

# Corn & Soybean News



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Grain and Forage  
Center of Excellence

## Ugly Corn Turning the Corner

**T**he 2024 corn season created some ugly cornfields around the state. Those fields are about to turn the corner and others already have. Excessive water, cool temperatures, windy conditions, active slugs and bugs, sidewall compaction, weeds and more created many challenges for the corn planted, especially corn planted earlier.

Most of the corn is somewhere between emergence and about shoulder high which can be anywhere from the V8 growth stage (which has eight fully emerged leaves) to about V15. At the time of this writing, less than 10% of the corn acres are still in the bag. Perhaps another 10% or more needed/needs to be planted again.

Corn fields seem to be either excellent or very poor. For the very poor fields, either the plants are rather small (probably V4 or less) or the corn plants are all over the place. Some fields have corn that is nearly waist high, corn that is stunted and yellow and low areas where corn was completely killed from flooding.

Saturated soils can cause corn plants to look yellow. Most of that yellowing is from root death and the inability of the plant to take up nitrogen. Those plants need oxygen back into the rooting zone to allow for new growth of roots. Once new roots are developed, the plants will start taking up nutrients again. Plants in these fields may take one to two weeks before they start to look better.

Saturated soils can cause nitrogen losses, mostly from denitrification, when anaerobic microbes convert the nitrogen into gaseous forms lost to the atmosphere. That nitrogen loss usually is not as high as you would think. Three days of saturation are needed before microbes will be active enough to denitrify.

Even in fields that have not been saturated, several nutrient deficiency symptoms are evident this year. Sulfur deficiency is more prevalent this year. Historically, visual sulfur deficiency does not translate to yield differences. However, some recent studies in Kentucky have showed yield increases to fertilizer sulfur. Dr. Hanna Poffenbarger reports, "Research at Spindletop Farm in 2021 and 2022 showed that sulfur deficiency in corn was more pronounced following winter cover crops (cereal rye,

crimson clover, and a mixture of the two) than no cover crops. The cover crops took up between 3 and 8 lb S/acre and about half of this S was released as the cover crops decomposed. The results suggest that cover crops 'stole' some S from the corn. Cover crops that took up more S (i.e., the cereal rye and mixture) resulted in a greater yield reduction. A rate of 30 lb S/acre applied to corn as gypsum overcame the deficiency." No more than 30 pounds of sulfur per acre should be used and foliar applications of sulfur are not effective.



The earlier-planted corn had more problems with slugs, insects, and seedling diseases. Raul Villanueva wrote an article on slug management for the last Corn and Soybean Newsletter: [https://graincrops.ca.uky.edu/sites/graincrops.ca.uky.edu/files/cornsoynewsletter2024vol06issue05\\_May\\_final\\_0.pdf](https://graincrops.ca.uky.edu/sites/graincrops.ca.uky.edu/files/cornsoynewsletter2024vol06issue05_May_final_0.pdf) Kiersten Wise wrote an article about seedling diseases in the same newsletter.

In this newsletter, Raul has an article about Fall Armyworm counts on the rise. Travis Legleiter includes an excellent article on weed management this year.

Corn around the state is growing out of this ugly phase in most fields. Once corn gets to about the V6 or V7 growth stages, the plants will actively take up nutrients and start to look healthier. The stress of the weather on the corn before the V5 growth stage likely will have little impact on yield if the plant population has been maintained.

Since we are past June 15, if any farmers are rolling the dice and planting corn, they should switch to an early hybrid. At this point, there is only one chance to get it right and farmers will not be able to replant. As much as possible avoid planting into wet conditions that create sidewall compaction. If done correctly, there is still an opportunity for respectable yields. The corn planted in June will grow very quickly. Current long-term forecasts suggest a warmer and wetter summer than average. If the summer is BOTH warmer and wetter than average, then the crop will rapidly develop and may speed up even faster than models suggest. Consider soil residual herbicides, accounting for what was applied earlier and accounting for crop rotation restrictions.

If you are still feeling bad about your crop, just drive north a few hours. They have some excellent corn and some corn that appears to be struggling right now. It will remind you how far your crop has come in the last couple weeks.

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# Weed Control Reminders for June 2024

**T**his month we are going to hit on a couple of weed control topics as we are quickly advancing towards crop canopy in corn and full season soybean.

