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UK Wheat Science Group
UK Corn & Soybean Science Group

In This Issue

Corn Diseases Associated with Ponding

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Recent rains and waterlogged soils have led to localized areas of ponding in emerged corn. Corn that is underwater briefly can recover but may be impacted by several diseases. Two minor diseases, crazy top and Physoderma brown spot may be problematic in areas where corn is underwater for 24-48 hours.

Crazy top is caused by a fungal-like organism called *Sclerophthora macrospora*. This pathogen survives in soil and infects young corn plants when there is excess rain or ponding in the spring. Crazy top symptoms are most often observed at tasseling when distorted and malformed tassels appear in areas that were ponded or saturated (Fig. 1). However, in some fields symptoms may be less diagnostic, and include stunting, tillering, thin, yellow leaves, and barren plants. More on crazy top can be found in the UK publication Crazy Top of Corn.

Physoderma brown spot is caused by the fungus *Physoderma maydis* which also survives in soil and residue and infects corn plants when plants are ponded or excess water remains in the whorl. The symptoms typically appear in the late vegetative stages through pollination and are characterized by very small chocolate brown or yellow lesions on the leaves and midrib (Fig. 2). The lesions may appear in a banded pattern. The lesions can also be found on the stalk, leaf sheath, or ear husks. Read Physoderma Brown Spot of Corn for more information.

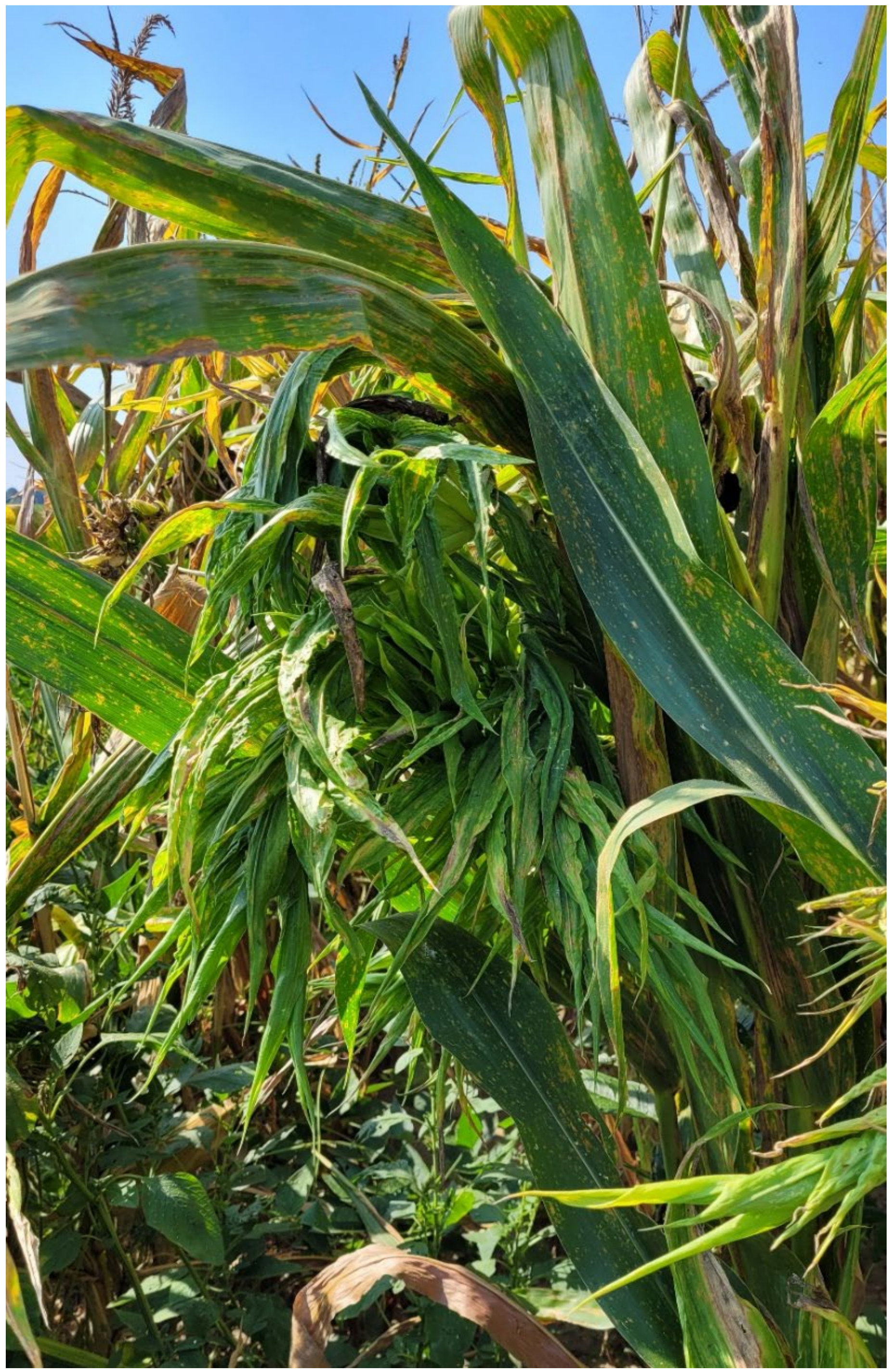

Figure 1. Classic symptoms of crazy top in corn.

