansas, nitrogen (N), phosphorus (P), potassium (K), sulfur (S), zinc (Zn), chloride (Cl), and iron (Fe) are the nutrients most likely to be found deficient. Recently, questions have been raised concerning copper (Cu), manganese (Mn), and molybdenum (Mo), though widespread deficiencies of those micronutrients have not been found in the state. Normally the best values are the "bundles" or "packages" of tests offered through many of the labs. They can be as simple as N, P and K, or can be all the mineral elements considered essential to plants. K-State offers a package which includes N, P, K, Ca, Mg, S, Fe, Cu, Zn, and Mn.

What will you get back from the lab?

The data returned from the lab will be reported as the concentration of nutrient elements, or potentially toxic elements, in the plants. Units reported will normally be in "percent" for the primary and secondary nutrients (N, P, K, Ca, Mg, S, and Cl) and "ppm" (parts per million) for most of the micronutrients (Zn, Cu, Fe, Mn, B, Mo, and Al).

Most labs/agronomists compare plant nutrient concentrations to published *sufficiency ranges*. A sufficiency range is simply the range of concentrations normally found in healthy, productive plants during surveys. It can be thought of as the range of values optimum for plant growth. The medical profession uses a similar range of normal values to evaluate blood work. The sufficiency ranges change with plant age (generally being higher in young plants), vary between plant parts, and can differ between hybrids. A value slightly below the sufficiency range does not always mean the plant is deficient in that nutrient. It is an indication that the nutrient is relatively low. Values on the low end

of the range are common in extremely high-yielding crops. However, if that nutrient is significantly below the sufficiency range, you should ask some serious questions about the availability and supply of that nutrient.

Keep in mind that any plant stress (drought, heat, soil compaction, saturated soils, etc.) can have a serious impact on nutrient uptake and plant tissue nutrient concentrations. A low value of a nutrient in the plant does not always mean the nutrient is low in the soil and the plant will respond to fertilizer. It may be that the nutrient is present in adequate amounts in the soil, but is either not available or not being taken up by the plant for a variety of reasons. Two examples are drought, which can reduce plant uptake of nutrients and cause low nutrient values in the plant, and high-pH soils, which can cause low iron availability.

On the other extreme, levels above "sufficiency" can also indicate problems. High values might indicate over-fertilization and luxury consumption of nutrients. Plants will also sometimes try to compensate for a shortage of one nutrient by loading up on another. This occurs at times with nutrients such as iron, zinc, and manganese.

Table 1 gives the range of nutrient contents considered to be "normal" or "sufficient" for corn seedlings below 12 inches tall and for the ear leaf of corn at silking. Keep in mind that these are the ranges normally found in healthy, productive crops.

Table 1. Range of nutrient contents considered "normal" or "sufficient" at two growth stages in corn.

Nutrient	Unit	Whole Plant <12" tall	Corn Ear Leaf at Green Silk
Nitrogen (N)	%	3.5-5.0	2.75-3.50
Phosphorus (P)	%	0.3-0.5	0.25-0.45
Potassium (K)	%	2.5-4.0	1.75-2.25
Calcium (Ca)	%	0.3-0.7	0.25-0.50
Magnesium (Mg)	%	0.15-0.45	0.16-0.60
Sulfur (S)	%	0.20-0.50	0.15-0.50
Chloride (Cl)	%	Not established	0.18-0.60
Copper (Cu)	ppm	5-20	5-25
Iron (Fe)	ppm	50-250	20-200
Manganese (Mn)	ppm	20-150	20-150
Zinc (Zn)	ppm	20-60	15-70
Boron (B)	ppm	5-25	4-25
Molybdenum (Mo)	ppm	0.1-10	0.1-3.0
Aluminum (Al)	ppm	<400	<200

Summary

In summary, plant analysis is a good tool to monitor the effectiveness of your fertilizer and lime program and as a very effective diagnostic tool. Consider adding this to your toolbox.

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2. Dealing with Fusarium head blight (head scab) in wheat

Symptoms of a troublesome disease known as Fusarium head blight are appearing in some wheat fields in central and eastern Kansas this year. The wheat crop in many parts of the central and eastern regions has already been hit hard by excessive rain and leaf diseases that hastened the maturity and cut valuable time from the grain-filling period of the crop. As the crop matures, many growers are reporting symptoms of Fusarium head blight.

Fusarium head blight (head scab) causes large tan lesions that encompass large portions of the wheat head (Figure 1). The symptoms of the disease are most evident during the late milk and early dough stages of kernel development. The symptoms are quickly masked by the maturation of the wheat crop and many growers may not realize the full extent of the damage until harvest and the Fusarium damaged kernels are visible in the grain. At this stage, the disease kernels will have a white, chalky appearance (Figure 1). Some kernels may also have a pink discoloration. The diseased grain may also contain mycotoxins that can negatively impact the health of animals and humans. Deoxynivalenol (DON) is the most common mycotoxin associated with Fusarium damaged wheat. This mycotoxin is also called "vomitoxin" by some segments of the wheat industry.

Figure 1. Wheat with symptoms of Fusarium head blight. Symptoms of the disease are most evident at the milk or dough stages of kernel development (upper photo) and are quickly masked by natural maturation of the crop. Gain damaged by the disease often contains white, chalky kernels (lower photo). Photo by Erick DeWolf, K-State Research and Extension.