## **Is Johnsongrass Worse This Year?**

Does it seem to you that Johnsongrass is worse this year in both corn and soybean? I know I have received more questions about it and do feel I see more of it in both corn and soybean fields this year. Why does it seem like there is more Johnsongrass this year? I believe we have been building our Johnsongrass stock (rhizomes) for the past couple of years and the weather this year was set up perfectly for Johnsongrass to thrive.

Generally, across the state we had a great April for field work and planting of corn and early soybean and for burndown of winter annuals for May planted crops. Then we received multiple heavy rainfall events in May that kept planters and sprayers out of the field. These spring conditions in combination with a warm winter and fields with existing Johnsongrass rhizomes allowed for a perfect scenario for Johnsongrass to thrive. Following the successful clearing of winter annuals from the field, Johnsongrass was able to immediately emerge from rhizomes and thrive in the late April and May conditions with little interruption from field activities.

A few have asked if Johnsongrass is worse because of a lack of residual herbicides. I would argue it could be the opposite. Residual herbicides are only effective on weeds emerging from seed. While there is some Johnsongrass emerging from seed, the majority that we have been witnessing the last two months is emerging from rhizomes which are not controlled by residual herbicides. Rhizome established Johnsongrass actually may benefit from a residual herbicide keeping summer annuals from emerging and reducing competition with the already thriving Johnsongrass. This is not to say that residuals should not be used, but rather that a plan to control Johnsongrass postemergence and in the fall should be implemented.

While it is counterintuitive to our typical message of spray small weeds, the rapid advancement of rhizome Johnsongrass to large plants over the month of May has been to our advantage for successful control. As a perennial we should target the plant near reproductive stages to encourage translocation of herbicides to the root and rhizomes to increase long-term control. Applying glyphosate to Johnsongrass in the boot stage is largely more successful than applications to small Johnsongrass plants. Thus, this year sprayers being held out of the field and Johnsongrass gaining substantial size has led to the majority of Johnsongrass being controlled with postemergence glyphosate applications applied to large Johnsongrass.

It should be noted though, that while our postemergence applications have been largely successful, we need to start thinking beyond this year for Johnsongrass control. As mentioned above, I believe

many fields have been building Johnsongrass rhizome (underground vegetative reproductive structures) networks over the past several years leading to the perceived increase this year. Those observing heavy Johnsongrass infestations this spring should note those fields and potentially plan for additional control practices in the fall. Fall applications are another key time to ensure herbicide translocation to the plant root and rhizomes to increase long-term control of this perennial species. Stay tuned for an article on this topic as we approach the fall.

### **Corn Postemergence Applications**

The majority of our corn in the state has surpassed growth stages for herbicide applications, although there may be some later planted corn still receiving herbicide applications. Remember all postemergence herbicide have growth stage limitations. A table of growth stage restrictions can be found on page 44 of the [2024 AGR-6](https://www2.ca.uky.edu/agcomm/pubs/agr/agr6/agr6.pdf) publication (<https://www2.ca.uky.edu/agcomm/pubs/agr/agr6/agr6.pdf>). Additionally, this table lists the rain fast period for postemergence products as well as adjuvants recommended by the label.

### **Soybean Postemergence Cutoff Dates and Growth Stages**

While the corn postemergence applications are winding down, postemergence applications on soybean are in full swing. A reminder that all applications of existing stocks of Xtendimax, Engenia, and Tavium must stop on June 30<sup>th</sup>. All sales of these three products stopped on May 31<sup>st</sup>.

There is not a cutoff date for Enlist Duo and Enlist One for use on Enlist soybean, rather there is a cutoff growth stage of R2 (full flowering) allowing for a bit more flexibility with these products. Additionally, as a reminder Liberty can be applied up to but not including the blooming stage of soybean and glyphosate can be applied through soybean flowering. A complete list of growth stage limits for soybean postemergence herbicide can be found on page 100 of [AGR-6](#).

### **Weed Didn't Die? Let UK Test for Herbicide Resistance**

Dr. Samuel Revolinski is the newest member of the weed science faculty at the University of Kentucky and has set up a herbicide resistance screening program. If you have weeds that are surviving herbicide application and you suspect resistance, Dr. Revolinski's program can screen the seed for resistance. His program is primarily in search for Italian ryegrass, waterhemp, Palmer amaranth, and Johnsongrass but will evaluate other species if needed. If you would like to have plants from your field screened, please contact your County ANR Extension Agent who will help you collect seeds and send them off to Lexington for Dr. Revolinski to screen. This also helps Dr. Revolinski build his database of weed species genetics from across the state to further enhance his program's understanding of herbicide resistance and implementation of methods for controlling herbicide resistant weeds.