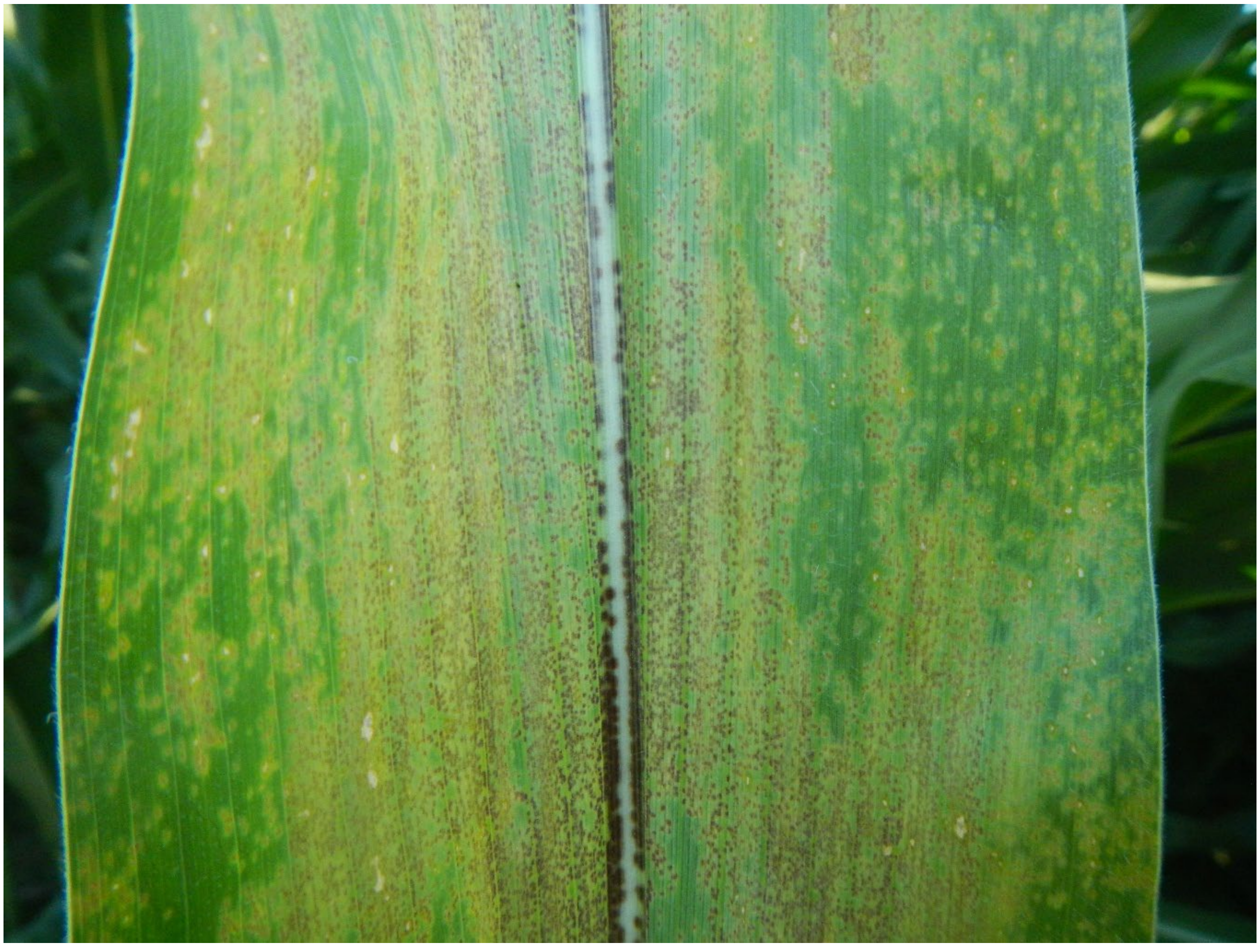

Figure 2. Symptoms of Physoderma brown spot on leaves (Picture courtesy Kiersten Wise)

Crazy top and Physoderma brown spot rarely need management and are usually only problematic when water covers the whorl of the plant for short periods of time. Improving soil drainage and removing infected plants will reduce the disease risk for subsequent crops. Fungicides are labeled for Physoderma brown spot management, but symptoms are usually not severe enough to warrant preventative fungicide applications.

Citation: Wise, K., 2025. Corn Diseases Associated with Ponding. Kentucky Field Crops News, Vol 1, Issue 5. University of Kentucky, May 16, 2025.

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Monitoring of Seedcorn Maggot May Be Required During Planting & Germination

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Seedcorn Maggot.

The seedcorn maggot, *Delia platura* (Diptera: Anthomyiidae), is the larval stage of a small fly that feeds on seeds of corn, soybean, cereals, brassicae such as broccoli (Figure 1), and various allium crops such as garlic, onion, and lilies. The seedcorn maggots are detritivores, meaning they feed on decomposing organic matter, and they often target germinating seeds of the aforementioned crops. Seedcorn maggots overwinter as pupae, with the first generation of adults emerging early in the growing season to mate and lay eggs.

Seedcorn larvae can feed on cotyledons, embryos, and endosperms of germinating seeds, potentially killing seedlings or delaying their development. Early planting often coincides with the emergence of the first generation of maggots, increasing the risk of significant damage to germinating maize and soybean crops. Outbreaks of seedcorn maggots can result in stand losses exceeding 90%. High soil moisture and low temperatures further exacerbate the issue by slowing seed germination, making seeds more vulnerable to seedcorn maggot attack.

Figure 1. Seed corn maggot on broccoli seedling (Photo by Ric Bessin) and on soybeans (Photo by University of Minnesota Extension).

Current Sowing Situation

Corn and soybean farmers in Kentucky have been postponing the sowing of their seeds in 2025. One of the reasons for this delay is the high soil moisture caused by cumulative precipitation levels, which are significantly higher compared to previous years. Figure 2 shows the cumulative precipitation in four Kentucky cities -Mayfield, Princeton, Bowling Green, and Lexington- located in four counties from west to east (Graves, Caldwell, Warren, and Fayette, respectively) from January 1 to May 3, for the years 2020, 2024, and 2025. These years represent "normal," dry, and high-precipitation conditions, respectively. The data presented here for cumulative were summarized from the UK Ag Weather Center (https://weather.uky.edu/ky/data.php).