The full extent of distribution and severity of Fusarium head blight is not clear, but it is very likely that many growers will experience elevated levels of the disease this year. Unfortunately, there is nothing that can be done to suppress development of the disease at this time. There are no fungicides labeled for application this close to harvest, and such treatments would have no effect on the disease. At this point, we are trying to make the best out a potentially difficult and frustrating situation.

Growers can begin preparing by setting harvest priorities on fields with lowest levels of Fusarium head blight. Where the crop is still at milk or dough stages, it may be possible to note disease levels before maturity. After maturity, we can use information about genetic resistance to help guide harvest priorities. Although all wheat varieties are vulnerable to the disease, varieties with moderate levels of genetic resistance (Everest, WB4269 and Zenda) are likely to have lower levels of disease than those with susceptible reactions to the disease. Varieties with intermediate reactions to Fusarium head blight (Bob Dole or SY Benefit) may also have less disease. Harvesting fields with the lowest disease levels can help prevent additional weathering of the crop and further degradation of grain test weight and quality.

Adjust harvest equipment to remove Fusarium damaged kernels. The kernels damaged by Fusarium head blight are often smaller and less dense than healthy kernels making mechanical separation of the affected grain possible. In many cases, it is possible to improve test weight and

grain quality by adjusting the air flow on the combine to remove the most damaged kernels during harvest.

Plan to separate loads of grain that are damaged by the disease. Grain elevators and growers with on-farm storage can help prepare for harvest by planning to segregate loads of grain with differing disease levels. Where possible, avoid mixing healthy grain with loads of grain with higher disease levels. Historically, the largest price discounts for Fusarium damaged grain occur during harvest, placing grain into storage temporarily can provide time for growers to document disease levels and the grain marketing infrastructure to adjust to accommodate the less desirable grain. In extreme cases, it may be possible to use seed cleaning equipment to remove the diseased kernels and improve the marketability of the crop.

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3. Post-emergence marestail and pigweed control in soybean fields

Controlling marestail or pigweeds post-emergence in soybeans is always easier when the weeds are small – less than 2 inches tall is preferable for good control. Once weeds get taller, they are often considerably more difficult to control. However, conditions are not always conducive to getting optimal post-emergence weed control. The wet weather in many areas this spring may cause weeds in some fields to get larger than you intended. The following are some suggestions for controlling these weeds post-emergence in soybeans.

Marestail

Marestail tend to be difficult to control even when the plants are small and in the rosette stage, but become even tougher when plants get more than 6 inches tall (Figure 1). That is why fall and early burndown treatments are critical to the long-term management of marestail. Unfortunately, that doesn't always happen. In addition, some marestail have developed glyphosate resistance in many areas. However, some marestail populations are still susceptible to glyphosate, and even resistant plants are not completely immune to glyphosate.

Figure 1. Growth stages of marestail from seedling, rosette, to bolting state. Photos by Dallas Peterson, K-State Research and Extension.

If Xtend soybeans are planted, Xtendimax, FeXapan, or Engenia should be some of the most effective herbicides for post-emergence control of marestail in soybeans. Remember that Xtendimax, FeXapan and Engenia can only be applied to Xtend soybeans.

If Liberty Link soybeans were planted, Liberty (glufosinate) also is fairly effective for marestail control, but requires higher spray volumes and good coverage for best results. The addition of ammonium sulfate is essential to optimize Liberty performance. It is important to remember that Liberty can only be applied post-emergence on Liberty Link soybeans.

The most effective herbicide treatment for controlling marestail in Roundup Ready soybeans is probably a tank-mix of glyphosate plus FirstRate. The combination of the two herbicides seems to work better than either herbicide alone, even on resistant plants. It is important to use the full

labeled rates of glyphosate and recommended adjuvants, including ammonium sulfate, to optimize control and help minimize the risk of developing more resistance. Other tank-mixes to consider with glyphosate for controlling marestail would include Classic and Synchrony herbicides. Unfortunately, some marestail may also be ALS resistant, in which case FirstRate, Classic, and Synchrony would also be fairly ineffective. This just further emphasizes the importance of early spring weed control.

Waterhemp and Palmer amaranth

Figure 2. Glyphosate-resistant Palmer amaranth escapes in soybeans. Photo by Dallas Peterson, K-State Research and Extension.

If pre-emergence herbicides weren't applied or didn't get activated in a timely manner, early-emerging waterhemp or Palmer amaranth may not have been controlled and can grow rapidly. Again, if Xtend soybeans were planted, the new dicamba products Xtendimax, Engenia, and FeXapan are an option to help control broadleaf weeds, including the pigweeds. However, just as with other post-emergence pigweed treatments, the pigweeds need to be less than 3 to 4 inches tall to achieve optimal control.

Likewise, Liberty herbicide can be used in Liberty Link soybeans to help control small pigweeds. Liberty is also most effective on smaller weeds and again, requires higher spray volumes to achieve good coverage and weed control. A sequential application of Liberty 7 to 10 days after the first application may be required for good control, especially on larger plants.