**Dr. Travis Legleiter**

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# Corn Disease Update for June

Farmers are annually concerned about corn disease, and this year will be no exception. Corn growth stages in Kentucky vary widely, with some corn likely to tassel this week, while in other parts of Kentucky, corn is still in the bag and yet to be planted. The challenges to the 2024 planting season will make foliar disease monitoring and management decisions more important as we move through the summer. Frequent rainfall across the state has led to some detections of [anthracnose leaf blight](#) (caused by *Colletotrichum graminicola*), and some low levels of [gray leaf spot](#) (caused by *Cercospora zea-maydis*) in the lower canopy of corn that is close to tasseling. Other diseases observed recently include [Diplodia leaf streak](#) (caused by *Stenocarpella* sp.) and [Holcus leaf spot](#) (caused by the bacteria *Pseudomonas syringae* pv. *syringae*). To date, no concerning levels of disease have been observed, but it is important to scout frequently, monitor University resources, and be prepared to act if conditions warrant foliar disease management. In most cases, a single foliar fungicide application at tasseling/silking (VT/R1) will be most effective at preventing yield loss due to foliar diseases, and also provides the greatest chance of seeing a positive return on investment.

One of the most important corn diseases to monitor in Kentucky is southern rust. The fungus that causes southern rust does not overwinter in Kentucky, but spores of the fungus move north on wind currents and weather each summer. We can track the movement of southern rust by watching the map on the cornipmpipe website here: <https://corn.ipmpipe.org/southerncornrust/>. On the map, red counties/parishes indicate that southern rust has been confirmed by university/Extension personnel. To date, southern rust has been confirmed in Louisiana and Georgia. Southern rust typically arrives in Kentucky in mid-July, and whether a fungicide will be needed to manage southern rust at that time will depend on the crop growth stage at the time it is detected in an area. Fungicide applications may be needed to manage southern rust through the milk (R3) growth stage. More information on southern rust can be found here: <https://cropprotectionnetwork.org/publications/an-overview-of-southern-rust>

Another disease that can be monitored on the cornipmpipe website is tar spot. Tar spot is a new disease in Kentucky, with only a handful of counties having confirmed disease since 2021. In all cases, tar spot was not observed until mid-September and did not impact yield. This is a disease of concern in states to the north, and we can monitor real-time confirmations at <https://corn.ipmpipe.org/tarspot/>. Tar spot has been detected in a few northern states as of June 10. More information on tar spot can be found here: <https://cropprotectionnetwork.org/publications/an-overview-of-tar-spot>

If considering a fungicide application in 2024, remember to scout fields first and check hybrid resistance ratings prior to fungicide application. Hybrids that are moderately resistant or resistant to foliar diseases like gray leaf spot are less likely to demonstrate an economic response to fungicide application.

Because of the variation in corn growth stages, and detections of important diseases in other states, farmers may be tempted to alter their planned fungicide application timings. Multiple foliar fungicide

application timings are promoted in corn, but research at the University of Kentucky and in other states has shown that a fungicide application at tasseling/silking (VT/R1) is most effective at preventing yield loss due to foliar diseases, and also provides the greatest chance of seeing a positive return on investment. Early foliar fungicide applications that occur at V4-V6 are less likely to provide an economic gain (<https://cropprotectionnetwork.org/publications/impact-of-foliar-fungicide-timing-and-fungicide-class-on-corn-yield-response-in-the-united-states-and-ontario-canada>). Another popular application timing in Kentucky is a pre-tassel application that occurs between V10 and V14. University of Kentucky research has indicated that this application timing can provide comparable disease control and yield response to a VT/R1 application in a year with average disease pressure.

Scouting over the next few weeks and just prior to tasseling can help determine if fungicide applications are needed. Although disease levels will continue to build over the course of the season, University research indicates that foliar fungicides applied at tasseling or early silking (VT-R1) provide optimal foliar disease control for diseases like gray leaf spot compared to applications that occur earlier or later in the season. For southern rust, a fungicide application may be needed through milk (R3). Management of tar spot will be on a case-by-case basis at this time. Always check with your County Agent for updates on the diseases present in your specific county and help determining if management is warranted.

