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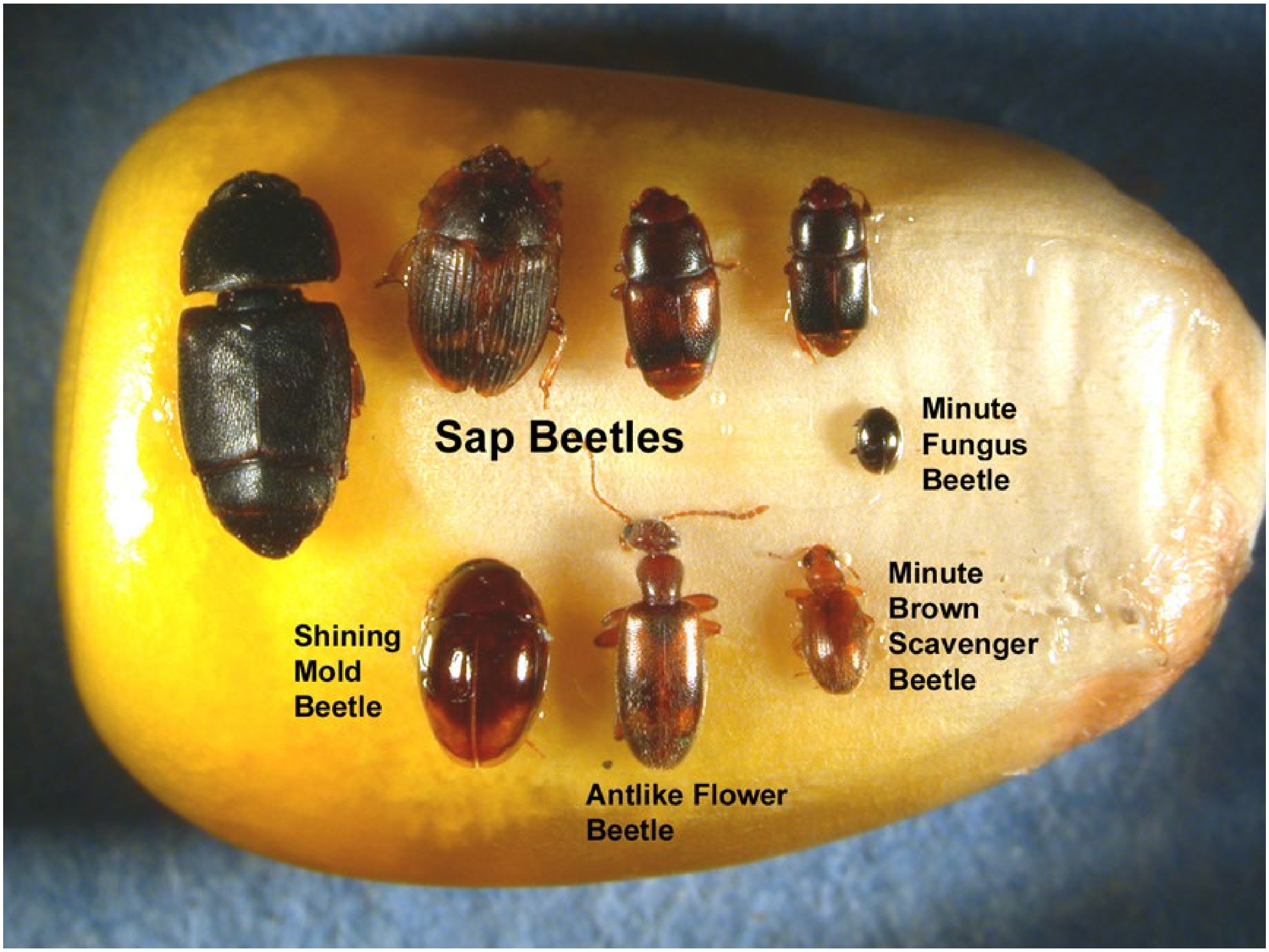
Little Beetles in Corn Ears – *(John Obermeyer)* -

As folks get out to inspect corn ears, especially in northern counties where western bean cutworm was a concern, they will find “little black bugs,” especially where kernels are damaged. Their presence is in response to previous damage to kernels, which includes insect and/or bird feeding, hail, etc. In addition, hybrids with short ear husks seem to be more prone to exposing kernels, making easy access for rootworm and Japanese beetles to compromise ear tip kernels while feeding on silks. These small, opportunistic insects are feeding on decaying kernels and subsequent molds. They are simply fulfilling their niche in the cycle of life, “clean up in Aisle 3.”



Several species of small beetles found in damaged ears.

Sap beetles and their larvae feeding on kernel goo.

Picnic beetle cleaning up after corn earworm feeding.

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2017 Western Bean Cutworm Pheromone Trap Report – *(John Obermeyer)* -

County	Cooperator	WBC Trapped						
		Week 1 6/22/17 - 6/28/17	Week 2 6/29/17 - 7/5/17	Week 3 7/6/17 - 7/12/17	Week 4 7/13/17 - 7/19/17	Week 5 7/20/17 - 7/26/17	Week 6 7/27/17- 8/2/17	Week 7 8/3/17- 8/9/17
Adams	Kaminsky/New Era Ag	0	6	4	0	5	1	5
Adams	Roe/Mercer Landmark	0	8	6	1	0	4	0