Flexstar, Cobra, Marvel, and Ultra Blazer can be fairly effective for controlling small pigweed, but are less effective as the pigweed gets larger, especially Palmer amaranth. Some waterhemp and Palmer amaranth also may have developed resistance to this class of herbicides, but size still seems to be a factor, even on resistant populations. These herbicides also provide some residual weed control, so tank-mixes of these herbicides with glyphosate should be applied within 3 weeks after planting to optimize performance in Roundup Ready soybeans. Producers may try to cut the rates of these

herbicides to reduce soybean injury. However, lower rates of these burner herbicides still cause similar soybean burn symptoms and weed control is often reduced.

Pursuit and Harmony were once fairly effective for pigweed control and can still provide good control of susceptible populations, but many fields now have ALS-resistant waterhemp and Palmer amaranth.

Residual herbicides such as Zidua, Anthem Maxx, Outlook, Dual Magnum, and Warrant can also be added to any of the previously mentioned post-emergence herbicides to provide some extended residual control of pigweeds. This may be especially helpful if a good rate of residual herbicide was not used earlier or with heavy pigweed pressure. Prefix and Warrant Ultra herbicides are premixes of Reflex and Group 15 herbicides than can provide both post-emergence control of small pigweeds along with extended residual control.

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4. Pre-harvest weed control in wheat

Recent hail storms, excessive rain/flooding, and other problems have affected wheat stands in many areas of Kansas this year. The resulting thin stands in those areas have caused weeds to start showing up in many wheat fields -- especially in fields not treated earlier. When broadleaf weeds are given the opportunity to grow rapidly in wheat fields because of wet weather and open canopies at the end of the growing season, these weeds flourish and often grow above the wheat canopy.

This raises several potential concerns, including harvest difficulties, dockage problems, weed seed production, and soil water depletion. No one wants to spend extra money on a below-average crop, but it may be necessary.

Figure 1. Weeds in wheat near harvest time. Photo by Dallas Peterson, K-State Research and Extension.

Unfortunately, there aren't many good options at this point in time. There are also a lot of questions about which herbicides are approved and the "use guidelines and restrictions" for pre-harvest treatments in wheat. Listed below are the various herbicide options producers can use as pre-harvest

aids in wheat. There are differences in how quickly they act to control the weeds, the interval requirement between application and grain harvest, and the level or length of control achieved. All of them will require good thorough spray coverage to be most effective.

Please note that the 2,4-D rate approved for pre-harvest weed control in wheat has been reduced to a maximum of 0.5 lb/acre, which is equal to 1 pt of a 4-lb formulation or 2/3 pt of a 6-lb material. 2,4-D also now has a 14-day pre-harvest requirement.

Another herbicide that is sometimes mentioned as a possible pre-harvest treatment is paraquat. **Paraquat is not labeled for pre-harvest treatment in wheat.** Application of paraquat to wheat is an illegal treatment and can result in a quarantine and destruction of the harvested grain, along with severe fines.

Product and rate	**Advantages**	**Disadvantages**	**Comments**
Aim EC (1 to 2 oz)	Acts quickly, usually within 3 days. Short waiting interval before harvest – 3 days.	Controls only broadleaf weeds. Regrowth of weeds may occur after 2-3 weeks or more, depending on the rate used.	Apply after wheat is mature. Always apply with 1% v/v crop oil concentrate in a minimum spray volume of 5 gal/acre for aerial application and 10 gal/acre for ground applications. Do not apply more than 2 oz of Aim during the growing season.
Dicamba (0.5 pt)	Controls many broadleaf weeds.	A waiting period of 7 days is required before harvest. Acts slowly to kill the weeds. Controls only broadleaf weeds. High potential for spray drift to susceptible crops.	Apply when the wheat is in the hard dough stage and green color is gone from the nodes of the stem. Do not use treated wheat for seed unless a germination test results in 95% or greater seed germination.
Glyphosate (1 qt of 3 lb ae/gal product, or 22 fl oz of Roundup PowerMax or WeatherMax)	Provides control of both grasses and susceptible broadleaf weeds.	Acts slowly. May take up to 2 weeks to completely kill weeds and grasses. Cannot harvest grain until 7 days after	Apply when wheat is in the hard dough stage (30% or less grain moisture). Consult label for recommended

		application. Kochia, pigweeds, and marestail may be resistant.	adjuvants. Not recommended for wheat being harvested for use as seed.
Metsulfuron (0.1 oz)	Provides control of susceptible broadleaf weeds.	Acts slowly. Cannot harvest grain until 10 days after application. Controls only susceptible broadleaf weeds. Kochia, pigweeds, and marestail may be resistant.	Apply when wheat is in the dough stage. Always apply with a nonionic surfactant at 0.25 to 0.5% v/v. Generally recommended in combination with glyphosate or 2,4-D. Do not use on soils with a pH greater than 7.9. Weeds growing under limited moisture may not be controlled. Do not use treated straw for livestock feed.
2,4-D LVE (1 pt of 4lb/gal product or 2/3 pt 6 lb/gal product)	Provides control of susceptible broadleaf weeds.	Acts slowly. Weak on kochia and wild buckwheat. Cannot harvest grain until 14 days after application.	Apply when wheat is in the hard dough stage to control large, actively growing broadleaf weeds. Weeds under drought stress may not be controlled. Do not use treated straw for livestock feed.

