Photo credit: CAFE, UK Agricultural Communications Services

Corn & Soybean News

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Managing southern rust in corn

Southern rust of corn, caused by the fungus *Puccinia polysora*, was confirmed in Kentucky on July 12, in Union County. The disease was at very low incidence and severity, however with our current weather conducive for disease development, it will not be surprising to see additional confirmations across the state. It will be important to scout and monitor fields over the next few weeks and submit samples to the Plant Disease Diagnostic Laboratory (PDDL) through local County Extension Agents if you suspect you have southern rust in a field.

Figure 1. Southern rust on corn (photo by Kiersten Wise)

Southern rust is first observed as raised, dusty orange pustules on the upper surface of the leaf (Fig. 1). Pustules will typically be present only on the upper surface of the leaf. The disease is easily confused with common rust, which produces pustules on both sides of the leaf. Common rust (*Puccinia sorghi*), can be found sporadically in Kentucky corn fields and is not economically important to manage, so it is important to distinguish between the two diseases before applying fungicide. If southern rust is suspected, the fastest way to get a diagnosis through the PDDL is to submit samples through County Agents. Confirmations of southern rust will be posted on the corn ipmpipe website here: https://corn.ipmpipe.org/southerncornrust/. On the map, red counties/parishes indicate that southern rust has been confirmed by university/Extension personnel.

The potential impact of southern rust in Kentucky will depend on the crop growth stage of a field once southern rust is confirmed in an area. Previous research from southern states indicates that fungicides may be needed to protect yield while corn is in the tasseling through milk (VT-R3) growth stages. Once corn is past milk (R3), fungicides are likely not needed to manage the disease. If fields have already received a fungicide application this year

at tasseling/silking (VT/R1), they are not likely to need a second application of fungicide once corn reaches the blister (R2) growth stage. Fields that were sprayed pre-tassel (V10-V14) should be scouted carefully to determine disease presence and progression and determine if an additional fungicide application is needed.

Very late planted fields of high-value corn that is still pre-tassel should be scouted to determine if the disease is present before deciding on a fungicide application. Fungicide application may be beneficial in certain fields of late -planted corn, but this should be determined on a case-by-case basis.

More information on timing of fungicide applications for southern rust can be found in Table 2 of the Crop Protection Network publication "Southern Rust" which can be read here: https://cropprotectionnetwork.org/resources/publications/southern-rust.

The efficacy of specific fungicide products for southern rust are described in the updated fungicide efficacy table for management of corn diseases, which is developed by the national Corn Disease Working Group, and posted on the Crop Protection Network website: https://cropprotectionnetwork.org/resources/publications/fungicide-efficacy-for-control-of-corn-diseases

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Dicamba Off-target Movement Continues in 2021

There have been several reports of dicamba off-target movement onto soybean and other sensitive crops over the last two weeks in parts of Kentucky. Despite four years of applicator training and three label changes to enhance restrictions and nullify the potential of off-target movement of dicamba during postemergence applications to dicamba-tolerant soybean, off-target events continue to occur in 2021. There have been a couple of consistent questions and comments that have come to me over the last two weeks that we will address below.

How should you report a dicamba injury case?

If you have crops that have been affected by dicamba off-target movement that you would like to have officially documented, you need to report a complaint to the KDA. You can file a complaint online (https://www.kyagr-apps.com/AgComplaint/Public/Complaint/CreatePS). You can check the box "Are you providing this notice for information purposes only" if you don't want to request an investigation, but simply would like it to be documented. I encourage all individuals who have experienced a dicamba off-target movement event onto their crop to report it to the KDA, this allows the case to be officially documented for future label reviews.

If you are questioning if you have dicamba injury or want verification that you are observing dicamba injury you should contact your county extension agent who can submit samples for verification. We are more than happy to verify dicamba injury at the University of Kentucky, but those verifications do not create any official documentation of the overall problem and thus why we encourage you to contact the KDA.

Should you send tissue samples for dicamba analysis?