Allen	Anderson/Syngenta Seed	0	4	26	34	14	1	0
Allen	Gynn/Southwind Farms	0	8	13	15	19	2	1
Allen	Kneubuhler/G&K Concepts/Harlan	0	4	13	4	0	1	3
Allen	Kneubuhler/G&K Concepts/Koch	0	10	0	4	0	5	5
Bartholomew	Bush/Pioneer Hybrids	0	0	0	0	0	1	1
Clay	Bower/Ceres Solutions/Clay City		0	0	0			
Clay	Bower/Ceres Solutions/Brazil		0	0	0			
Clinton	Emanuel/Boone Co. CES	1	1	1	0	1	5	2
Clinton	Foster/Purdue Entomology	0	0	2	1	1	0	0
DeKalb	Hoffman/ATA Solutions			87	174	167	18	4
Dubois	Eck/Purdue CES	0	1	0	0	1	1	0
Elkhart	Kauffman/Crop Tech Inc.		35	156	150	95	3	4
Fayette	Schelle/Falmouth Farm Supply Inc.	1	1	0	0	0		
Fountain	Mroczkiewicz/Syngenta	41	31	14	4	0	1	1
Fulton	Jenkins/N. Central Coop/Talma	379	385	167	76	5	0	0
Fulton	Ranstead/N. Central Coop/Rochester			309	46	15	3	
Gibson	Schmitz/Gibson Co. CES	0	0	2	0	0	2	0
Hamilton	Campbell/Beck's Hybrids	3	2	2	2	0	0	
Hendricks	Nicholson/Nicholson Consulting	0	1	1	1	2	0	
Jasper	Overstreet/Purdue CES	438	410	304	237	103	0	0
Jasper	Ritter/Brodbeck Seeds	302	171	124	97	14	5	2
Jay	Boyer/Davis PAC	5	1	0	3	1	2	0
Jay	Shrack/Ran Del Agri Services	0	0	0	1	1	0	0
Jay	Temple/Jay County CES/Pennville	0	1	3	2	0	2	2
Jay	Temple/Jay County CES/Redkey	3	4	7	2	0	1	0
Jennings	Bauerle/SEPAC	0	0	0	1	0	0	0
Knox	Bower/Ceres Solutions/Vincennes		0	0	0			
Knox	Bower/Ceres Solutions/Freelandville		0	0				
Kosciusko	Klotz/Etna Green	75	112	92	46		19	3
Lake	Kleine/Kleine Farms	0	4	41	11	0	19	7
Lake	Moyer/Dekalb Hybrids, Shelby	157	108	63	16	20	7	0
Lake	Moyer/Dekalb Hybrids, Schneider	246	151	101	93	63	1	0

LaPorte	Rocke/Agri-Mgmt Solutions, Wanatah	120	122	321	138	10	18	2
LaPorte	Smith/Co-Alliance/LaPorte	0	11	29	22	7	7	1
LaPorte	Smith/Co-Alliance/Fish Lake	6	20	109	107	115	72	7
LaPorte	Smith/Co-Alliance/Union Mills	15	19	122	100	40	24	5
LaPorte	Smith/Co-Alliance/LaCrosse	35	149	337	112	17	9	4
Marshall	Harrell/Harrell Ag Services		4	118	149	6	0	
Marshall	Klotz/SR 10 & SR 331	29	81	130	90	13	2	2
Marshall	Miller/North Central Coop			48	43	10		
Miami	Early/Pioneer Hybrids	189	216	140	154	9	3	
Newton	Moyer/Dekalb Hybrids, Lake Village	16	139	262	193	32	9	5
Porter	Leuck/PPAC	11	17	335	287	68	4	1
Pulaski	Capouch/M&R Ag Services	42	49	94	50	20	4	
Pulaski	Leman/North Central Coop	4	22	34				
Putnam	Nicholson/Nicholson Consulting	0	2	0	0	0	1	1
Randolph	Boyer/DPAC	2	2	3	0	4	0	0
Rush	Schelle/Falmouth Farm Supply Inc.		0	0	0	0		
Shelby	Fisher/Shelby Co. Co-Op	0	0	0	0	0	1	0
Shelby	Simpson/Simpson Farms	4	5	2	0	0	0	4
Starke	Capouch/M&R Ag Services	0	184	246	10	7	2	
Starke	David Wickert/Wickert Consulting	5	28	21	10	4	2	2
Starke	Larry Wickert/Wickert Consulting	136	292	185	16	4	8	1
St. Joseph	Barry/Helena	3	28	108	56	26	5	5
St. Joseph	Gary Battles	1	12	16	16	10	0	0
St. Joseph	Carbiener/Union Twp.	0	11	50	19	7	0	0
St. Joseph	Smith/Co-Alliance/Granger	7	46	87	69	95	95	36
St. Joseph	Smith/Co-Alliance/New Carlisle	0	3	69	93	109	100	23
Sullivan	Bower/Ceres Solutions/Farmersburg		0	0	0			
Tippecanoe	Bower/Ceres Solutions/Sullivan		0	8	0			
Tippecanoe	Bower/Ceres Solutions/Lafayette		15	25	24			
Tippecanoe	Nagel/Ceres Solutions	1	1	6	1	0	0	0
Tippecanoe	Obermeyer/Purdue Entomology	0	0	0	0	0	0	0
Tippecanoe	Westerfeld/Monsanto	2	3	0	0	2	4	1
Tipton	Campbell/Beck's Hybrids	0	2	0	0	0	0	

Vermillion	Bower/Ceres Solutions/Clinton		0	0	0			
Wabash	Enyeart/North Central Coop	1	10	15		4		
Whitley	Richards/NEPAC	23	70	39	13	5	1	0
Whitley	Richards/NEPAC			182	101	23	6	2