**Dr. Kiersten Wise**

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# UK Launches New "Weather Alert" Smartphone App

I'm excited to present a new smartphone app called "**Weather Alert**", developed in collaboration between the [UK Ag Weather Center](#), [UK Center for Computational Sciences](#), and [Southeastern Center for Agricultural Health and Injury Prevention \(SCAHIP\)](#). The goals of this app are two-fold: to heighten awareness during extreme weather conditions and secondly, to empower Kentucky farming operations with valuable insights for management and production-related decisions.



Made possible through support from Smith-Lever/Land Grant Engagement funding, SCAHIP, and the [UK Department of Biosystems & Ag Engineering](#), the initial phase of app development is now COMPLETE. This includes a user-friendly design for easily accessing current and forecast weather data, including a high-resolution radar interface. This app also seamlessly integrates the ability to deliver timely warning and watch alerts directly to your mobile device, all accessible through your phone's GPS location or other designated areas of interest.

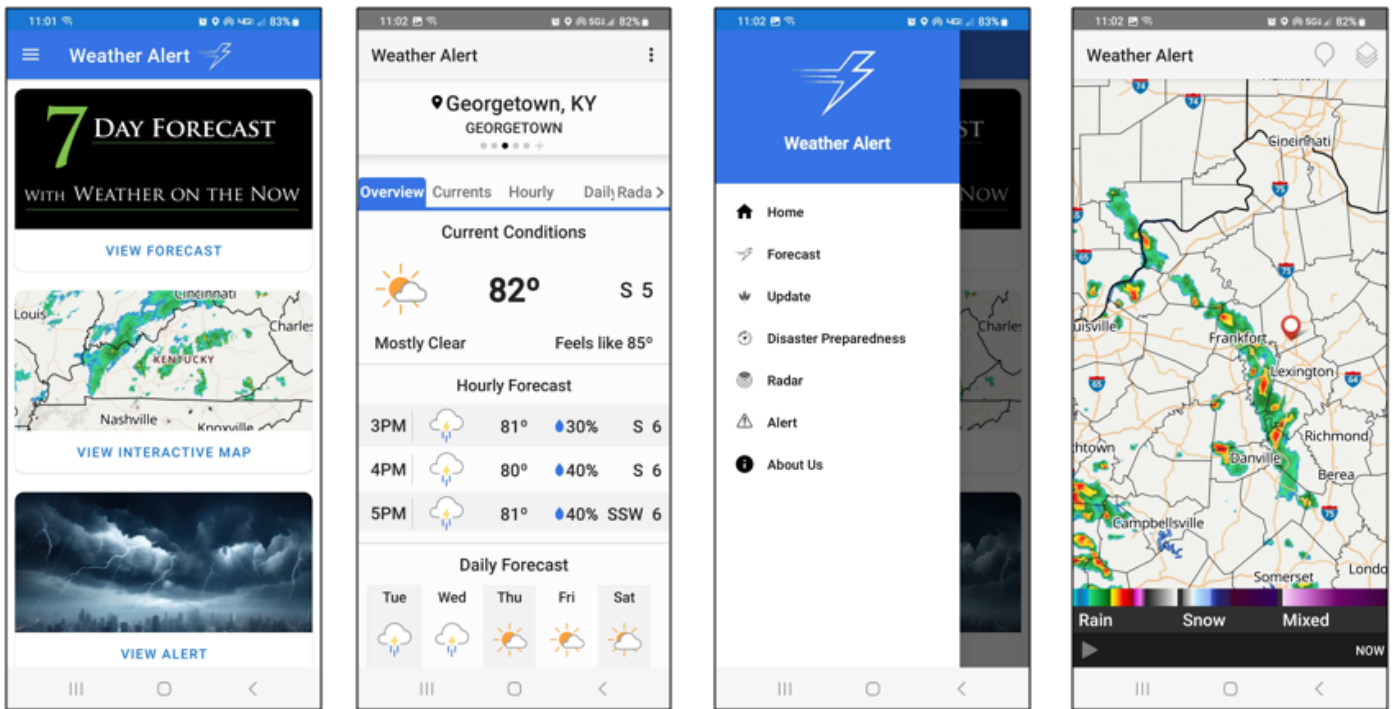
The app can be accessed for each platform by scanning or clicking the QR codes below.



Phase two of app development will start in the coming weeks, where tools from the Ag Weather Center will be updated and modernized to create a GPS-enabled, county-by-county ag weather product for the Bluegrass State. We'll then turn our attention to disaster readiness in phase three, focusing once again on a county-by-county product.

