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Pest & Crop Newsletter

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PURDUE UNIVERSITY | Extension - Entomology

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In This Issue

Some Cutworms Out And About, Still Too Early For Black Cutworm

(Christian Krupke) & (John Obermeyer)

Locally, we have been impressed and amazed at the number of black cutworm moths captured in our pheromone traps the last few weeks. Though we are wary of the potential impact these larvae could have on the slow emerging corn crop, we know that heat units for insect development have also been slow in coming during this cool spring. Many cutworm species look alike and identification is often confusing. Historically, the black cutworm is our most common species damaging the crop, which is why most assume it the culprit when damage is found, but it’s far from the only cutworm species in the state.

Black cutworm do not overwinter in the Midwest, which is why we have monitored their arrival each spring with pheromone traps. Once they arrive in large numbers (also called “intensive captures”) we begin predicting their development and subsequent damage by tracking heat unit accumulations. We recorded intensive captures on, and around, the first of April and have begun tracking their development (see accompanying map). Those females looked for broadleaf weeds to lay eggs in early April and those larvae have hatched, but since then, not much has happened. There have not been sufficient heat units accumulated this spring for black cutworm to get 1/2 to 3/4 inches long – the size when they begin to cut plants (300 accumulated heat units). So, if you are finding cutworm damage on emerged corn (or any plant, for that matter) at this time, there is another cutworm species to blame, a species that overwinters locally…this can include any one of the dingy, variegated, and/or claybacked cutworms.

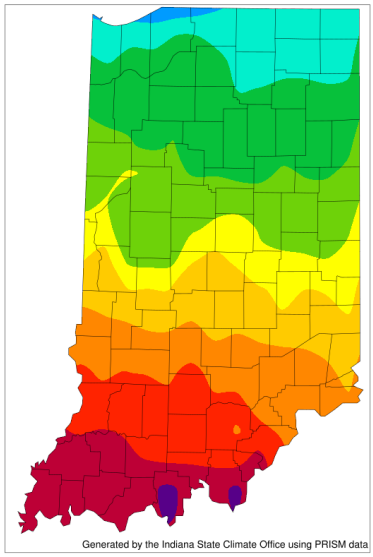
Cutworms are larvae of noctuid moths, a huge family with over 11,000 species worldwide (which include many familiar pests like the corn earworm and western bean cutworm) and some are important pests. The dingy, variegated, and claybacked cutworm species all overwinter in Indiana as partially-grown larvae. They are not specialist feeders, and feed on a wide range of plants. Late in the growing season, as cold weather moves in, the larvae cease feeding and become dormant under mats of plants (e.g., chickweed) during the winter months. As temperatures begin to increase in the early spring, they resume feeding. They can complete develop on these weeds, but typically these plants are killed by spring herbicide applications, forcing them to move to alternate food sources. If available, this could include the emerging crop. Because these larvae are about ¾ to 1 inch in length at this time of year, they aren’t deterred much by the low concentrations of insecticidal seed treatments in above-ground plant tissues. Therefore, depending on density of larvae and the rate of the crop’s growth and development, damage may be quite significant.

The dingy and variegated cutworms are primarily leaf feeders and will rarely cut plants, and if they do, the cutting is above ground level. Because a corn plant up to the 5-leaf stage can withstand severe defoliation without a yield loss, treatment for these cutworms is rarely justified. However, the claybacked cutworm’s damage is a mix of leaf feeding and plant cutting so black cutworm thresholds should be observed. To add to the confusion, other species of cutworms may be encountered feeding on crops as well. The sandhill cutworm, as its name implies, is found on sandy knolls. Sandhill and the glassy cutworms tend to be a perennial threat in specific environments, most producers that have experience with them are quite aware of their destructive abilities.

Identification of these cutworm species is a little tricky and requires a pretty good understanding of morphological characteristics of immature insects, a course taught in Entomology. In short, while using a 10X magnifying lens, carefully analyze the skin texture of the worm. If it is considerably “bumpy,” it is most likely a black cutworm. The other cutworm species have smooth skin. Species identification can usually be confirmed by sending us quality, in-focus pictures, especially of the dorsal, i.e., top, of the cutworms. Happy Scouting!