It is very difficult to estimate the value of preharvest weed treatments as it will depend in part on the differences a treatment would have on harvest efficiency and dockage. It may not pay to treat wheat with lower weed densities unless harvest is delayed. If the weeds are about to set seed, a preharvest treatment can go a long way toward reducing weed problems in future years by preventing seed production.

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5. Update on summer row crop planting progress in Kansas and the Corn Belt

Corn and soybean planting in U.S. Corn Belt and in Kansas is proceeding following one of the slowest rates ever recorded. For Kansas, corn planted progress moved from 79 to 96 percent in two-weeks from June 3 to 17 (USDA Kansas Crop Progress and Condition Report). Similar progress has been observed for Iowa, Nebraska, and Minnesota, however Ohio, South Dakota, Indiana, and Illinois are still behind (Figure 1, right panel). For soybeans, planted progress moved from 26 to 74 percent for Kansas. This is still well behind from 93 % from last year and 82 % for the 5-year average (Figure 1). Similar progress has occurred for Nebraska, Minnesota, and Iowa but there are large departures from planted progress for Ohio, South Dakota, Indiana, Illinois, and Missouri.

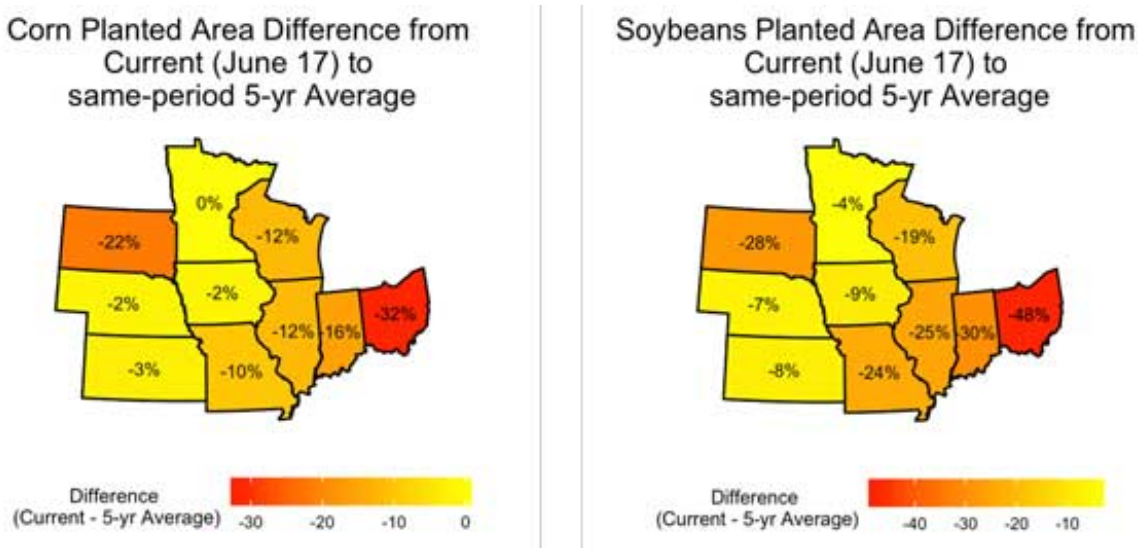

Figure 1. Progress of corn (right) and soybeans (left) planted area (%) from USDA Crop Progress Report, June 17. Figures by Leonardo Bastos, Kansas State Research and Extension.

Saturated soil conditions impacted the expected number of suitable working days in a given period of time. Knowing how many suitable working days might be available to conduct fieldwork for a given crop operation impacts crop choice and machinery investment decisions. The most active planting dates for corn are usually between April 15 and May 15 (20th to 80th percentile, respectively) and for soybeans and grain sorghum planting time those dates are from May 15 to June 20 (20th to 80th percentile, respectively) (2010 USDA NASS handbook).

For Kansas, during the last three weeks, the number of days suitable for fieldwork has been increasing, approaching the highest number for Kansas compared to the same point for the last week of April. In overall, close to 5 days suitable for fieldwork per week were available for most of the states during the last two weeks of the report from June 3 to 17.