This question comes up often, and for the most part you are better suited to not send tissue samples for dicamba analysis. In most cases it takes 2 weeks from a low rate dicamba exposure event for the dicamba symptoms to appear on soybean, in some cases it can take 3 weeks. Dicamba is metabolized by the plant within a week of exposure and thus in most cases the compound will be undetectable by the time symptoms are evident and samples are sent to the lab. The symptoms of dicamba are distinct enough that verification by visual injury should suffice for verifying an off-target movement event.

I heard that group 15 herbicides are responsible for some of the injury to sensitive soybean.

This statement has been floating around on social media for the last couple of weeks with lots of debate. It is true that group 15 herbicides (Zidua, Dual II Magnum, Outlook, Warrant, etc.) can cause leaf distortion and strapping when applied postemergence. The injury from group 15 herbicides is often referred to as "drawstringing" or an appearance of bunched up tissue at the leaf tip, as if the mid vein had been pulled in (Photo 1). In most cases, dicamba causes a much more distinct cupping injury that is distinguishable from group 15 herbicide injury (Photo 2). Additionally, the injury from group 15 herbicide typically occurs on leaves that were present at the time of application, where as dicamba injury will occur on leaves that were present at the time of exposure as well as the newest trifoliate's.

Although it should be noted that in some of our plots we have observed dicamba injury that looks very similar to group 15 injury in our untreated checks (Photo 3). The untreated checks do not receive herbicide applications and thus group 15 injury is not possible. In cases of only slight leaf malformation and strapping you will need to do a bit more investigation to determine if the injury occurred due to dicamba, group 15's, or both. This can be done by looking at all applications to the field in question and surrounding fields, observing multiple plants and noting if only older growth is affected or if new trifoliates are also showing some signs of dicamba injury.

In the majority of cases I have observed so far in Kentucky in 2021, the injury has been distinct dicamba injury with moderate to severe cupping of the newest trifoliates.

The last dicamba application in the area occurred 2 to 3 weeks ago, but the Enlist field that is cupped was sprayed last week, so it has to be something in the spray tank since symptoms didn't show up until after the Enlist application.

The symptoms of low dose dicamba exposure can take 2 to 3 weeks to appear on soybean and other sensitive plants. We have consistently observed this delay in research plots as well as in grower fields over the last five plus years and expect the 2 to 3 week delay. Thus in the statement above the dicamba application occurring 2 to 3 weeks ago is a major indicator to us that the injury is from dicamba exposure. Conversely, if you have a case of high dosage exposure (such as over spraying onto a sensitive field that's planted row to row) then the injury will occur much more quickly. In most cases we are seeing in Kentucky in 2021 though, the injury is due to low dose exposure events and unfortunately in most cases a postemergence application has typically been made to injured field in the 2 to 3 weeks between exposure and symptom appearance.

Photo 1. Injury to a dicamba tolerant soybean plant that received a postemergence application of a group 15 herbicide. The "drawstring" injury observed is typical of group 15 herbicides when applied postemergence.

Photo 2. Distinct cupping and leaf malformation indicative of dicamba injury on soybean. Also note the cupping of the newest emerging trifoliates.

Photo 3. Dicamba injury on soybean that mimics group 15 injury in a weed research plot that has not received a postemergence herbicide application.

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Nitrogen for Soybean in Kentucky: Principles and Practice

Nitrogen is contained in chlorophyll, and chlorophyll is needed for photosynthesis, where carbon dioxide (CO_2) and sunlight are turned into plant carbon/dry matter. Nitrogen is also contained in protein, so amino acids, the building blocks of protein, depend upon plant N.

After water, N is most often limiting to crop production. Notably, soybean can form a symbiotic relationship with bacteria, *Bradyrhizobium japonicum*, which biologically fix dinitrogen (N_2) gas making up 78 percent of our atmosphere. The fixed N is quickly used by the plant. Well nodulated soybean (Figure 1, left) will also take up soil ammonium (NH_4^+) and nitrate (NO_3^-) released by mineralization of soil organic N. With these two N sources, soybean's N supply is sufficient. Soybean does have a high N demand, about 3 pounds of N for each bushel of grain, and more is required for roots, stems, and leaves. A 70 bushel per acre soybean yield will require about 330 lb N/acre.