Growing Degree Day (50 F / 86 F) Accumulation

April 1 - April 23, 2024



Revealed, from just under the soil surface, a black cutworm curled next to cut corn seedling. (*Photo Credit: John Obermeyer*)

Claybacked cutworm next to remnants of a devoured soybean seedling. (*Photo Credit: Ron Blackwell*)

Dingy cutworm up feeding on corn seedling. (*Photo Credit: John Obermeyer*)

Variegated cutworm with distinctive gold spots on the dorsal surface. (*Photo Credit: John Obermeyer*)

Dorsal abdominal segments of the dingy, claybacked, and black cutworm species. Note the bumpy surface of the black cutworm. (*Photo Credit: John Obermeyer*)

Armyworm Pheromone Trap Report – 2024

(John Obermeyer)

County/Cooperator	Wk 1	Wk 2	Wk 3	Wk 4	Wk 5	Wk 6	Wk 7	Wk 8	Wk 9	Wk 10	Wk 11
Dubois/SIPAC Ag Center	0	8	41	101							
Jennings/SEPAC Ag Center	1	8	58	137							
Knox/SWPAC Ag Center	0	0	41	31							
LaPorte/Pinney Ag Center	0	44	51	65							
Lawrence/Feldun Ag Center	4	125	248	103							
Randolph/DPAC Ag Center	0	0	25	90							
Tippecanoe/ACRE	0	4	37	27							
Whitley/NEPAC Ag Center	0	0	62	179							

Wk 1 = 4/1-4/3/24; Wk 2 = 4/4-4/10/24; Wk 3 = 4/11-4/17/24; Wk 4 = 4/18-4/24/24; Wk 5 = 4/25-5/1/24; Wk 6 = 5/2-5/8/24; Wk 7 = 5/9-5/15/24; Wk 8 = 5/16-5/22/24; Wk 9 = 5/23-5/29/24; Wk 10 = 5/30-6/5/24; Wk 11 = 6/6-6/12/24

Foliar Diseases Of Wheat And Fusarium Head Blight (Scab) Management

(Darcy Telenko)

It is time to keep an eye on wheat for diseases and scab risk. There are a number of foliar diseases in wheat to watch out for. These include – leaf, strip and stem (Fig. 1A,B,C), Septoria leaf spot and tan spot (Fig. 2A,B). A number of resources are available to help distinguish wheat leaf diseases and "*Identifying Rust Diseases of Wheat and Barley.*" https://www.ars.usda.gov/ARSUserFiles/50620500/Cerealrusts/Rust_Diseases_National.pdf

Samples can always be submitted to the Purdue Plant Pest Diagnostic Lab for disease identification and confirmation.

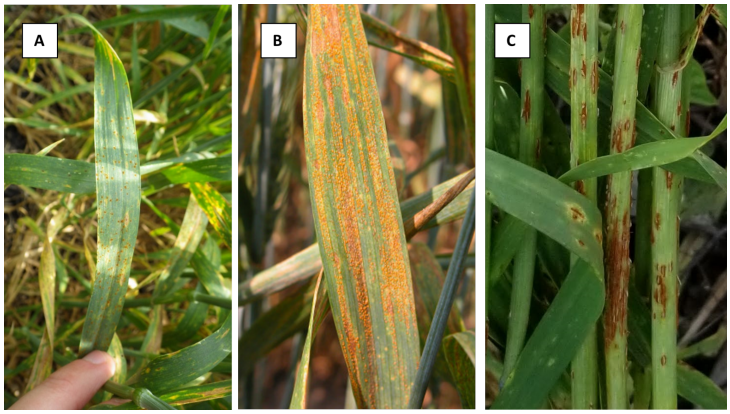


Figure 1. Pustules of leaf rust (A), strip rust (B) and stem rust (C) in wheat. Image source. A) A. Friskop at https://cropprotectionnetwork.org/encyclopedia/leaf-rust-of-wheat, B). C. Grau at https://cropprotectionnetwork.org/encyclopedia/stripe-rust-of-wheat and D. Telenko, Purdue University.