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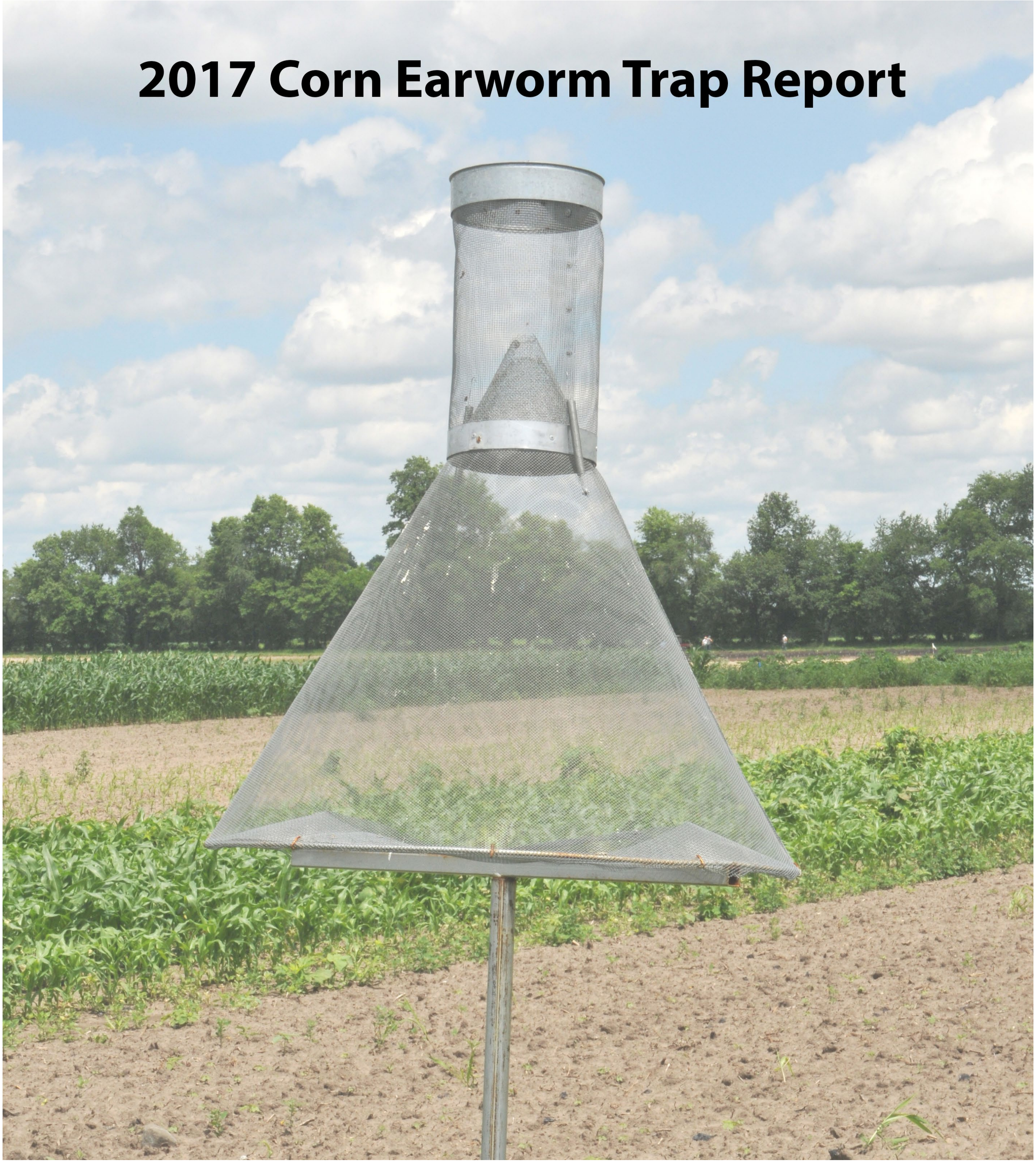
2017 Corn Earworm Pheromone Trap Report – *(John Obermeyer)* -



Corn Earworm Trap Report

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Response of Roundup Ready Soybean Yield to Dicamba Exposure – *(Joe Ikley and Bill Johnson)* -

As the number of off-target dicamba injury complaints continue to roll in, one question that we often get asked is "how will this injury affect my yield". A few weeks ago we posted a manuscript from one of our former graduate students Andy Robinson that directly addressed this question. The purpose of this article is summarize this into a more user friendly format to share our experiences with plant injury response and measurable yield components when non-Xtend soybean are exposed to low levels of dicamba.

There are a number of research papers published on this topic dating back to the 1960's. Most of this early work showed that it was difficult to find a reliable early-season measurement that predicted yield loss. A few of the authors found that height reduction was a somewhat reliable indicator of yield loss, but the amount of yield loss varied quite a bit from experiment to experiment. We initiated this research in 2009 in anticipation of the issues that cropped up this year and wanted to be able to provide some insight into yield response of newer soybean varieties.

In this study we applied 8 different rates of dicamba, ranging from 1/10,000X to 1/25X of the 0.5 lb per acre labeled use rate (12.8 oz/A of Engenia or 22 oz/A of Xtendimax/Fexapan). These treatments were applied either at the V2, V5, or R2 growth stage. This would simulate a single exposure of soybean to dicamba at the respective growth stages. Visual injury ratings on a scale of 0 to 100% (0% = no injury, 100% = complete plant death) were taken 14 and 28 says after treatment, and plots were taken to yield. The data collected from these treatments were then used to model the effective dose of dicamba to cause various levels of injury and yield loss. We conducted this research in 2009 and 2010 at these sites for a total of 3 site years.

Figure 1 shows the level of injury 28 days after treatment for 1/2,500X, 1/1,000X, and 1/500X of the 0.5 lb per acre rates labelled for in-crop use on Xtend soybean. Our models revealed that the rates required to cause 20% visual injury ranged from 1/1563X to 1/410X rate of dicamba. Dicamba doses of 1/250X or greater rate caused apical meristem death (which we assigned a visual injury rating of 50%). Plants exposed to these higher rates would branch at the cotyledon or unifoliate node and begin regrowth from these or multiple lower nodes. In addition to visual symptoms, we saw a 10% reduction in plant height from dicamba doses of 1/1000X to 1/254X.

In this study there was a difference in the dicamba rate that caused 10% yield loss at our different site years. In 2009, our TPAC location experienced dry conditions during key reproductive growth stages from July through September (2.75 inches of rain over those 3 months). Under these drought conditions, the dicamba rate that caused 10% yield loss was 1/3333X. At our other site year locations, we received twice the rainfall amounts from the July through September (5.25" over those three months). At these locations, the rate that caused 10% yield loss ranged from 1/1064X to 1/510X. This difference highlights why many academics are concerned over claims of negligible yield loss after off-target injury. Our research shows that adverse weather conditions during reproductive growth stages can result in yield losses from dicamba exposure 5-7 times lower than in years where we received adequate moisture during this crucial period. Making such statements about yield in June and early July is simply hard to predict without knowing the weather for the rest of the growing season.