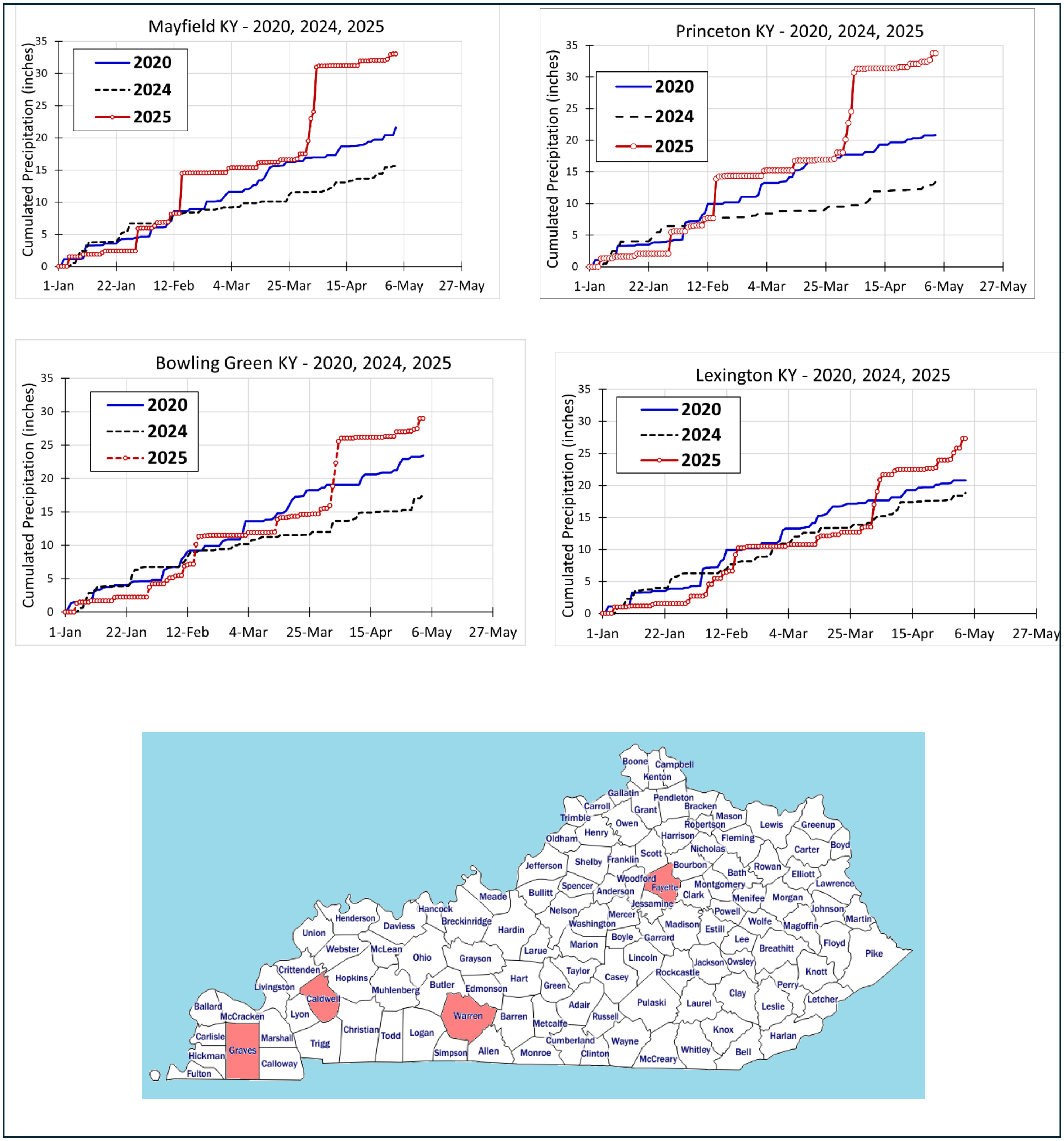

Figure 2. Cumulated precipitation (inches) in 2020 (“normal” rainfall year), 2024 (dry year), and 2025 (wet year) in Mayfield, Princeton, Bowling Green, and Lexington located in Graves, Caldwell, Warren, and Fayette counties (map inset shows county locations).

Compared to 2020 (a normal year), cumulative precipitation in 2024 (a dry year) was 28%, 36%, 25%, and 9% lower, whereas in 2025 (a wet year), cumulative precipitation was 53%, 62%, 24%, and 31% higher for Mayfield, Princeton, Bowling Green, and Lexington, respectively (Figure 3).