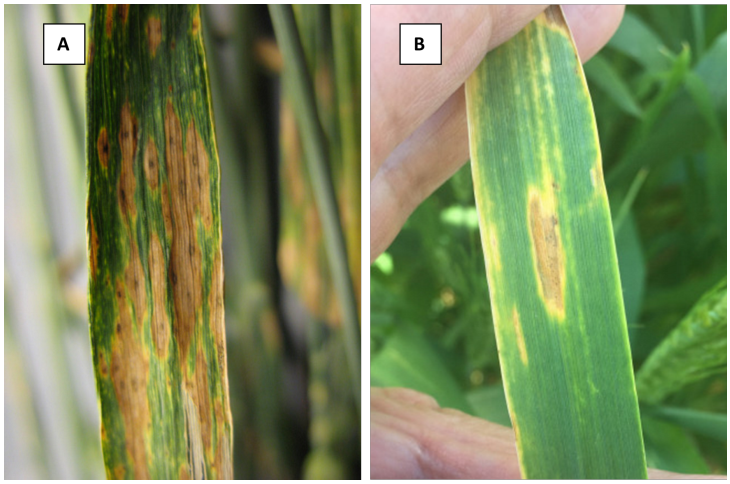


Figure 2. A) Elliptical, tan-brown lesions of Septoria tritici blotch, and 2) tan spot leaf lesion on wheat. Image source: M. Burrows https://cropprotectionnetwork.org/encyclopedia/septoria-tritici-blotch-of-wheat and https://cropprotectionnetwork.org/encyclopedia/tan-spot-of-wheat

Wheat in Indiana is between 6-10 feekes at the end of last week and some of our southern fields are at boot stage (Feekes 10). Therefore, I expect flowering to start over the next couple of weeks (Fig 3A). During flowering (anthesis) **warm, wet weather** with high relative humidity will favor the development of Fusarium head blight (scab). Fusarium head blight (FHB) is caused by the fungus *Fusarium graminearium*. It infects wheat during flowering, beginning at Feekes 10.5.1. Symptoms of FHB will appear as bleaches spiklets on the head later in the season (Fig 3B). Infection can lead to small or shriveled grain kernels referred to as "tombstones." In addition to shriveled grain this fungus produces mycotoxins such as deoxynivalenol (DON), which can accumulate in the infected grain.

Figure 3. A) Wheat beginning to flower and B) Fusarium head blight infection. (*Photo credit: Darcy Telenko*)

A number of resources are available to help you make disease management decisions in wheat.

1) **The Fusarium Risk Assessment Tool** is available at the following website. http://www.wheatscab.psu.edu/. This tool estimates the risk of a Fusarium head blight epidemic (> than 10% field severity) using weather conditions (temperature, rainfall, and relative humidity) measured 15 days prior to flowering. See below for the current risk map – much of Indiana is colored yellow (medium risk for scab development) and red (high risk for scab development) due to recent wet weather.

Keep in mind that actual disease risk depends heavily on the growth stage of wheat in your area. We are still on the early side; the estimate

is most relevant just prior to flowering (Feekes 10.5.1) or the early stages of grain development. Fusarium head blight risk is highest when there are three or more days with extended periods of high relative humidity and moderate temperatures (65 to 80°F) during the early stages of kernel development. See below for the current risk map – much of Indiana is colored yellow (medium risk for scab development) and red (high risk for scab development) due to recent wet weather (Fig. 4).

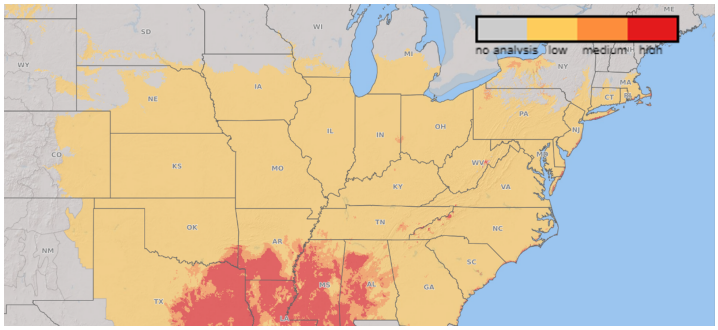


Figure 4. Fusarium Risk Assessment Tool Indiana map generated on 22 May 2024. Red = high risk, Orange = medium risk, and Yellow = low risk for Fusarium head blight on wheat just prior to flowering or the early stages of grain development. Image credit: http://www.wheatscab.psu.edu/.

Farmers and crop advisors can sign up for alerts from the U.S. Wheat and Barley Scab Initiative, these can be sent to a cell phone as a text or email. To sign up visit https://scabusa.org/scripts/FHB_Alerts/

2) **Fungicide Application:** A fungicide application might be considered if a Fusarium head blight (FHB) susceptible variety is planted, or if you are worried about scab on your farm. These applications should be made at Feekes 10.5.1, or early flowering to suppress FHB. Fungicides recommended for FHB and DON include Prosaro, Caramba, Proline, and Miravis Ace. The use of products containing strobilurin fungicides may result in higher levels of DON accumulation in grain when damaged by FHB. These are not labelled for FHB management.