We were able to estimate the amount of yield loss based on our visual injury estimate at 14 and 28 days after application. We saw a 10% yield loss when plants sprayed at V2 showed 20% visual injury at 14 and 28 days after treatment. Plants at V5 and R2 growth stage lost 10% of their yield when injury was rated at 30%. Once injury over 40% was observed, there was a much sharper rate in lost yield for soybean in V5 or R2 growth stage than in the V2 growth stage.

While we were able to predict yield loss based on injury, we realize that this may not be the most consistent method to predict yield loss due to 2 factors. First is the subjectivity of visual injury ratings. The second issue with estimating yield loss based on visual injury in commercial fields is that we often don't know when the dicamba exposure event occurred. Depending on environmental conditions and soybean growth stage, it could take between 7 and 21 days for injury symptoms to occur. Without knowing the exact date of dicamba exposure, yield predictions can vary from the regression model used in this study.

The published manuscript can be accessed at: **https://www.researchgate.net/publication/275700911_Response_of_Glyphosate-Tolerant_Soybean_Yield_Components_to_Dicamba_Exposure**

Figure 1. Visual injury symptoms of dicamba 28 days after treatment. Dicamba rate, application timing, and injury rating are included in each box.

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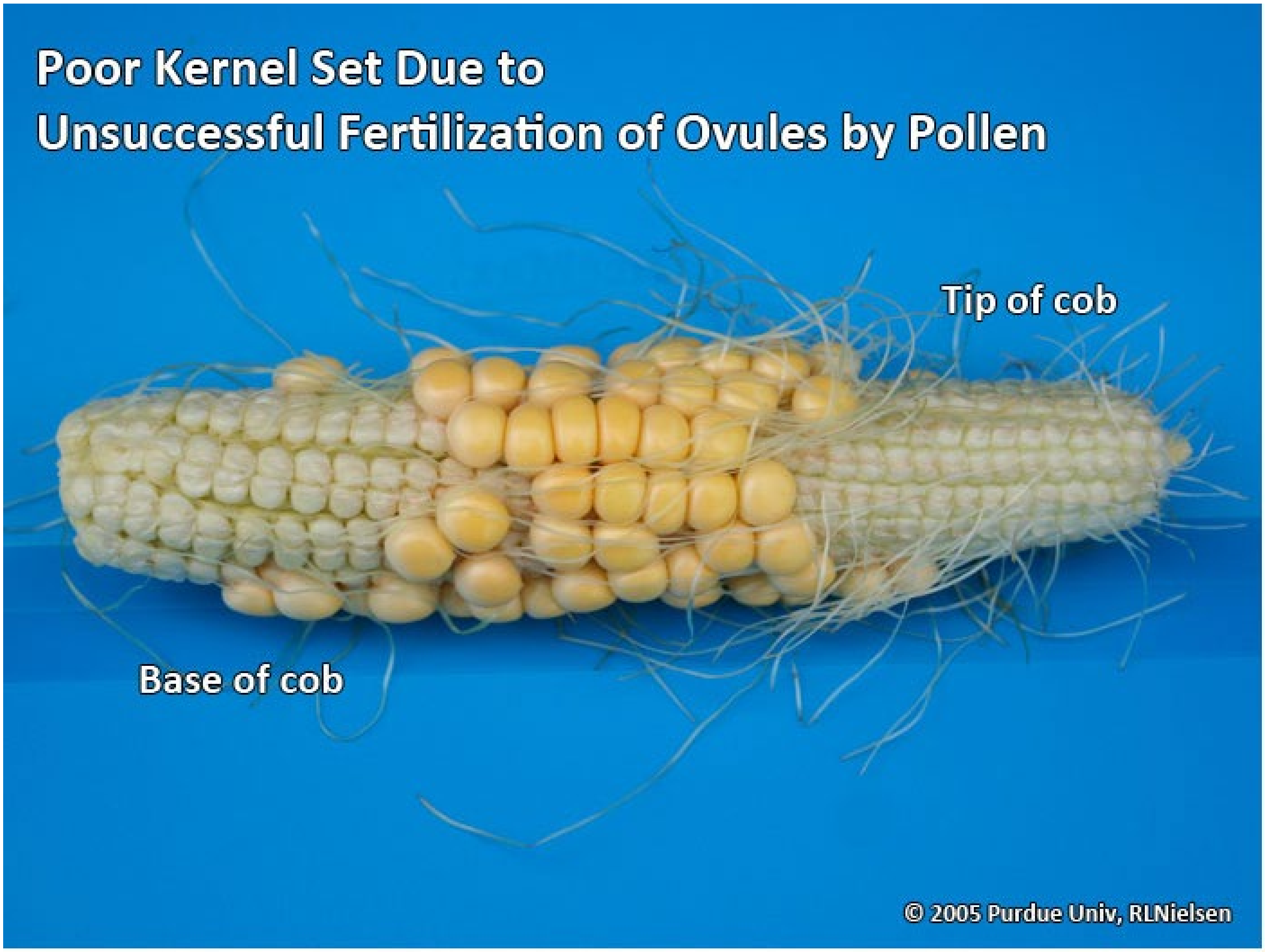
Kernel Set Scuttlebutt – *(Bob Nielsen)* -