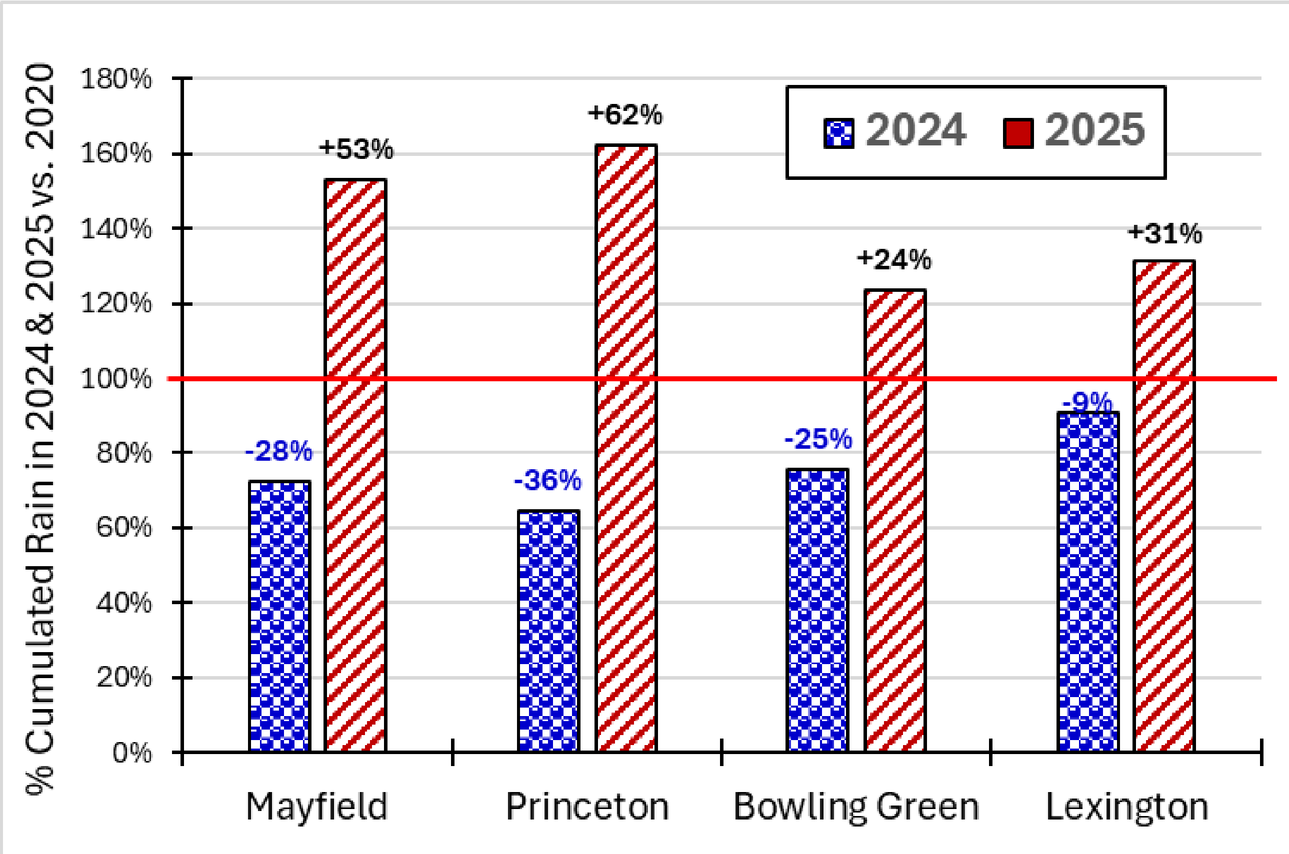

Figure 3. Comparison of the cumulated precipitation (inches) for 2024 (dry year), and 2025 (wet year) vs. 2020 ("normal" rainfall year), in Mayfield, Princeton, Bowling Green, and Lexington. Rainfall was most noticeable in western cities (Mayfield and Princeton) compared with central KY cities (Bowling Green) and eastern (Lexington).

Moist soils and heavy rains can affect the longevity of seed treatments, increase the risk of fungal diseases, wash away fertilizers or herbicides, and promote the proliferation of insects and mollusks. The entomology lab in Princeton is closely monitoring snail and slug populations; so far, these populations have not surged in Western KY, but this week (05/08/25), Colby Guffey the County Extension Agent, Agriculture and Natural Resources of Clinton County reported and outbreak of slugs in soybeans in Wayne County (Figure 4), reporting a 23.9 ± 8.4 (mean ± SEM) and highest count of 50 snail per 5 sq-ft .

Figure 4. Slugs outbreak in Wayne County in May 2025. Photo: Colby Guffey (CEA-ANR, Clinton Co.).

Soybean and corn growers should remain alert, as high soil moisture can also increase the activity of seed corn maggots and mollusks.

Management

Scouting for seedcorn maggots should be conducted during the germination stage of maize and soybeans. If plants appear damaged during the cotyledon stage, dig around the seedlings to check for the presence of maggots. Symptoms such as yellowing leaves or stunted growth may also indicate seedcorn maggot infestation.

There are no rescue treatments available for seedcorn maggots. Therefore, preventative measures are essential. These may include the use of insecticide-treated seeds or in-furrow insecticides in fields at high risk for infestation. If heavy losses occur, replanting may be necessary.

Cultural control strategies include:

- Planting when environmental conditions favor rapid seed germination and seedling growth.
- Avoiding planting for at least two weeks after incorporating fresh organic matter into the soil.
- Prompt replanting with treated seed to improve stand establishment.

More information

Seedcorn Maggot, University of Minnesota

Seedcorn Maggots (ENTFACT-309), University of Kentucky

Seedcorn Maggots Get an Early Start, Iowa State University

Seedcorn Maggot Seen in Abundant Numbers in Corn and Soybeans, Kentucky Pest News, University of Kentucky

Citation: Villanueva, R., 2025. Close Monitoring of Seedcorn Maggot May Be Required During Maize and Soybean Sowing and Germination. Kentucky Field Crops News, Vol 1, Issue 5. University of Kentucky, May 15, 2025.

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Timing is Key – Describing the Critical Stages of Yield Production

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The effect of management practices or stress on corn and soybean yields often depends upon when it happens. It's not just how dry it is or how hot it is, but when it's hot or dry. 'When' refers to what the crop is doing. As with most things in life – timing is all important.

We need a framework to help us understand this timing effect. Nearly 60 years ago a Japanese Crop Physiologist (Murata, 1969) described the yield production process by dividing it into three phases. Phase I - Formation of organs for nutrient absorption and photosynthesis (vegetative growth), Phase II - Production of flower organs and the yield container (determination of seed number), and Phase III - Production and translocation of yield contents (seed filling).

I think this simple model is a very useful tool to help us think about timing and yield for the following reasons. First, it emphasizes the sequential nature of the process – first the plant grows vegetatively (Phase I), then it flowers and sets seeds (Phase II), and, finally, it fills the seeds (Phase III), and yield is produced. Events early in the sequence can have implications for processes later in the sequence.

Secondly, this model relates directly to the Universal Yield Equation [Yield per acre = (number of seeds per acre) x (weight per seed)] with seed number fixed during Phase II and weight per seed (seed size) during Phase III.

Finally, this simple model applies to all grain crops (after all, economic yield is always the seed regardless of the species), although there are some species differences in details. Soybean, for example, continues vegetative growth (Phase I) until the end of Phase II while there is a clearer separation of the three phases in corn.

The crop produces the photosynthetic machinery that will ultimately produce yield during Phase I (vegetative growth). Stress during this phase (in soybean, the portion of Phase I occurring before Phase II) may not affect yield if the plants are healthy and produce enough leaf area to completely cover the ground at the beginning or shortly after the beginning of Phase II. Sunshine that reaches the soil does not contribute to photosynthesis of the crop and, to make matters worse, it helps weeds grow. Having complete ground cover (leaves intercept almost all the sunshine) near the beginning of phase II is a requirement for maximum yield.