Fungicide Efficacy Tables are updated yearly and available from the Crop Protection Network

- Fungicide Efficacy for Control of Wheat Diseases CPN -3002 (https://cropprotectionnetwork.org/publications/fungicide-efficacy-for-control-of-wheat-diseases)
- Optimizing Fungicide Use for Fusarium Head Blight (Scab) and Associated Mycotoxins CPN-3001 are two available resources (https://cropprotectionnetwork.org/publications/optimizing-fungicide-use-for-fusarium-head-blight-scab-and-associated-mycotoxins).

These tables can help you identify products to use based on your targeted disease. As a reminder follow the label on harvest restriction as some products may have 30 to 45 days required between last fungicide application and harvest.

Luckily, most of our wheat is still a few weeks from flower, but this should be a warning to keep an eye on your fields. Those most at-risk would-be fields that were planted to a Fusarium head blight susceptible variety or those with limited rotation that follow a previous crop of wheat or corn.

“Corkscrewed” Mesocotyls: What Does It Mean?

(Dan Quinn)

As planting season begins and corn plants begins to emerge, a very important step to take each spring is to assess the emergence of the corn plants and take note of any abnormalities, missing plants, or uneven emergence patterns. One symptom that often occurs each year is referred to as a “Corkscrewed” mesocotyl (or the plant tissue that connects the base of the plant to the seed; Pictures 1 and 2). These symptoms are often caused by three main factors: 1) cold injury, 2) soil conditions, and 3) herbicide injury. However, it is important to note that these factors can often be confounded with each other and make it difficult to diagnose the exact cause of the problem.

Soils with cold temperatures and/or wide swings in temperature can cause uneven damage to the outer surface layers of the mesocotyl causing it to form the “corkscrew” shape. When damage is uneven on these outer surface layers, the healthier tissue areas of the mesocotyl continue to elongate, where the damaged surface layers do not, which causes this symptom to occur. Another issue where these symptoms can occur is from poor soil conditions (e.g., surface crusting or compaction). When soil conditions following planting crust over or are very dense (e.g., cloddy) this can cause the young corn seedling to have restricted emergence. In conditions which restrict the corn plant from emerging, the seedling can have bending, twisting, or even leaf out underground, yet not emerge due to these difficult conditions where the seedling cannot “breakthrough” the soil surface. Lastly, herbicide injury can also cause these symptoms. Group 15 herbicides such as acetochlor can impact young seedling development if conditions are cool and poor for rapid emergence and growth, however these symptoms are often less common today due to safeners and current herbicide rates used.

As spring planting begins and corn plants begin to emerge, it is always important to asses plant stand and check for any oddities in plant development, uneven emergence, and/or missing plants. Also, it is important to note that the majority of the problems that are observed are occurring due to symptoms belowground. Therefore, it is always important to have a shovel with you as you begin to assess early-season corn emergence and check the overall health and shape of the seed and root system.

Additional Resources:

Nielsen, R.L., 2022. Emergence Problems in Corn. Corny News Network. Purdue Univ. Ext. https://www.agry.purdue.edu/ext/corn/news/timeless/EmergenceFailure.html

Hartzler, B., and M. Anderson. 2018. May Maize Maladies. Iowa State Univ. Ext. https://crops.extension.iastate.edu/blog/bob-hartzler-meaghan-anderson/may-maize-maladies

Thomison, P. 2017. “Corkscrewed” mesocotyl development causing emergence problems in corn. C.O.R.N. newsletter. Ohio State Univ. Ext. https://agcrops.osu.edu/newsletter/corn-newsletter/2017-13/%E2%80%9Ccorkscrewed%E2%80%9D-mesocotyl-development-causing-emergence-problems

Picture 1. Corn seedling mesocotyl “corkscrewing” symptoms which occurred following late-April planting in West Lafayette, IN 2022.

Picture 2. Corn seedling mesocotyl “corkscrewing” symptoms which occurred following late-April planting in West Lafayette, IN 2022.

Irrigation Season: Start With Inspections And Repairs

(Lyndon Kelley (MSU/Purdue Extension Irrigation Educator)) & *(Younsuk Dong, Michigan State University Extension)*

Running through a checklist of inspections and repairs for each irrigation system greatly improves the chance of being able to start irrigating the day the crop needs it.