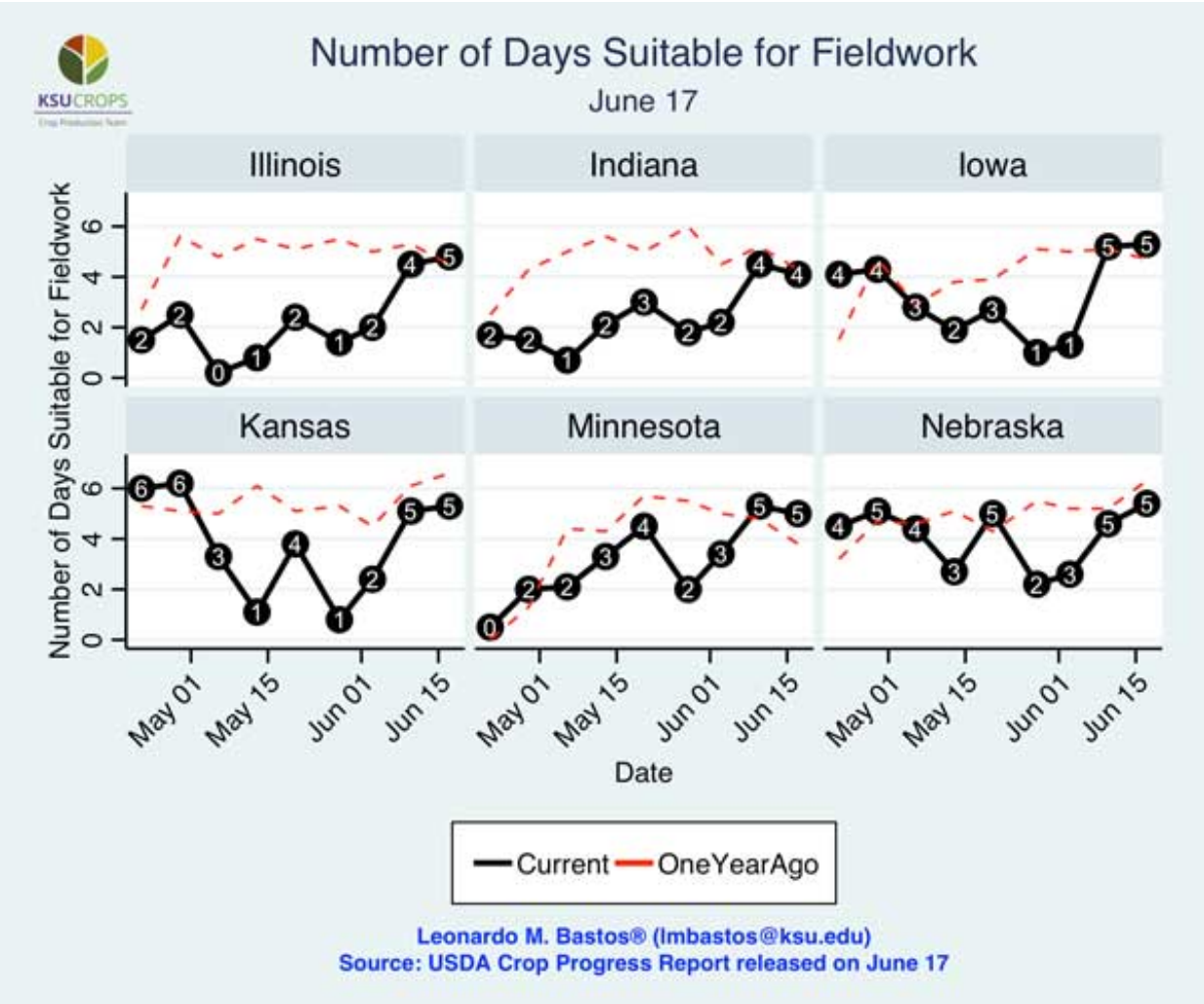

Figure 2. Number of days suitable for fieldwork from USDA Crop Progress Report, June 17. Figure by Leonardo Bastos, Kansas State Research and Extension.

The days suitable for fieldwork approached 5 days available per week for the last two consecutive weeks, one of the highest numbers compared with the entire planting window this growing season. In parallel, the topsoil moisture conditions across many states is reflecting a reduction in the surplus category, with less fields presenting standing water. Still, the states presenting the largest delay in corn planted progress are also the ones documenting close to 30% of surplus of topsoil moisture conditions. For Kansas, the topsoil moisture condition, reflected as an average of the state-level cropland area, decreased over the last two weeks for the surplus category, reaching an overall value of 18% by June 17 (Figure 3). The latter reflects the drier weather conditions experienced in the last weeks, helping farmers catch up with planting new crop and re-planting some bad looking areas (poor stands, well below optimal plant population).