The number of seeds per acre (the size of the yield container) is determined during Phase II making this phase critical for high yield. Phase II in soybean runs from Growth Stage R1 (one open flower at any node on the main stem) to a little past Growth Stage R5 [at least one pod at the top four nodes with a completely unrolled leaf contains a 3 mm (1/8 inch) seed] while in corn, this phase is often considered to run from 20 days before silking to 20 days after silking.

Seed number is related to the supply of simple sugars from photosynthesis during this phase, assuming there are enough flowers (never a problem with soybean). If there are not enough flowers, there will not be enough seeds for high yield (happens in corn if the population is too low). Any stress that reduces photosynthesis during this period will reduce seed number and probably yield.

I say probably because increases in seed size can compensate for reductions in seed number and limit the effect of stress during Phase II on yield. Soybean seeds are more flexible than corn kernels, but there is limit to how much they can flex (you can't fit a golf ball into a soybean pod) and how much they can compensate. The bottom line is that reductions in seed number during Phase II will probably reduce yield, so avoiding stress during Phase II is a must for high yields.

The length of Phase II varies, but Crop Physiologists are not in agreement over the importance of this variation. Some believe (and there is data to support this position) that a longer Phase II results in more seeds and higher yields. Others (including me) believe that length is not important. We believe that, since seed number is related to the productivity of the crop, including length will disrupt this relationship. The crop would produce more seeds than it could fill, resulting in abnormally small seeds.

Yield is produced during Phase III which ends at Growth Stage R7 (one normal pod on the main stem that has reached its mature pod color) in soybean and at Black Layer (black layer formed at the base of the kernels) in corn. Yield production is complete at the end of Phase III, but the seeds must dry before they can be harvested.

Not surprisingly, the length of the seed filling period, which has a genetic and an environmental component, is directly related to yield. The longer the seeds grow, the higher the yield.

Phase III has several interesting characteristics. First, it is short, usually lasting only 30 to 40 days, so all systems must be go to produce high yields in such a short time. The crop allocates most of its growth (~70% out of a 115-day growth cycle, for example) to preliminary events (Phase I and II) with only ~30% (35- day seed-filling period) to producing yield.

The second interesting characteristic is that early in seed filling the leaves start to senesce, breaking down the photosynthetic apparatus and shipping the breakdown products to the developing seeds. It seems strange that the crop starts destroying its capacity to produce yield just when it finally starts actually accumulating yield. Senescence does, however, increase the efficiency of nitrogen use by reducing the amount left in the leaves and stems at maturity.

Stress during phase III will reduce seed size and yield. High temperatures shorten the seed-filling period as does moisture stress. We found in greenhouse experiments that the acceleration of leaf senesce by moisture stress could not be reversed by rewatering the plants after only 3-days of stress making yield vulnerable to short periods of water stress.

Murata's (1969) three phase model of the yield production process helps us think about how the environment and management practices affect yield. The simple model describes the sequential nature of the process and identifies the critical periods for maximizing yield. First the crop produces the photosynthetic machinery, then the yield container (seed number) and finally it fills the container. Understanding this model will lead to better management decisions and that means more money in the bank.

This model fits the concept expressed by Albert Einstein (physicist, Noble laureate, 1879-1955) that "Everything should be made as simple as possible, but not simpler."

Adapted from Egli, D.B. 2021. Applied Crop Physiology: Understanding the Fundamentals of Grain Crop Management. CABI. Wallingford, UK. 178 pp.

References

Murata, Y. 1969. Physiological responses to nitrogen in plants. p. 235-259. In: Eastin, J.D. et al. (eds). Physiological Aspects of Crop Yield. ASA-CSSA. Madison WI.

Citation: Egli, D. 2025. Timing is Key – Describing the Critical Stages of Yield Production. Kentucky Field Crops News, Vol 1, Issue 5. University of Kentucky, May 16, 2025.

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Late-season Management Tips for Winter Wheat

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Chad Lee, Grain and Forage Center of Excellence director

Note: This article was originally written for County Extension Agents. Jennifer Elwell consulted with Chad Lee, Travis Legleiter, Raul Villanueva and Carl Bradley. The article is reprinted here.

May is the prime time to scout and take action for wheat for diseases, insects and weeds.

While approximately 10,000 acres of wheat that were underwater for several days in April are lost, most farmers across Kentucky have reported only a small portion of their wheat fields were impacted. Further good news is that the condition of Kentucky's surviving wheat crop has improved, according to the May 5 USDA-NASS Crop Progress and Condition report.

By May, wheat is typically flowering and developing seeds. This grain-filling period is critical for producing high yields because kernel size and weight are determined during this stage. Yields will be reduced by any stress (high temperatures, low soil moisture, nutrient deficiencies and pests) occurring during grain fill.

Even though we have little control over weather scenarios, decisions can be made to address pest stressors.

Pre-harvest Weed Control

After wheat has headed, watch for emerging warm-season weeds. A preharvest treatment after the hard-dough stage, where the crop has 30% or less grain moisture, may be needed to control weeds and improve harvesting wheat efficiency, especially where wheat stands are poor and weed infestations are heavy. However, research has shown preharvest treatments are not effective in preventing the production of viable seed of winter annuals weeds such as Italian ryegrass.

Glyphosate and specific formulations of 2,4-D are examples of herbicides registered for preharvest weed control in wheat and should be applied as a weed control tactic and not as a harvest aid to reduce wheat grain moisture. Preharvest applications of glyphosate or 2,4-D require a 7-to-14-day preharvest interval. Preharvest treatments can also injure wheat or reduce seed germination or seedling vigor and are not recommended for wheat grown for seed production.

Late Season Insect Pests

Scouting for insect pests, such as aphids, armyworms, and the cereal leaf beetle, should continue through May. Early detection, correct identification, and assessment of pest problems allow appropriate management decisions to be made. Regular field monitoring is the best means of getting the information needed to follow the recommended treatment guidelines.