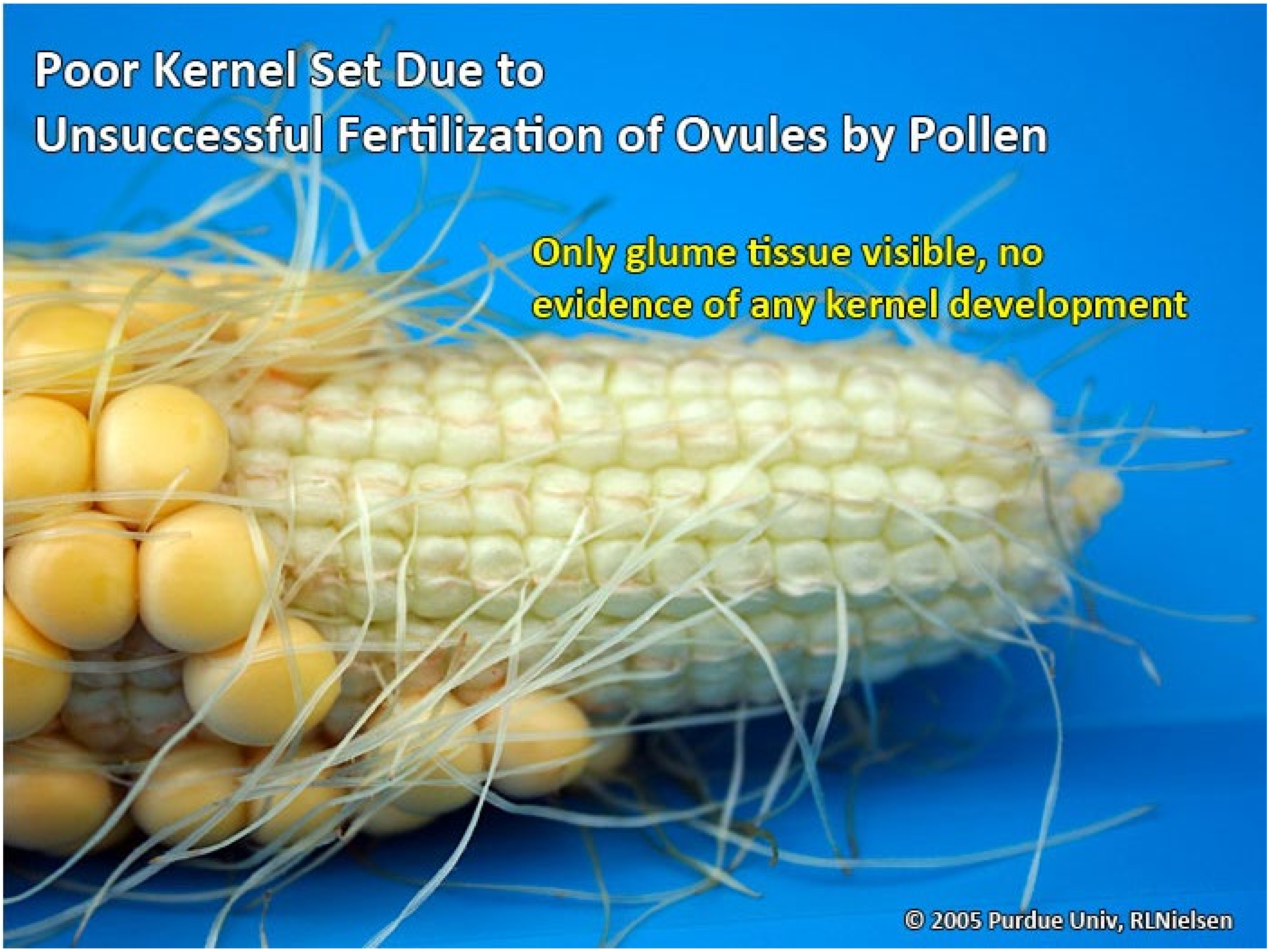
"Scuttlebutt": The cask of drinking water on ships was called a scuttlebutt and since sailors exchanged gossip when they gathered at the scuttlebutt for a drink of water, scuttlebutt became U.S. Navy slang for gossip or rumors. A butt was a wooden cask, which held water or other liquids; to scuttle is to drill a hole, as for tapping a cask. Nautical Terms and Phrases, NAVAL HISTORICAL CENTER, Washington DC 20374-5060. Online at **www.ussbrainedd630.com/terms.htm** [URL accessed Aug 2017].

The post-pollination scuttlebutt overheard in coffee shops throughout Indiana during late summer often revolves around the potential for severe stress that might reduce kernel set or kernel size in neighborhood cornfields. Growers' interest in this topic obviously lies with the fact that the number of kernels per ear is a rather important component of total grain yield per acre for corn.

Poor kernel set, meaning an unacceptably low kernel number per ear, is not surprising in fields that are obviously severely stressed by drought, but can also occur in fields that otherwise appear to be in good shape. Good or poor kernel set is determined from pollination through the early stages of kernel development; typically 2 to 3 weeks after pollination is complete.



Poor kernel set due to unsuccessful fertilization of ovules by pollen.



Poor kernel set due to unsuccessful fertilization of ovules by pollen.

Problems with kernel set stem from ineffective pollination, ineffective fertilization of the ovaries, kernel abortion, or all three. Distinguishing the symptoms is easy. Determining the exact cause of the problem is sometimes difficult.

Potential Yield Loss

The potential loss in grain yield caused by lower kernel numbers per ear can be estimated using the formula of the so-called Yield Component Method first described by the Univ. of Illinois many years ago (Nafziger, 2017; Nielsen, 2016b). For example, the loss of only 1 kernel per row for a hybrid with 16-row ears and a stand count of 30,000 ears per acre would equal a potential yield loss of approximately 5 bushels per acre (1 [kernel] x 16 [rows] x 30 [thousand ears per acre] divided by 90 [thousand kernels per bushel]).

Ineffective Pollination / Fertilization

Poor kernel set may be caused by ineffective pollination (the transfer of pollen from the tassel to the silks) and/or the subsequent failure of the pollen's male gametes to fertilize the female gametes of the ovules on the cob. Ineffective pollination is characterized by an absence of noticeable kernel development. In other words, all you see is cob tissue. Pollination problems may be due to several stress factors, sometimes working together to influence kernel set.

Severe drought stress, aggravated by excessive heat, can delay silk emergence to the extent that pollen shed is complete or nearly complete by the time the silks finally emerge from the husk. Without a pollen source, ovule fertilization cannot occur.

Persistent severe silk clipping by insects such as the corn rootworm beetle or Japanese beetle throughout the active pollen shed period can also limit the success of pollination. The simultaneous effects of severe drought stress on silk emergence can easily amplify the consequences of severe silk clipping.