Last but not least, this app is completely **FREE** with **NO ADS!** One of the best compliments I received a few weeks ago was from a farmer in Boyle County. She mentioned that this is the first weather app she could use in her rural location that doesn't bog down because of ads!

Please share with friends and family! While the focus is on the state of Kentucky, you can utilize this app anywhere across the United States. I've included some screenshots of the iOS version below for reference. As mentioned above, this app is being completed in three phases, and I'm more than open to suggestions and comments as we move forward in development. You can send those to our email at [weather.alert@uky.edu]. Ultimately, the goal is for this app to be your go-to source for your ag weather needs and staying weather aware!



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# Will the Corn Population Treadmill Ever End?

**C**orn populations are always increasing. Farmers growing open-pollinated varieties in the 1930's planted 4,000 to 8,000 seeds per acre and produced yields in the 20-bushel range. Populations today are usually above 30,000 plants per acre while yield contest winners often report populations above 50,000 plants per acre.

Why have corn populations consistently increased over the years? The short answer is that higher yields are associated with higher populations - but why does this association exist? To answer this question, we have to go back to the basics and consider the universal yield equation.

This equation divides yield into its two components – the number of kernels (seeds) per acre and the weight per kernel (seed). Any increase in yield of any grain crop must come from increases in either or both of these components.

It turns out that most of the yield increase in corn (and soybean) since the 1930's was associated with an increase in kernels (seeds). Weight per kernel (seed) made a much smaller contribution, principally as a result of longer seed-filling periods. So now the question is – how did the corn plant increase the number of kernels to produce higher yield?

Studies have shown that ear size (kernels per ear) did not increase much as yield increased during the hybrid era. Increasing population (ears per acre) was the only way that kernel number could be increased. More plants (ears) were needed to produce the kernels required for higher yield because the corn plant is not flexible. There was no other option.

The ancestors of corn and early corn varieties were flexible – they produced ear-bearing tillers and multiple ears on the main stem, but variety improvement over the years got rid of most of this flexibility. Most modern hybrids produce only a single ear on the main stem, even though there are ear primordia at all nodes below the ear. An occasional hybrid will produce a second ear at low populations or in highly productive environments (i.e., they are prolific). Old-time corn breeders often commented that they made their selections at high populations which would not select for multiple ears, increases in ear size or weight per kernel.

Comparing the response of corn (inflexible) and soybean (flexible) perfectly illustrates the relationship between plant population and flexibility. Corn populations have gone up steadily since the beginning of the hybrid era, while soybean populations either haven't changed or, in recent years, actually decreased as seed prices increased. The yield increase of both species was associated with an increase in kernels (seeds) per unit area, but soybean is flexible and can increase seeds per plant by branching (more nodes), increasing flowers per node, and perhaps decreasing flower and small-pod abortion. None of these mechanisms are available to the corn plant, so the producer has to increase population to accommodate the extra kernels needed for high yield. The relative rate of yield increase of the two species is the same despite their drastic differences in flexibility.

Inflexibility results in a crop that is harder to manage than a flexible crop (e.g., soybean). Maximum

corn yield requires the correct population, uniform spacing of plants in the row and uniform emergence. Flexible crops produce the same yield over a range of populations and don't require uniformity because the dominant plants (wider spacing or early emergers) can increase seed numbers to make up for the loss on the dominated plants (narrow spacing or late emergers) so that yield is not affected. Corn cannot do this.

Increasing corn population to support the super-high yields of the future will eventually create management problems. A yield of 350 bu./acre will require (applying the universal yield equation and assuming a kernel size of 75,000 kernels/bushel, 500 kernels per ear and 1 ear per plant) a population of 52,500 plants/acre which translates into 3 plants per foot in a 30-inch row (4 inches between plant centers) which doesn't leave much space between plants. Eventually, there will not be enough space in the row to accommodate ultra-high populations. Narrower rows or twin-rows may be necessary.

The population treadmill in corn will continue as long as yields continue to increase, as a result of more kernels, and the corn plant does not change (larger ears, more flexibility). A greater reliance on longer seed-filling periods or greater prolificacy could eventually slow the treadmill. The bottom line is that the population treadmill will likely continue for the foreseeable future. But don't forget that "prediction is very difficult, especially if its about the future" (Niels Bohr, physicist).