Late-season disease

The risk of Fusarium head blight (FHB) has increased due to rains and generally cloudy weather that occurred in early May. According to the FHB risk map (www.wheatscab.psu.edu), large differences in risk can be observed for susceptible varieties compared to moderately resistant varieties. In May, wheat is generally beyond the time where a fungicide application can be made several days past early anthesis, except for a few exceptions with later-maturing wheat varieties. It will be important to start monitoring for symptoms of FHB in wheat fields over the coming weeks to determine if adjustments to combine fan speeds should be made, which can help blow out the lightweight "tombstone" kernels, which may have the highest levels of vomitoxin.

Other diseases that have been observed this year include Stagonospora and Septoria leaf blotch, leaf rust, and symptoms that resemble viral diseases. Other diseases that may be present include powdery mildew, glume blotch, black chaff, bacterial leaf streak, and stripe rust.

In general, management of important wheat diseases includes an integrated approach such as planting the most disease-resistant varieties available and applying an effective fungicide at the appropriate wheat growth stage if warranted from disease risk and/or scouting observations.

Additional recommendations on managing late-season wheat and preparing equipment for harvest can be found at https://graincrops.ca.uky.edu or contact your local Extension office for more information.

Citation: Lee, C., Elwell, J., 2025. Late-season Management Tips for Winter Wheat. Kentucky Field Crops News, Vol 1, Issue 5. University of Kentucky, May 15, 2025.

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Latest Wheat Production Numbers

Jennifer Elwell, M-G CAFE Marketing and Communications

NASS-USDA 5/12/2025 Crop Production Report

Winter wheat production in Kentucky is forecast at 29.465 million bushels, up 215 thousand bushels from 2024. It is estimated that farmers will harvest 355 thousand acres, down 35 thousand acres from 2024. Average yield is forecast at 83.0 bushels per acre, up 8 bushels from 2024.

Winter wheat production in the United States is forecast at 1.38 billion bushels, up 2 percent from 2024. As of May 1, the United States yield is forecast at 53.7 bushels per acre, up 2.0 bushels from last year's average yield of 51.7 bushels per acre. Area expected to be harvested for grain or seed totals 25.7 million acres, down 1 percent from last year.

Citation: Elwell, J., 2025. Latest Wheat Production Numbers. Kentucky Field Crops News, Vol 1, Issue 5. University of Kentucky, May 15, 2025.

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Winged Aphids Too Late to Cause Major Concerns in Small Cereals in 2025

Raul T. Villanueva, Entomology Extension Specialist

Current Situation

From January until mid-April, the entomology program for small cereals in Princeton monitored aphid populations in wheat planted on four different dates (from mid-September to December 1, 2024). Aphids were largely absent during this period. However, from mid-March to mid-April, an average of fewer than two aphids per 1-foot row-length was recorded. Since the beginning of this week (April 21, 2025), an average of one winged foundress aphid and three nymphs has been observed on every other flag leaf in commercial fields across Lyon, Caldwell, and Livingston counties. A winged foundress aphid typically emerges in the spring from overwintering eggs and initiates an asexual reproductive cycle (known as parthenogenesis). These winged foundresses then disperse to secondary hosts, colonize new fields, and establish new colonies.

The majority of aphids observed was the English grain aphid (*Sitobion avenae*) (Figure 1), However, there are several species of aphids in small grain fields in Kentucky (see below). These species are threatening pests of wheat, rye, oat, or barley not for the direct feeding but for the transmission of Yellow Dwarf Viruses (YDVs). All these species can be vectors of Yellow Dwarf Viruses (YDVs).

Figure 1. English aphid: winged (left), wingless laying a nymph (center), and a nymph (right).

Aphids and yellow dwarf viruses

In Kentucky, the most important aphid species vectors of YDVs include the English grain aphid, the bird cherry-oat aphid (*Rhopalosiphum padi*), the corn leaf aphid (*R. maidis*), the rice soil aphid (*R. padi*), the greenbug (*Schizaphis graminum*), and the rose-grain aphid (*Metopolophium dirhodum*). These aphid species differ in transmission efficiency and abundance in small cereal fields. During the winter wheat growing season, the most abundant aphids observed in Kentucky are the bird cherry-oat aphid and the English grain aphid.

Yellow dwarf viruses are economically important and can cause yield losses that can reach 80% in cereals (wheat, barley, rye, etc.), reduce yield quality and can affect non-cultivated grasses. Yellow Dwarf Viruses are phloem-limited, that are in the Solemoviridae and Tombusviridae families. In the Tombusviridae, YDVs include five species of barley yellow dwarf virus (BYDV): BYDV-PAV, BYDV-PAS, BYDV-MAV, BYDV-kerll, BYDV-kerlll). In the Solemoviridae, YDVs include two species of cereal yellow dwarf virus (CYDV-RPS, CYDV-RPV) and one of maize yellow dwarf virus (MYDV-RMV) and other species (i.e. BYDV-GPV, BYDV-SGV, BYDV-GPV and BYDV-SGV). The viruses in these groups tend to have broad, overlapping host ranges in the Poaceae grasses, with somewhat more specificity in vector relations.

What to do?

Small grain farmers may be concerned about the risk of Barley Yellow Dwarf Viruses infection, transmitted by aphids. In response, they might consider applying insecticides to control aphid populations. However, most wheat in western Kentucky has already reached growth stages between 10.1 (heading) and 10.5 (flowering) or later. At these advanced growth stages, the potential for virus transmission remains high, but the impact on yield is minimal. Therefore, insecticide applications may not be necessary, as the crop is developed enough that any effect on yield would likely be negligible.

More information

- Peters, et al. Ecology of Yellow Dwarf Viruses in Crops and Grasslands: Interactions in the Context of Climate Change. https://doi.org/10.1146/annurev-phyto-020620-101848
- Villanueva, Raul T. Scouting For Aphids in Winter Wheat Fields With or Without Insecticide Seed Treatment in March and April is Critical to Reduce BYDV

Citation: Villanueva, R., 2025. Aphids Were Scarce in 2025, Winged Aphids Arrived Too Late to Cause Major Concerns in Small Cereals in 2025. Kentucky Field Crops News, Vol 1, Issue 5. University of Kentucky, May 15, 2025.