Western corn rootworm beetles feeding on silks.

Incomplete tip fill on an unusually long ear likely due to lack of pollen when tip silks finally emerged.

Combination of pollination failure and kernel abortion.

Severe drought stress coupled with excessive heat and low humidity can desiccate emerged silks to the point that they are no longer receptive to pollen grain germination. I suspect this is low on the list of possible stressors for Indiana most years (because of our typically high humidity levels), but may play a role in some fields once in a while. Similarly, I doubt that pollen viability is usually an issue for Indiana cornfields because temperatures in the low 90's are usually not great enough to kill pollen.

Consecutive days of persistent rainfall or showers that keep tassels wet for many hours per day over several days can delay or interfere with anther exsertion and pollen shed. Such a weather period does not typically occur in Indiana, but the remnants of Hurricane Dennis that visited many parts of Indiana in early July of 2005 may have influenced kernel set in some fields that were trying to pollinate during that week as a result of the many days of showery humid weather (coupled with the excessive cloudiness and its negative effect on photosynthesis).

Exceptionally long potential ears resulting from good weather during ear size determination sometimes fail to pollinate the final kernels near the tip of the cob. Remember, butt silks emerge first and tip silks emerge last. With oversized ears, sometimes tip silks emerge after all the pollen has been shed.

An increasingly common hybrid trait in recent years is an aggressive silking habit that results in silks emerging from the husk leaves several days prior to the availability of pollen from the tassels. The trait is associated with drought tolerance in the sense that silk emergence delays are less likely under severe drought stress and, thus, silk/pollen synchrony is better retained. However, favorable weather during silk elongation tends to favor unusually early silk appearance that can result in silk aging / deterioration prior to the availability of pollen. The typical kernel set pattern associated with this situation is blank cob tissue near the basal end of the cobs.

Kernel Abortion

Poor kernel set can also be a reflection of kernel abortion following successful fertilization of the ovules on the cob. In contrast to ineffective pollination or fertilization, initial kernel development obviously precedes kernel abortion, so the symptoms are usually shriveled remnants of kernels that may be whitish- or yellowish-translucent.

Kernel abortion results from severe stresses that greatly reduce the overall photosynthetic output of the plant during the first several weeks after the end of pollination as the kernels develop through the blister (R2) and milk (R3) stages of development. The risk of kernel abortion decreases significantly after the R3 stage of kernel development. Obvious photosynthetic stressors include severe drought & heat stress, consecutive days of excessively cloudy weather and significant loss of photosynthetically active leaf area (e.g., hail damage, leaf diseases, insect damage, nutrient deficiency).

Warm nights during pollination and early grain fill may indirectly affect survival of developing kernels. Research suggests that the increased rate of kernel development due to warmer temperatures lowers the available amount of photosynthate per unit of thermal time; which then becomes a stressor to kernel development particularly at the tip of the ear, leading to kernel abortion (Cantarero et al., 1999).

Final Food for Thought

A plethora (meaning a whole lot) of blank cob tips can quickly ruin the joy of walking a cornfield in the middle of August. Before getting too bent out of shape over the missing kernels, remember to count the number of harvestable kernels on those ears. Sometimes, ears exhibit 1 to 2 inches of blank tips; yet still contain 16 rows by 30 to 35 harvestable kernels per row. Those are perfectly acceptable ear sizes in a year where dry weather has been a concern.

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Brief Update on Indiana Corn Crop Conditions – *(Bob Nielsen) -*

A rough start to the growing season put Indiana's corn crop behind the proverbial 8-ball from the beginning, due to the weather- and disease-driven challenges to germination, emergence, and early establishment of the young plants. Many fields were replanted, fully or partially, in an attempt to get out from behind the 8-ball. However, frequent and excessive rains on poorly drained soils "put the damper" on many of those attempts and many fields remain rife with blank "wet holes" or stunted, uneven corn plant development throughout.

Consequently, the percentage of the 2017 Indiana corn crop rated as good to excellent (the highest two crop condition categories) hovered in the high 40's for nine straight weeks (Fig. 1) and only recently "improved" up to the low 50's with the most recent USDA-NASS crop progress report. Nine straight weeks of such low statewide crop condition is not without precedent, but you have to go back 21 years (1996) to find a similar early-season stretch of poor crop condition ratings. Statewide corn yields that year subsequently averaged about 7% below the historical trend yield.

Fortunately, the 2017 weather conditions during the important pollination and early kernel set period were mostly favorable and kernel numbers per ear in fields I have walked recently appear to be generally acceptable. Plant health relative to diseases is relatively good, though common rust is indeed common this year and reports have trickled in regarding early onset of southern corn rust in the southern third of the state. Weather conditions from here forward will determine whether these foliar diseases become pervasive and serious. Some fields exhibit noticeable late-season nitrogen deficiency, though often primarily in areas of fields that are also severely stunted by earlier periods of excessive water.

As of Sunday, 6 Aug, nearly 50% of the state's corn crop had reached the dough stage of kernel development or beyond and some was reported to be in the dent stage (USDA-NASS, 2017). At dough stage of development, only 40 to 50 percent of the final grain yield has been determined and so the next 30 to 45 days are important for determining the remainder of the final grain yield. Moderate rainfall and slightly cooler than normal temperatures from here on out would be beneficial for improving the yield prospects of the 2017 corn crop.

Given the current, somewhat average, pace of crop development, the bulk of the state corn crop will likely reach physiological maturity and be safe from fall freeze events from mid-Sept through early October. Such timing of maturity would be about on par with the most recent 5-year average and well ahead of usual occurrences of fall frosts or killing freezes.

Once kernel development reaches the dent stage (Nielsen, 2016b), growers can begin to sample ears, count kernels, and estimate grain yield (Nielsen, 2016a). The accuracy of such yield estimates rely on number of ear samples collected and areas of field sampled. While sampling, be on the lookout for the potential development of ear rots (Woloshuk, 2009, 2010. Frequent rains during pollination tend to favor the infection of silks by many of the causal ear rot fungi. Send samples of infested ears to Purdue's Plant and Pest Diagnostic Laboratory to confirm the specific ear rot disease (PPDL, 2017).