**Dr. Dennis Egli**

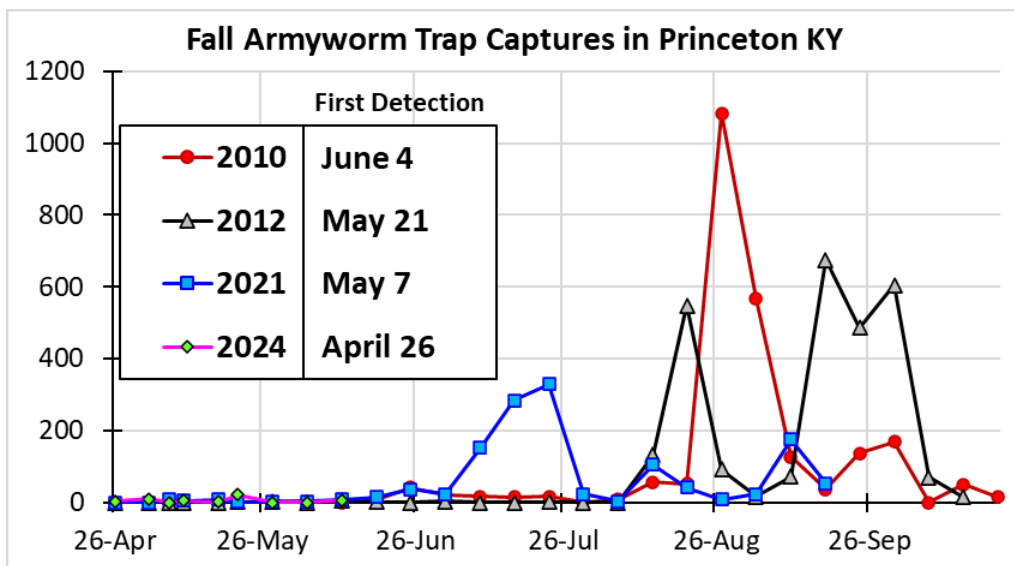
**UK Professor Emeritus** (859) 218-0753 [degli@uly.edu](mailto:degli@uly.edu)

# 2024: Early Presence of Fall Armyworm Moths in Pheromone Traps and Detection of Egg Masses in Corn and Man-Made Surfaces

**F**all armyworm (FAW) also known as *Spodoptera frugiperda* (Lepidoptera: Noctuidae), is a key pest of maize in most Latin American countries, and an occasional pest of forages, corn or soybean in North America. However, now it has worldwide distribution. It was detected in Africa in 2016, India in 2018, and Cyprus, Greece and Portugal in 2023; and may be distributed rapidly to the rest of European countries as it has a great capacity to migrate from calid areas to frigid regions where they cannot overwinter. This migration occurs every year in the USA and the FAW population peaks occur in the fall, hence it has this name.