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Managing Crop Markets When Trade Disrupts Prices

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Note: This article was originally written for Southern Ag Today .

International markets support U.S. agriculture, especially in the Southern states. Exports make up a significant portion of cash receipts for many major commodities produced in the Southern states (Figure 1). From 2010 to 2023, an average of 84% of cotton receipts came from exports, underscoring the crop's reliance on global trade. Wheat and soybeans also depend heavily on international markets, with exports accounting for 64% and 55% of their respective receipts. In contrast, corn is less export-oriented, with just 19% of receipts linked to foreign buyers[1]. This level of exposure makes Southern agriculture especially sensitive to tariff changes and trade policy shifts. During periods of uncertainty, a well-informed marketing and risk management strategy is often the best defense producers have against market volatility.

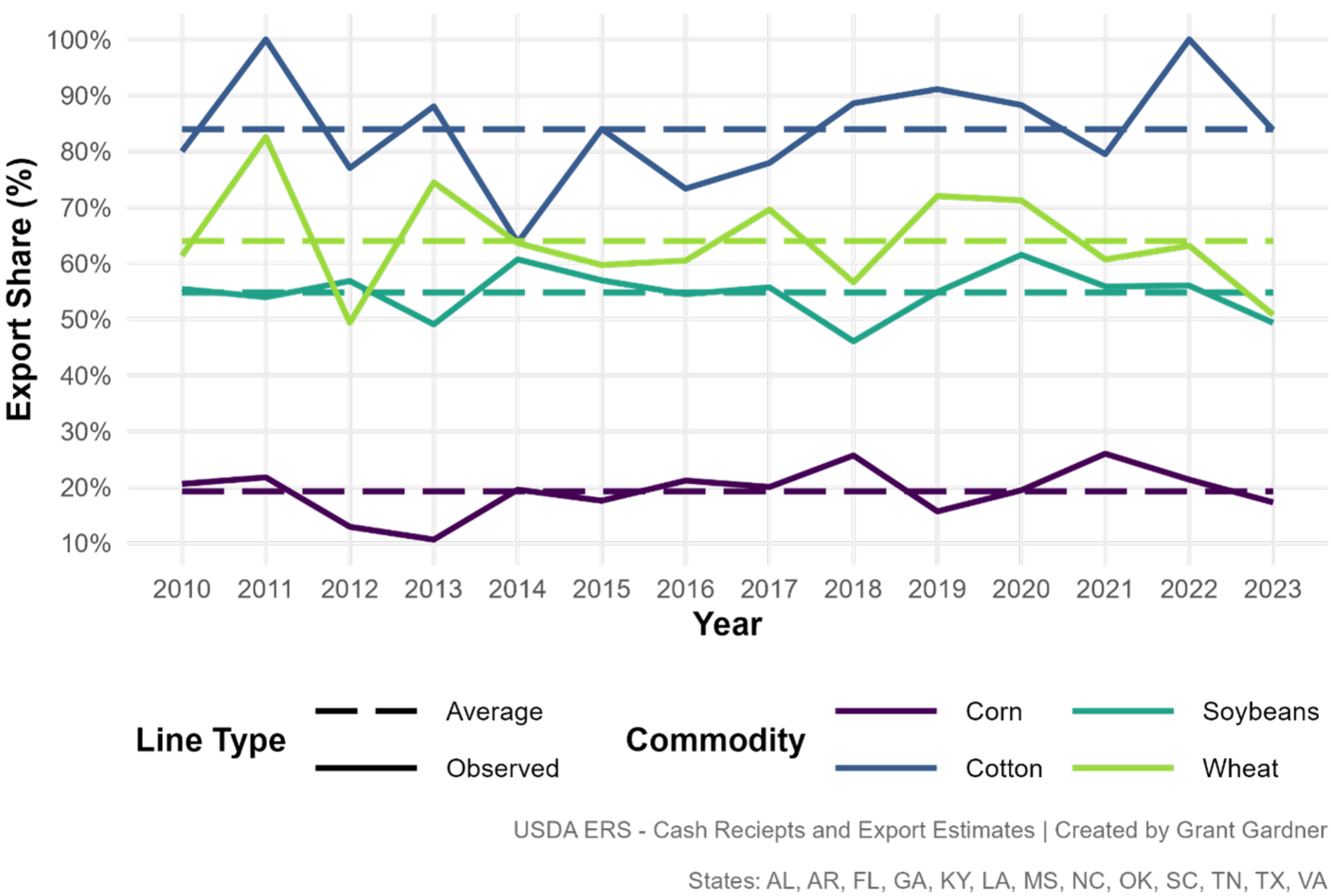

Figure 1. Export Contribution to Southern Ag Receipts, Observed and Average Share by Commodity, 2010-2023

A well-developed marketing and risk management plan is essential for producers facing today's volatile markets. While trade uncertainty is a significant source of price swings, volatility is a constant in agriculture—driven by weather, input costs, and global events. Trade is one of the dominant factors right now. Regardless of the cause, producers should expect uncertainty and be ready to manage price risk each crop year. A strong marketing and risk management plan is the best tool for navigating uncertainty. Crucially, the plan should be written down and shared with everyone involved in the operation to ensure clear communication and timely decisions. Growing a crop and marketing a crop involve two completely different skill sets, so communication between those in charge of production and those in charge of marketing and risk management is essential.

The most significant value of a marketing plan is determining sales timing, which should coincide with when production risk is reduced, and what action should be taken at different price points. Trying to time price peaks in markets shaped by unpredictable trade shifts is often ineffective and can be risky. Instead, a solid marketing plan sets decision dates, creating structure around when and how much to sell if markets achieve price targets. Dates should be tied to when production risk is reduced and be informed by realistic price targets, helping producers stay disciplined and focused on financial goals while taking some of the emotion out of pricing decisions. The key is to make sales when prices meet or exceed profit objectives at strategic points in the production/marketing year—even if prices might rise later. Especially in tight-margin years, locking in profits when available can be critical to the operation's financial success.