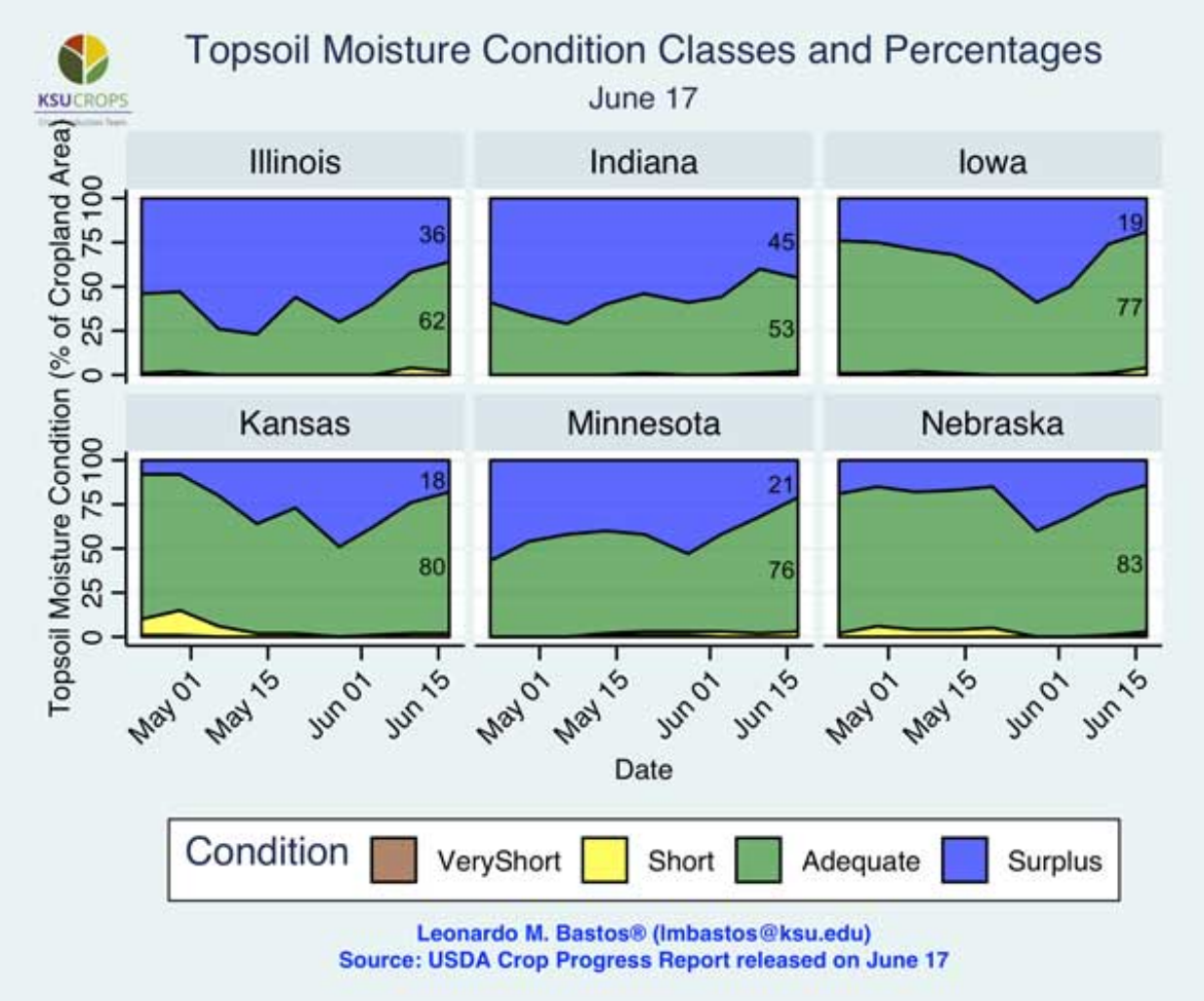

Figure 3. Topsoil moisture conditions classes and percentages from USDA Crop Progress Report, June 17. Figure by Leonardo Bastos, Kansas State Research and Extension.

In summary, both corn and soybeans are catching up from their respective five-year and 2018 progress averages the last two weeks, with soybeans catching up and corn getting close to the final line. For Kansas, sorghum is currently at 55% planted progress, well behind the 84 % from 2018 and somewhat behind the five-year average of 71%.

Depending on your location, delayed planting will be a normal situation considering the weather already experienced during this spring. Considering crop insurance and the main agronomic practices to implant a successful crop will be critical factors guiding our planting decisions.

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6. 2019 Kansas Corn Yield Contest

Now that corn planting is almost complete, harvest in Kansas will be here before you know it. Corn producers in the state are encouraged to keep in mind the Kansas Corn Yield Contest before they fire up the combines this year.

Kansas Corn, in conjunction with K-State Research and Extension, will conduct a 2019 Kansas Corn Yield Contest. All Kansas corn producers are eligible to enter the contest, but they must be active members of the Kansas Corn Growers Association.

The contest is a fun way for producers to showcase their high yielding and high quality corn with other growers in the state, and provide motivation to producers to increase yields. The contest also serves as a vehicle to improve farming operations and increase awareness of best management practices (BMPs) to improve and sustain corn yields.

In addition to grower recognition, cash awards will be awarded at the district and state levels. The districts align with crop reporting districts, plus a NNE district was created to include Doniphan and parts of Brown and Atchison (Figure 1). In addition, one statewide dryland winner and one statewide irrigated winner will be announced. District winners will receive $300 and a plaque. Second place entries will receive a $200 prize and third place will receive a $100 prize. The highest yielding dryland and irrigated entries statewide will receive an additional $500 prize. All farmers entering the contest and completing the harvest form will receive a shirt from Kansas Corn. Contest winners will be recognized at the Kansas Corn Symposium in January 2020.

The contest is free of charge to members of the Kansas Corn Growers Association. Pre-registration must be complete by **August 30, 2019 or prior to harvest.** All entries must be postmarked by December 1, 2019. Entries submitted to the National Corn Yield Contest qualify to enter the state contest, but entries must be made to both contests.