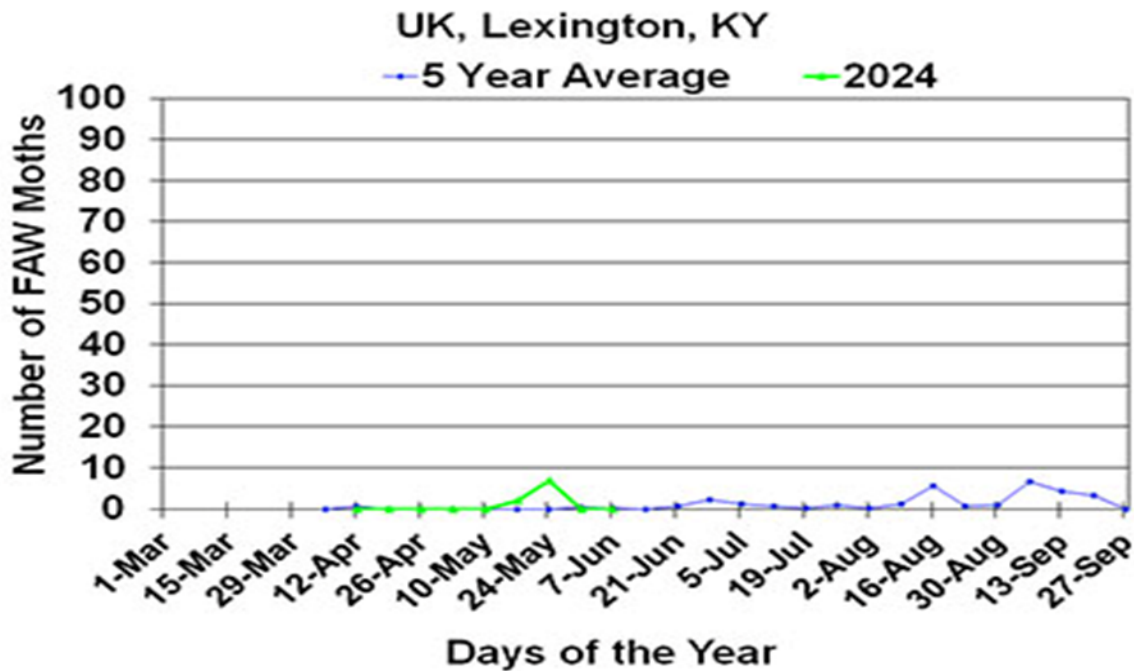
## Historic Data

In Princeton (western Kentucky), FAW and other moths that damage field crops had been monitored since 1993 in pheromone-based traps that capture adult male moths **Insect Trap Data** (<https://ipm.ca.uky.edu/faw>). Outbreaks of FAW had occurred in the past. In 2010 there was an exceptional FAW moth catch in Kentucky; trap counts on August 27 were 1,038 moths, an increase from 52 moth captures the week before (Figure 1, red line). In the 29 years the IPM traps have been collected in Princeton, the second-highest number of moth counts came in at 549 moths for the week of Aug. 20, 2012 (Figure 1, black line), and in 2021, another FAW outbreak affected many areas from states around the Gulf of Mexico to Kentucky ((Figure 1, blue line), many northcentral and eastern states, and Ontario and Quebec in Canada. In Kentucky the peak was 329 moths captured reached in July 30. In Kentucky alone this pest affected more than 100,000 acres of forages and its economic impact was more than \$5.2 million. All this information was accessed from [Insect Trap Data](#).



**Figure 1.** Fall armyworm trap captures and first detection in Princeton KY in 2010, 2012, 2021, and 2024 (modified from [Insect Trap Data](#)).

The clear differences between the outbreaks of 2010, 2012 and 2021 were the peak populations they reach **but hidden data that may be important** is their initial first detection: June 4 in 2010, May 21 in 2012, and May 7 in 2021. Whereas in 2024 these dates for Princeton and Lexington are even earlier: April 26 in Princeton (Figure 1) and May 17 in Lexington (Figure 2). A progressive earlier detection in recent years. These earlier captures are caused probably by the shorter winter periods happening every year that provides earlier migration from the overwintering sites, producing earlier mating, and earlier egg laying. In addition, we have more frequent tropical storms that help with this rapid FAW migration.



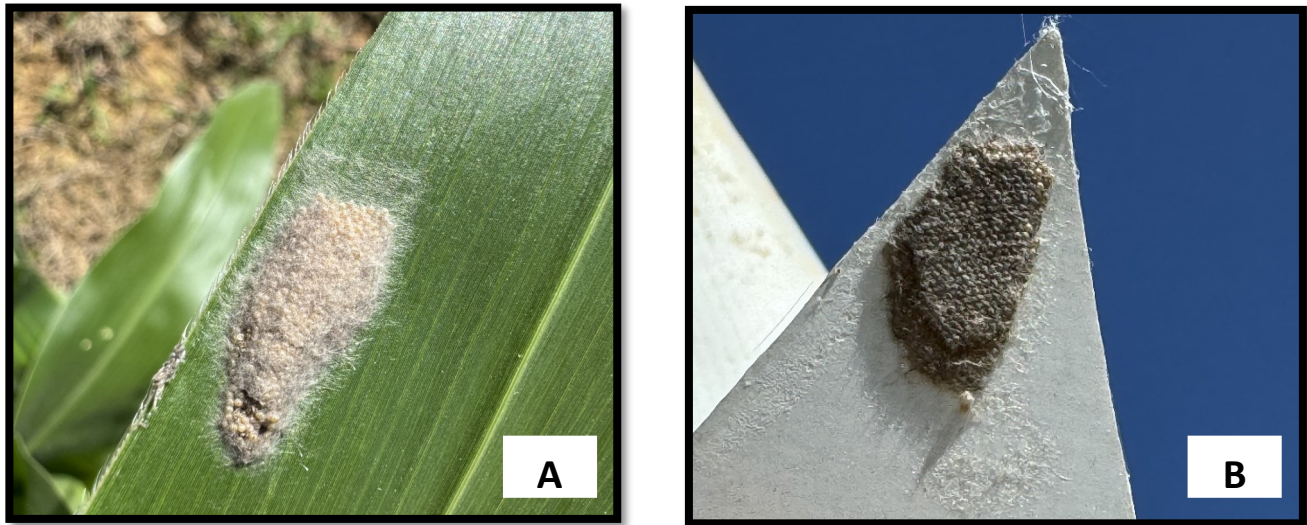
**Figure 2.** Fall armyworm trap captures in Lexington KY in 2024 and a 5-year average (Taken from [Trap Data](#)).