Nitrogen is mobile, so deficiency symptoms (Figure 2) generally occur on older leaves. The N deficient crop will exhibit reduced growth and show pale green leaves that eventually turn yellow/brown and senesce prema-turely. Little to no nodulation (Figure 1, right) is the common cause of soybean N deficiency. Soybean under stress (drought, flooding) can exhibit the deficiency symptoms of several nutrients, including N.

Figure 1. Soybean roots with excellent (left) and poor (right) nodulation (photos courtesy of Chad Lee).

Dealing with soybean N deficiency requires looking at soybean root systems to find out if these are well nodulated and healthy. After being split open with a knife, a healthy nodule that is actively fixing N should be pink to bright red. Nodules on plants under drought or flood stress might not be pink or red. If nodules seem healthy, you then determine if other nutrients or growth factors cause symptoms. When nodules are lacking, root growth is not limited and N deficiency is observed prior to flowering, N fertilizer may be needed. About 200 to 250 lb N/acre will be needed for a normal yield because of soybean's high N requirement. All N sources are equal, but all should be applied directly to the soil as high foliar N rates will result in crop burn. Volatilization loss is possible from surface broadcast urea or surface dribbled UAN.

When the crop is well nodulated, and with soil N from organic matter, there is no fertilizer N need. Still, soybean yield has been rising, and there are times when soil N supply is relatively low. Questions about nodulated soybean's need for fertilizer N continue and have been the subject of ongoing UK research, in both double-crop and full-season soybean production. Judy and Murdock (1998) examined double-crop soybean response to 30 to 40 lb N/acre applied as dribble banded UAN solution between full bloom and very early pod formation at six locations. Their hypothesis was that soil N supply to double-crop soybean was low as residues of the previous wheat crop decompose. Yield of the check (not N fertilized) treatments ranged from 38 to 45 bu/acre, averaging 41 bu/acre. The yield response to applied N ranged from -1.3 to +2.8 bu/acre and averaged +1.5 bu/acre. They found that the N application was unprofitable at 4 of 6 locations (using then current prices).

Figure 2. Nitrogen sufficiency (left) and deficiency (right) in soybean (photo courtesy M Stewart, International Plant Nutrition Institute).

More recent work, from the 2019 and 2020 production seasons, has been done with full-season soybean. I thank Drs. Edwin Ritchey, Chad Lee, and Carrie Knott for their contributions to this newest data set. Financial support from the Kentucky Soybean Board is gratefully acknowledged. The interpretation of the results is entirely my own. These latest trials did not have soybean N nutrition as the primary, or only, study objective, but particular treatment combinations (total of 9) permitted an evaluation of the benefit of added N to soybean yield. Added N rates ranged from about 10 to 40 lb N/acre. The N sources included ammonium sulfate, ammonium thiosulfate, UAN and urea. One objective was to determine if greater soybean yield potential increased the possibility of a positive response to added N fertilizer.

Grain yield for the check (no N fertilizer) treatment ranged from 49 to 83 bu/acre, averaging 69 bu/acre. The yield response to applied N ranged from -3.7 to +6.3 bu/acre and averaged +1.0 bu/acre. The N application was unprofitable in 7 of 9 locations (using then current prices). Further, there was no relationship between soybean yield potential and the crop's response to N fertilizer. Both negative and positive yield responses were observed at both ends of the range in yield potential.

In summary, there continues to be no need to apply fertilizer N to nodulated soybean. Average yield responses to the practice remain only slightly positive and are generally uneconomical – a mixture of both more negative and positive outcomes for individual field sites. There are better places for a grower to invest production expense monies.

Judy, C., and Murdock, L.W. 1998. Late season supplemental nitrogen on double-cropped soybeans. Soil Sci. News Views 19 (2). https://uknowledge.uky.edu/pss_views/10

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Corn, Soybean and Tobacco Field Day packed with timely information, networking opportunities

University of Kentucky specialists will offer timely, researched-based information and interactive opportunities for the region's producers during the Corn, Soybean and Tobacco Field Day July 27 at the UK Research and Education Center Farm in Princeton. Registration begins at 7:15 a.m. CDT.