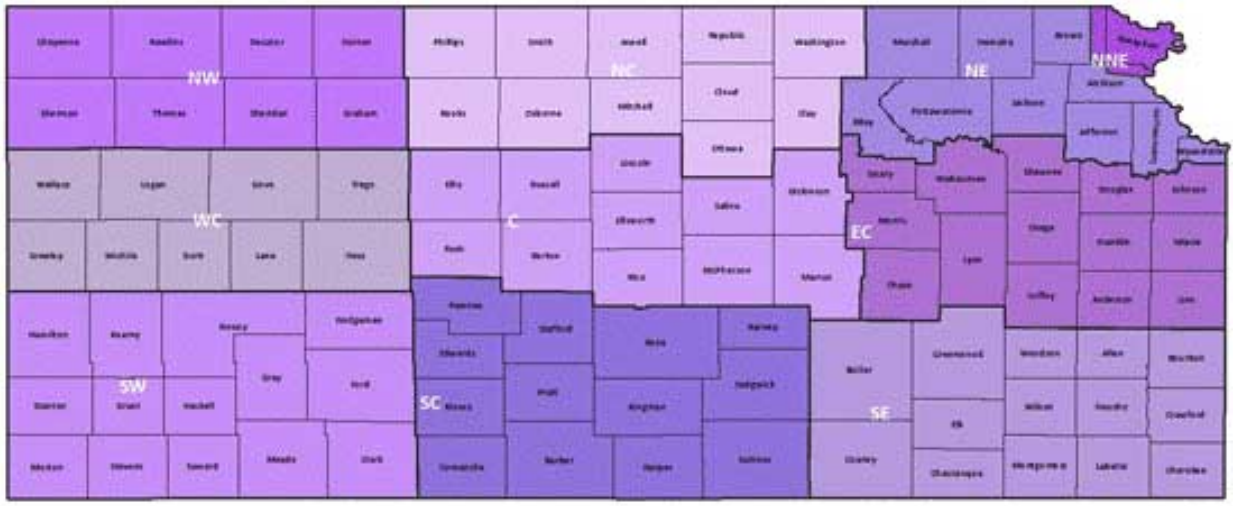

Figure 1. Dryland and irrigated contest districts. Note: NNE includes only those fields north and/or east of KS Hwy 73 in Brown, Doniphan, and Atchison counties.

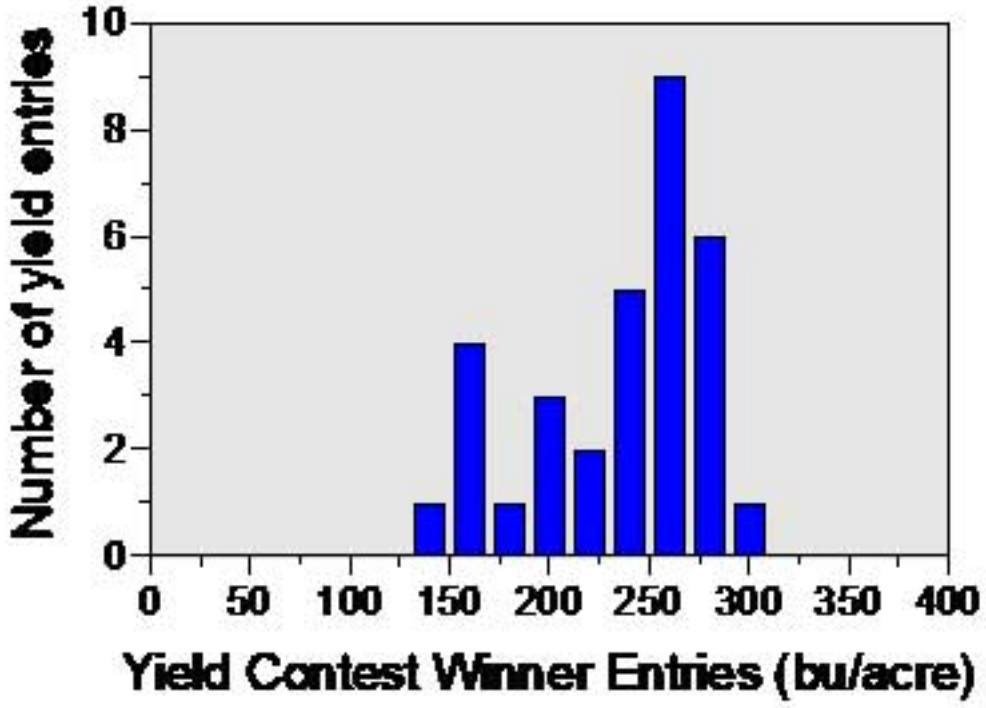

Figure 2. Kansas contest winner entries to the Kansas Corn Contest from 2018 inaugural year. Yield values along the x-axis are in bushels per acre. Graph produced by Ignacio Ciampitti, K-State Research and Extension.

All contest rules and required entry forms can be found online at https://kscorn.com/yield

For more information, call Kansas Corn at 785-410-5009 or email yield@ksgrains.com

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7. 2019 K-State/KARA Summer Field School

Kansas State University and the Kansas Agribusiness Retailers Association (KARA) will be hosting two, two-day hands-on field schools on July 9-10 and July 11-12 at the K-State Agronomy North Farm (2200 Kimball Ave) located just north of the football stadium. This year's program will focus on soybean and cotton production and fertility. In addition, there will be comprehensive training in herbicide efficacy and injury, weed identification, soil and water management, crop diseases, and insects. Agendas for both sessions are included at the end of this article.