Between now and harvest, growers should continue to walk fields and scout for the onset of stalk rot diseases (Freije et al., 2016), especially in those fields that experience severe stress during these next 30 to 45 days. Send samples of stalk rot to Purdue's Plant and Pest Diagnostic Laboratory to confirm the specific ear rot disease (PPDL, 2017). Access to aerial imagery can aid the identification of problem areas within fields and help target areas to inspect more closely. Fields that develop significant levels of stalk rot should be targeted for earlier harvest to avoid the headaches of harvesting "weak-knee'd" corn plants that could be lying on the ground.

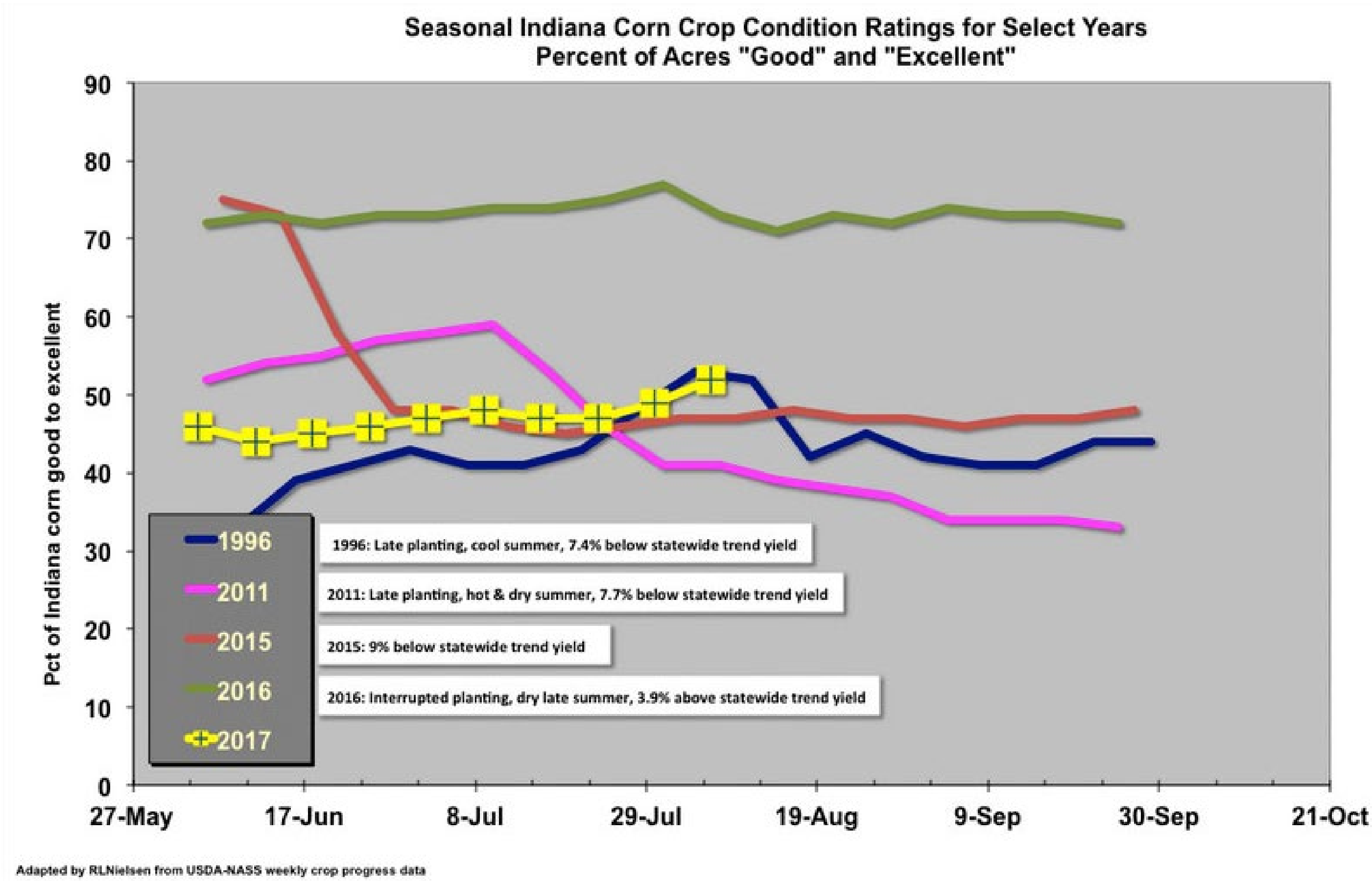

Fig. 1. Seasonal Indiana Corn Crop Condition Ratings (percent "good" to "excellent") for Select Years.

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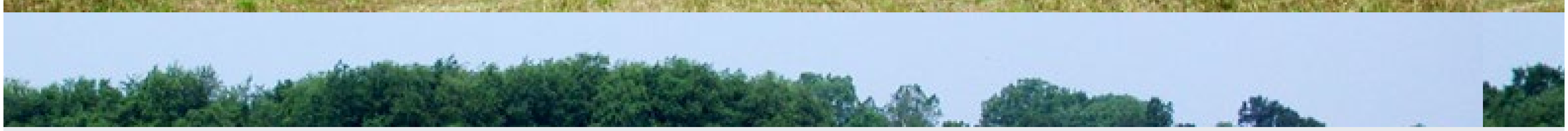

2017 Agronomy Field Day at ACRE – *(Agronomy Department)* -

Save the date for the 2017 Agronomy Field Day at ACRE!

September 7, 2017 - 7:30 a.m. to 2 p.m. at the Agronomy Center for Research & Education - (4540 U.S. 52 W, West Laf., IN 47906)

Farmers trying to balance weak crop prices and rising input costs can learn more about farm financial fitness at this years Agronomy Field Day @ ACRE sponsored by Purdue Extension, the Purdue Department of Agronomy, the Indiana Soybean Alliance and the Indiana Corn Marketing Council.