### Current Conditions

In addition to this earlier detection of moths, we were finding FAW eggs in corn leaves and in walls, poles and in flags near corn fields. This is worrisome, because in less than 15 years (2010 to 2024) the first detection of FAW was drop 39 days. This occurrence may coincide with the outbreaks that happened in 2012, and 2021. We are not suggesting that this alone is the cause of the outbreaks because there are other factors that may contribute to this problem; this may include the following:

- presence of the Rice strain of the FAW when damages are caused in forages,
- failures of control by some insecticides (by their continues use that are conducive to the development of insect resistance)
- the great capacity of oviposition of this species. A single female can lay egg masses that can reach up to 2,000 eggs causing a rapid increase of populations. These eggs are oviposited in 2 to 3 layers that are covered by moth scales (Figure 3A and 3B).

We recommend that growers, consultants, Agricultural Natural Resources County Extension agents to be aware of this condition and to be vigilant of the presence of the earlier instars of the FAW larva that are harder to see but detectable if hand lenses are used.



**Figure 3.** (3A) Pearl colored eggs oviposited over a corn leaf, its light coloration indicates that they may be 1 or 2 days older; whereas (3B) darker coloration indicates that eggs may be oviposited 5 or 6 days before and larva may be hatching soon. Notice the fuzzy moth scales on 3A that protect the eggs from natural enemies (parasitoids or predators).

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# Pest Management Field Day

## June 27, 2024

8:30 a.m. to 12:30 p.m.

### Speakers and Topics

#### Travis Legleiter

- Waterhemp and Palmer amaranth management
- Soybean residual herbicides for management of *Amaranthus* species
- Maximizing metribuzin in soybean
- Postemergence soybean herbicide programs across HR trait platforms
- Corn herbicide programs

#### Kiersten Wise

- Corn disease update

#### Carl Bradley

- Soybean disease update

**Weed Science and Plant Pathology Graduate Student Project Updates**

Sign-in begins at 8:00 a.m. CDT at the Princeton First Baptist Church Christian Life Center located at 300 W. Main St. Parking is available at the church lot at the West Market Street and North Cave Street intersection. A caravan will proceed to UKREC for field plot tours.

A **free lunch** will be provided. Pre-registration is recommended by June 20. Pre-register online at <https://tinyurl.com/2i9y33md> or by scanning QR Code; calling the UKREC, (270) 365-7541, EXT. 22569, or email [jason.travis@uky.edu](mailto:jason.travis@uky.edu).



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Disabilities  
accommodated  
with prior notification.

# **Corn, Soybean & Tobacco Field Day**

**UKREC, Princeton KY 42445**

**Wagons roll: 8:00am CT**

## **Topics include:**

**Corn Disease Concerns For 2024**

**Familiar and New Soybean Diseases to Look Out for in 2024**

**Insect Update**

**Corn and Soybean Variety Trials**

**Weed Control in 2024 And Beyond**

**“Weather Alert”**

**Maximizing Corn Yields Following a Cover Crop**

**Soybean yield and economic response to irrigation**

**Corn and Soybean Outlook**

**The Fundamentals of Soil pH Management for Production Agriculture**

**Changes To Agr-1 Fertilizer Rate Recommendations for Kentucky Grain Crops**

**UKREC Dark Tobacco Infrastructure and Research Update**

**Tobacco Research Update from University of Tennessee**

**Sulfur Fertility in Tobacco**

**Registration: <http://tiny.cc/m9jlyz> Or scan the QR Code**



**Thanks to our lunch sponsors!**



# UPCOMING EVENTS

## Pest Management Field Day (IPM Grain Crops)

*June 27, 2024*

## CORN, SOYBEAN & TOBACCO FIELD DAY

*July 23, 2024*

## KATS Field Crop Pest Management & Spray Clinic

*August 29, 2024*



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