The complete program and registration link can be found at https://www.ksagretailers.org/events-training/ksu-field-days/. (Please note: KSRE agents should register via the registration link distributed over the Ag Agent email list serve). The cost for this year's program is $210 and includes lunch on both days and the opportunity to earn 12 CCA credits and multiple 1A credits.

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Kansas State University/KARA Summer Field Day (Session 1)

North Agronomy Farm, Manhattan, KS, July 9-12, 2019

K-STATE Research and Extension

	Tuesday 7/9/19		
8:00 Registration – **North Agronomy Farm**	**Group A**	**Group B**	**Group C**
8:30	Herbicide Efficacy (Peterson & Kumar)	Soil Compaction (Presley)	Soybean Production (Ciampitti)
9:30	Herbicide Injury (Peterson & Kumar)	Water quality (Tomlinson)	Soybean Fertility (Ruiz Diaz)
10:30	**Break**		
10:45	Weed ID (Dille, Donnelly)	Soybean Production (Ciampitti)	Crop Insect Pests (Whitworth/Davis) Throckmorton 2501
11:45	Weed ID (Dille, Donnelly)	Soybean Fertility (Ruiz Diaz)	Crop Diseases (Jardine) Throckmorton 1506
12:45	**Lunch – North Agronomy Farm (Welcome)**		
1:30	Soybean Production (Ciampitti)	Crop Diseases (Jardine) Throckmorton 1506	Weed ID (Dille, Donnelly)
2:30	Soybean Fertility (Ruiz Diaz)	Crop Insect Pests (Whitworth/Davis) Throckmorton 2501	Weed ID (Dille, Donnelly)
3:30	**Adjourn**		
	Wednesday 7/10/19		
7:00 Registration – **North Agronomy Farm**	**Group A**	**Group B**	**Group C**
7:30	Cotton Production (Duncan & Haag)	Herbicide Efficacy (Peterson & Kumar)	Soil Compaction (Presley)
8:30	Cotton Fertility (Ruiz Diaz, Haag)	Herbicide Injury (Peterson & Kumar)	Water quality (Tomlinson)
9:30	**Break**		
9:45	Soil Compaction (Presley)	Cotton Production (Duncan & Haag)	Herbicide Efficacy (Peterson & Kumar)
10:45	Water quality (Tomlinson)	Cotton Fertility (Ruiz Diaz, Haag)	Herbicide Injury (Peterson & Kumar)
11:45	**Lunch – North Agronomy Farm**		
12:30	Crop Diseases (Jardine) Throckmorton 1506	Weed ID (Dille, Donnelly)	Cotton Production (Duncan & Haag)
1:30	Crop Insect Pests (Whitworth/Davis) Throckmorton 2501	Weed ID (Dille, Donnelly)	Cotton Fertility (Ruiz Diaz, Haag)
2:30	**Adjourn**		

Kansas State University/KARA Summer Field Day (Session 2)

North Agronomy Farm, Manhattan, KS, July 9-12, 2019

K-STATE Research and Extension

	Thursday 7/11/19		
8:00 Registration – **North Agronomy Farm**	**Group A**	**Group B**	**Group C**
8:30	Cotton Production (Duncan & Haag)	Herbicide Efficacy (Peterson & Kumar)	Soil. Compaction (Presley)
9:30	Cotton Fertility (Ruiz Diaz, Haag)	Herbicide Injury (Peterson & Kumar)	Water quality (Tomlinson)
10:30	**Break**		
10:45	Soil. Compaction (Presley)	Cotton Production (Duncan & Haag)	Herbicide Efficacy (Peterson & Kumar)
11:45	Water quality (Tomlinson)	Cotton Fertility (Ruiz Diaz, Haag)	Herbicide Injury (Peterson & Kumar)
12:45	**Lunch – North Agronomy Farm (Welcome)**		
1:30	Crop Diseases (Jardine) Throckmorton 1506	Weed ID (Dille, Donnelly)	Cotton Production (Duncan & Haag)
2:30	Crop Insect Pests (Whitworth/Davis) Throckmorton 2501	Weed ID (Dille, Donnelly)	Cotton Fertility (Ruiz Diaz, Haag)
3:30	**Adjourn**		
	Friday 7/12/19		
7:00 Registration – **North Agronomy Farm**	**Group A**	**Group B**	**Group C**
7:30	Herbicide Efficacy (Peterson & Kumar)	Soil. Compaction (Presley)	Soybean Production (Ciampitti)
8:30	Herbicide Injury (Peterson & Kumar)	Water quality (Tomlinson)	Soybean Fertility (Ruiz Diaz)
9:30	**Break**		
9:45	Weed ID (Dille, Donnelly)	Soybean Production (Ciampitti)	Crop Insect Pests (Whitworth/Davis) Throckmorton 2501
10:45	Weed ID (Dille, Donnelly)	Soybean Fertility (Ruiz Diaz)	Crop Diseases (Jardine) Throckmorton 1506
11:45	**Lunch – North Agronomy Farm**		
12:30	Soybean Production (Ciampitti)	Crop Diseases (Jardine) Throckmorton 1506	Weed ID (Dille, Donnelly)
1:30	Soybean Fertility (Ruiz Diaz)	Crop Insect Pests (Whitworth/Davis) Throckmorton 2501	Weed ID (Dille, Donnelly)
2:30	**Adjourn**		