Producers may benefit from a more proactive sales strategy in today's challenging market environment when profit opportunities arise. For instance, a summer weather rally that pushes prices higher could present a good time to forward the contract or price additional bushels before harvest. While aggressiveness in pre-harvest marketing will vary depending on each producer's risk tolerance, defining that comfort level in advance is essential. The best marketing decisions are those made with forethought—not in the heat of the moment. In years with tight margins, relying on chance is a risk most operations can't afford.

[1] Estimates do not include by products for crops such as ethanol, dried distiller grains (DDGs), soybean oil, and soybean meal.

Citation: Gardner, G., Maples, W., 2025. Managing Crop Markets When Trade Disrupts Prices. Kentucky Field Crops News, Vol 1, Issue 5. University of Kentucky, May 16, 2025.

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Pyrethroid Resistance in Fall Armyworm in KY Wheat: Prevention & Management

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In October 2024, we received a report of a fall armyworm (*Spodoptera frugiperda*) (Lepidoptera: Noctuidae) outbreak in a wheat field in Daviess County, western Kentucky (Figure 1). After visiting the field, we collected 82 live caterpillars after the application of a pyrethroid insecticide. The caterpillars were taken to the entomology laboratory at the UK Research & Education Center in Princeton. Mortality was recorded at only 14.6% and 15.8% at one and three days after the spray, respectively.

Figure 1. Wheat field damaged by fall armyworm caterpillars. Daviess Co. October 2024.

How Insecticide Resistance is Developed in Insect Populations

One of the reasons for such low insecticide efficacy is resistance. An insect can be resistant to insecticides through three main mechanisms:

- Having a thicker cuticle ("skin") that reduces the penetration of the insecticide;
- Having higher levels of specific enzymes to break insecticides down faster;
- Having small changes at the target site that prevent the insecticide from binding in their body and stop it from working properly

Some insects in a population may already have one or more of these natural traits that make them less affected by some insecticides (i.e., resistant). When the same insecticide is used repeatedly, these resistant insects survive and reproduce, while the susceptible ones die. As a result, the few initial survivors can give rise to thousands of resistant individuals in just one generation. If this process continues over multiple generations, then most of the insect population will be composed of resistant individuals and that specific insecticide will no longer be effective.

Insecticide Resistance - Prevention and Management

However, this problem can be managed by rotating insecticides with different modes of action. While most insecticides target the insect's nervous system, they bind to different sites within it. Therefore, if an insect is resistant to one insecticide because it has a small change at the target site that prevents binding, it will still be susceptible to any other insecticide that binds on a different and unaffected part of its body.

The Case Study in Kentucky and Recommendations

According to the farmer who reported the fall armyworm outbreak, he had used the same insecticide multiple times to target stink bugs in soybeans planted in the same field prior to the wheat crop. It is possible that this repeated use of the insecticide selected for resistance in the fall armyworm population during the soybean cultivation, leading to the lack of control in the newly planted wheat, when the plants were still young and highly vulnerable to pest damage (Figure 2).

Figure 2. Closer view of wheat seedlings damaged by fall armyworm caterpillars. Daviess Co. October 2024.

We have conducted laboratory tests with this resistant fall armyworm population, and the results confirmed resistance to several pyrethroid insecticides. However, other insecticides—such as chlorantraniliprole and indoxacarb—provided 100% control. Using insecticides with different modes of action helps eliminate resistant individuals within a population, thereby preserving the effectiveness of available products. This practice also maintains access to a broader range of control options, including more affordable alternatives.

Further Recommended Reading

For more detailed information on the referred fall armyworm outbreak and insecticide resistance management, the following articles are recommended:

- Villanueva, R. T., & Batista, F. C. 2024. *Warmer temperatures & tail winds of Helene might cause an outbreak of fall armyworm in cover crops in central KY*. Kentucky Pest News. https://kentuckypestnews.wordpress.com/2024/10/15/warmer-temperatures-tail-winds-of-helene-might-cause-an-outbreak-of-fall-armyworm-in-cover-crops-in-central-ky
- Batista, F. C., & Villanueva, R. T. 2025. *Insecticide resistance: How it happens & how to prevent it in your fields*. Kentucky Pest News. https://kentuckypestnews.wordpress.com/2025/04/29/insecticide-resistance-how-it-happens-how-to-prevent-it-in-your-fields

Citation: Batista, F., Villanueva, R., 2025. Pyrethroid Resistance in Fall Armyworm in Kentucky Wheat: Prevention & Management. Kentucky Field Crops News, Vol 1, Issue 5. University of Kentucky, May 15, 2025.

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DRONE PILOT CERTIFICATION WORKSHOP

KATS
Kentucky Agriculture Training School

Martin-Gatton
College of Agriculture, Food and Environment

AN INTENSIVE WORKSHOP TO PREPARE CANDIDATES FOR THE FAA'S PART 107 DRONE PILOT CERTIFICATION EXAM

NEW DATE

June 30-July 1, 2025
Madisonville, KY

Class size is limited!

Course: $400
Exam: $175

KATS.CA.UKY.EDU

Register https://June2025DronePilotCertificationWorkshop.eventbrite.com

Lunch provided both days

All study materials included

MORE INFORMATION

Contact: Lori Rogers
lori.rogers@uky.edu
270-365-7541 Ext 21317

UPCOMING EVENTS

KATS Planter Clinic (UKREC)	(TBD):
KATS Drone Pilot Certification Exam (Madisonville)	**NEW DATE** June 30-July 1st
CORN, SOYBEAN & TOBACCO FIELD DAY	**July 22nd**
KY High School Crop Scouting Competition	July 24th
KATS Field Crop Pest Management & Spray Clinic	August 28th

To sign up & receive the **Kentucky Field Crops News**, click the link: KFCN NEWSLETTER or scan the QR code.