Participants walk between stations during a past Corn, Soybean and Tobacco Field Day. (Photo by Matt Barton, UK agricultural communications)

The free field day will have information related to the production of these three crops plus industrial hemp. It is also an opportunity for growers to talk to and get information from UK College of Agriculture, Food and Environment specialists, fellow producers and consultants.

"We are excited to be hosting this in-person field day, and look forward to seeing everyone at the UKREC," said Travis Legleiter, UK weed scientist. "We are looking forward to an interactive event and encourage participants to come with questions and concerns they would like the speakers to address."

Three tours will run concurrently beginning at 7:50 a.m. Each will last two hours. Producers will have the opportunity to participate in two tours. The tours will focus on topics surrounding grain crops pest management, grain crops agronomics and tobacco. Some of the presentations include carbon markets 101, managing foliar diseases in soybeans in a world with fungicide resistance and will include an update on angular leaf spot disease in dark tobacco. During the tobacco tour, UK agronomist Bob Pearce will discuss the future of hemp production.

Each tour will have its own set of continuing education units for pesticide applicators and Certified Crop Advisors. Participants can receive one CCA credit each in crop management and soil and water management on the agronomic tour. On the pest management tour, participants can receive two pest management CCA credits. Pesticide applicators can receive one general and one specific hours in categories 1A, 10 and 12 on the same tour. Tobacco tour participants may receive 1.5 CCA hours in crop management and 0.5 hours pest management. Pesticide applicator credits for the tour include one general and one specific hours in categories 1A, 10 and 12.

The event will conclude with lunch sponsored by Gallatin Redrying and Storage Company, Kentucky Corn Growers Association and Kentucky Soybean Promotion Board.

For more information, contact Colette Laurent, UK extension grain crops coordinator, at **Colette.laurent@uky.edu**.

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UK CORN, SOYBEAN & TOBACCO FIELD DAY

July 27, 2021

COLLEGE OF AGRICULTURE, FOOD AND ENVIRONMENT
Grain and Forage Center of Excellence

UKREC Farm, Princeton KY
Registration begins at 7:15 am (central)
Wagons roll at 7:50 (central)

GRAIN CROPS PEST MANAGEMENT TOUR

Weed Science Research Update —Travis Legleiter
Managing Nozzles for Better Chemical Application —Tim Stombaugh

2021 Corn Disease Update— Kiersten Wise
Managing Foliar Soybean Diseases in a World w/ Fungicide Resistance -Carl Bradley
Scouting for European Corn Borer & Updates on Soybean Pests —Raul Villanueva

CCA: PM 2 Pesticide Credits: 1 General & 1 specific (cat 1A, 10 and 12)

GRAIN CROPS AGRONOMICS TOUR

Carbon Markets **101**—Jordan Shockley
Soil Considerations in Carbon Sequestration—John Grove
Carbon Management and Precision Ag - ????

How Corn is Handling the Challenges From the Year— Chad Lee
Blue Water Farms: Edge-of-Field Monitoring in Western KY Row Crop Fields—Brad Lee
Agronomic Management to improve Soybean Yield & Profitability in KY—Connor Raymond

CCA: CM 1, SW 1 Pesticide Credits: N/A

TOBACCO TOUR

Update on Angular Leafspot Research in Dark Tobacco Andrea Keeney
Connecticut Broadleaf Cigar Wrapper Research Update Andy Bailey
Hemp in Kentucky: Where Do We Go From Here? Bob Pearce
Joint Research with Burley and Dark Tobacco in KY and TN Mitchell Richmond

CCA: CM 1.5 PM 0.5 Pesticide Credits: 1 General & 1 Specific (Cat 1A, 10 and 12)

For additional information contact Colette Laurent, claurent@uky.edu, 270-365-7541 ext 21321

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KyGRAINS.info

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http://wheatscience.ca.uky.edu/home

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Entomology · Plant Pathology · Weed Science

http://kentuckypestnews.wordpress.com/

KATS

Kentucky Agriculture Training School

2021 Upcoming Events

Date	Event
July 22	UK 2021 High School Crop Scouting Competition
July 26-30	KATS – Self-Led Educational Tour
July 27	**2021 Corn, Soybean and Tobacco Field Day**

University of Kentucky

College of Agriculture, Food and Environment

Grain and Forage Center of Excellence