Proper irrigation equipment maintenance and repair can help avoid major

catastrophes. Photos by Lyndon Kelley, MSU Extension.

Now is the time to make sure the irrigation equipment is in running order. If you ignore irrigation equipment until the day you need to water, it leads to cutting corners and taking risks that can lead to damage and downtime. Here are suggestions of system inspection and repair areas to concentrate on.

Check and test all control and power boxes

With all power off, open each electrical box and blow it out with compressed air. Avoid leaving any dust or debris in the box or connections. Seal holes that rodents, snakes or insects may use to gain access to the box. A small application of a long residual action insecticide to the bottom of the box can reduce ant and spider problems in the future. Inspect the function of disconnects and repair or replace faulty equipment. Make sure all connections are tight and all connection surfaces are free of corrosion. Many electrical disconnects or pivot control boxes meet an early demise from an electrified mouse nest explosion in the box.

Vermin nests can cause explosions, electrical shorts and corrosion of wires. To avoid a dangerous situation, inspect and clean all electrical control boxes from the power supply to the pivot panel before energizing. Photo by Lyndon Kelley, MSU Extension.

Turn on power supply using proper safety protocol

If you generate your own power, start the engine and bring it up to proper RPMs for the generator. Check the voltage at each pump and pivot in the system. Inspect the grounding wire from terminal to rods. Some irrigated crop contracts have requirements for testing of the grounding system and maximum resistance. Make a list of needed repairs for your electrician to follow-up on and get them started before the traditional over-committed first days of irrigation season.

Lightning damage can result in the need for a total replacement of the metering unit and disconnect boxes. The sooner you find the problem, the more time you will have to replace it before irrigation is needed. Photo by Lyndon Kelley, MSU Extension.

Service pump engines and inspect all fluid levels

Pumps run for hours without operator presence, and even small oil or coolant leaks can result in damage. Inspect belts, batteries and recharge system. Look carefully for rodent damage and insect nests that may result in a malfunction later. Inspect pump murphy or safety shut-down systems or install them if you do not have them. Low oil and high temperature shutdowns can avoid burning up your engine.

Measure static water levels in wells

Many of your neighbors may be concerned that irrigation water use is permanently lowering the water table. Documenting the static water level in your well and surrounding wells before you start pumping each year allows a comparison from beginning to end of pumping season. A late fall reading will show the recovery levels. If you do not have the equipment to measure the static water level of your well, consider an annual well maintenance company inspection or a single visit from a well driller to inspect equipment and measure water levels.

Start the well or pump

Slowly fill water supply lines allowing air to escape from ends of lines. With the distribution system running furthest from the water source, inspect all the remaining outlets for freeze damage, missing frost plugs and leaks. Compare last year's records with your start-up reading for pressure and flow.

Be aware of demand charges on your electric bill

Many power companies have a demand charge as a factor in your monthly bill. In some cases, these demand charges can be substantial, even a couple hundred dollars for a large motor or pump. These charges are often based on the peak power use over the billing period for a short period of time (15 minutes for example).

Some power providers have off-season plans to avoid service charges over the winter. Knowing when the billing cycle starts and ends allows a producer to schedule start-up and avoid unnecessary charges. It is always good to have the irrigation system ready before planting, but in some cases starting the pump a month or two before it's needed can

result in hundreds of dollars of extra cost.

Check rock traps, screens and filters

Remove debris, sand and small stones from rock traps. Clean screens and filters often used in conjunction with end guns and cornering arms. Rock traps are often removed for the winter to prevent freeze damage from water condensation in pipe and accumulating in trap. If rock traps were removed for the winter and bird guards are not put in place, inspect openings for nests.

It is rare to find this many leaks in one place, but worn-out pipe flange gaskets, rust holes in the bottom of the pipe, and supply line leaks are common challenges. Photo by Lyndon Kelley, MSU Extension.

Inspect system leaks and bad sprinklers

Start the system up and pressurize it. Look for leaks and bad sprinklers and create a list of units in need of attention. Remember to check risers and other irrigation pipe areas that may need attention. Small leaks can saturate the soil and weaken force blocks used to hold underground pipe end plugs in place. Create a list of pressure and flow meter readings (if available) for each pumping station and pivot point. Knowing the starting pressure can help diagnose in-season irrigation problems later.

Check sprinkler patterns

With water up to pressure, check sprinkler patterns. This can be easily done on bare earth or when crops are small. You can also use a drone to fly over the pivot to quickly do a check of the sprinkler package and look for leaks. Look for sprinklers that have smaller wetted patterns than others. Plugs, no-turns and non-uniform watering patterns would indicate damage. Check pressure at the pivot point and the last sprinkler and compare to the sprinkler chart; pressure that varies from the chart by more than 10% indicates the need for attention.

Inspect cornering arm hydro valves

Hydro valves are the most common method used to turn off the irrigation water on cornering arms and Z-arms that are in their folded back position. If valves are stuck open, you are grossly overwatering end-rows or other field edges where the arm is not deployed. Valves that are stuck closed will result in under watering corners of the field. While the machine is running, inspect sprinklers in a corner area with the arm fully deployed to make sure all sprinklers come on and then in an area with the arm fully folded to see if all valves shut off.

Sprinkler control systems for pivot corner arm are notorious for freeze damage. Proof the system before the season starts so they only water when needed. Photo by Lyndon Kelley, MSU Extension.

Adjust end gun

Make sure you are covering every foot of planted ground possible and are not watering areas that are not cropped. Fine adjustments now can improve coverage area or keep you out of trouble if irrigation water ends up where it should not be. Avoid going overboard—higher surface and ground water levels in the spring can give a little bigger coverage area now than they will late summer.

Check irrigation tires

Check air pressure in each pivot tire. Refill to 20 pounds or the recommended level. Note tires less than 5 pounds and return a week later to see if they leaked. Expect tires to lose 2 or 3 pounds of pressure each year if not re-inflated annually.

Service center drive and final drives on pivots

Gearboxes should be checked annually. First, drain condensation water from the bottom of the box and then refill with recommended gear lube. Exterior leaks will show as stained areas indicating a need for replacing gasket. Some producers are using corn head grease in place of gear lube to extend the life of worn gear boxes.

Tree trimming and brush control

Check fence row height compared to pivot overhangs and cut or spray to eliminate damage to the center pivot. The Ohio State University Extension bulletin, "Relative Effectiveness of Herbicides Commonly Used to Control Woody Vegetation" is an excellent resource.

Unchecked fence row tree and brush growth into the path of the end gun and pivot end boom can create major damage. Photo by Lyndon Kelley, MSU Extension.

Inspect bridge crossings and wheel paths through rough and low areas

Wheel tracks will only deepen as the season progresses. Identify potential problem areas now to allow time to build-up, fill, level and permanently seed problem areas. In some situations, larger tires or track systems may need to be added to allow the pivot to float over wet spots.

Chemigation valve and fertigation pump power supply

Many producers are investigating chemigation/fertigation as an option for making pesticide and fertilizer applications, respectively. Adding the equipment now makes it a far more viable option in the future. Make sure there is a functional chemigation valve on each water supply feeding into the system. Install an interlocked injection pump power source. This will operate only when the irrigation water pump is on, avoiding undiluted fertilizer from ever going into the irrigation system. For a diesel engine, this may be as simple as running the injection pump from a v-belt from the engine shaft.

Check stop barricades and switches

Pivots that make partial circles often use stop barricades at the edge of the water area. Check stops for integrity, making sure the height is still appropriate for the machine's turnoff mechanism. Manually operate the turn-off arms on the pivot to make sure they are functioning. Newer style stop barricades are designed to catch and spin the tire against the barricade, allowing the safety system to shut the pivot down as a backup safety system.

Stop control switches can fail, often due to waterlogged or freeze damage. Check the switch function and the alignment to the infield stop to avoid a run-away pivot. Photo by Lyndon Kelley, MSU Extension.

The stop barricade normally contacts the electronic stop arm, turning or reversing the system. The stop should not allow the wheel to climb resulting in rollover of the last span. Photo by Lyndon Kelley, MSU Extension.

Tire wear marks on the stop barricade indicate the electronic stop has failed recently. Photo by Lyndon Kelley, MSU Extension.

Stop barricade design and construction should stop the forward movement of the tower and cause the drive tire to slip and not climb the stop barricade. An electronic control in the next to the last tower (over watering timer) will cause the pivot's safety system to shut the system down after the tower has not moved for a few minutes. Photo by Lyndon Kelley, MSU Extension.

Please check MSU Extension Bulletin E3439: Efficient Irrigation Management with Center Pivot Systems for learning more about how to improve irrigation system efficiency.

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