AGRONOMY FIELD DAY @ ACRE
SEPTEMBER 7, 2017

PURDUE EXTENSION | LOCAL FACES COUNTLESS CONNECTIONS

Beck Agricultural Center
@ the Agronomy Center for Research and Education (ACRE)
4540 U.S. 52 W
West Lafayette, IN 47906

This is a FREE program, but participants must register:
http://bit.ly/2017AgFieldDay
For more information, contact Karen Mitchell at (765)474-0793 or mitcheka@purdue.edu

PARP, CEU & CCH credits have been applied for. There is a $10 fee for PARP credits. Cash or check will be accepted.

7:30 a.m.	Check-in
8:00 a.m.	Welcome + Weather Outlook
	Austin Pearson, Tipton County Extension Educator, Agriculture & Natural Resources
8:45 a.m.	Break + Attendees Load Shuttles
9:00 a.m.	Field Learning Stations
	Bob Nielsen, Professor of Agronomy + Extension Corn Specialist, Purdue University
	Shaun Casteel, Associate Professor of Agronomy + Extension Soybean Specialist, Purdue University
	Bill Johnson, Professor of Botany & Plant Pathology + Extension Weed Specialist, Purdue University
	John Obermeyer, Extension Integrated Pest Management Specialist, Purdue University
	Jim Camberato, Professor of Agronomy + Extension Soil & Fertility Specialist, Purdue University
	Fred Whitford, Clinical Engagement Professor, Pesticide Programs, Purdue University
12:15 p.m.	Lunch
1:00 p.m.	*Commodity Week Panel*
	Chris Hurt, Professor of Agricultural Economics, Purdue University
	Chuck Shelby, President & CEO, Risk Management Commodities Inc.
	Joseph Hubbs, Clinical Assistant Professor & Agricultural Economist, University of Illinois
	Moderator: **Todd Gleason**, Extension Media Communications Specialist, University of Illinois
2:00 p.m.	Program End

Farm Financial Fitness

Effective Crop Management

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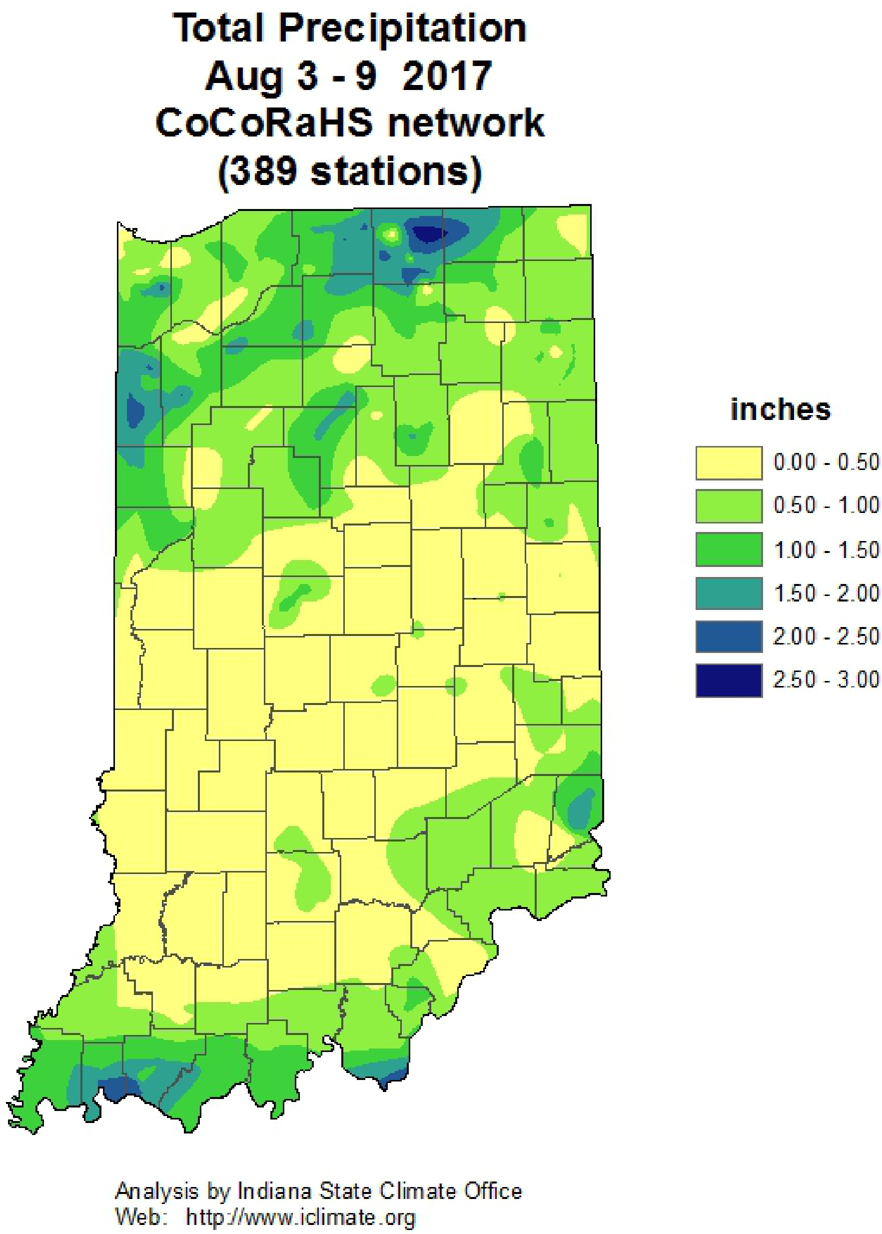
WEATHER UPDATE

Precipitation


Total Precipitation
Aug 3 - 9 2017
CoCoRaHS network
(389 stations)
inches
0.00 - 0.50
0.50 - 1.00
1.00 - 1.50
1.50 - 2.00
2.00 - 2.50
2.50 - 3.00
Analysis by Indiana State Climate Office
Web: http://www.iclimate.org

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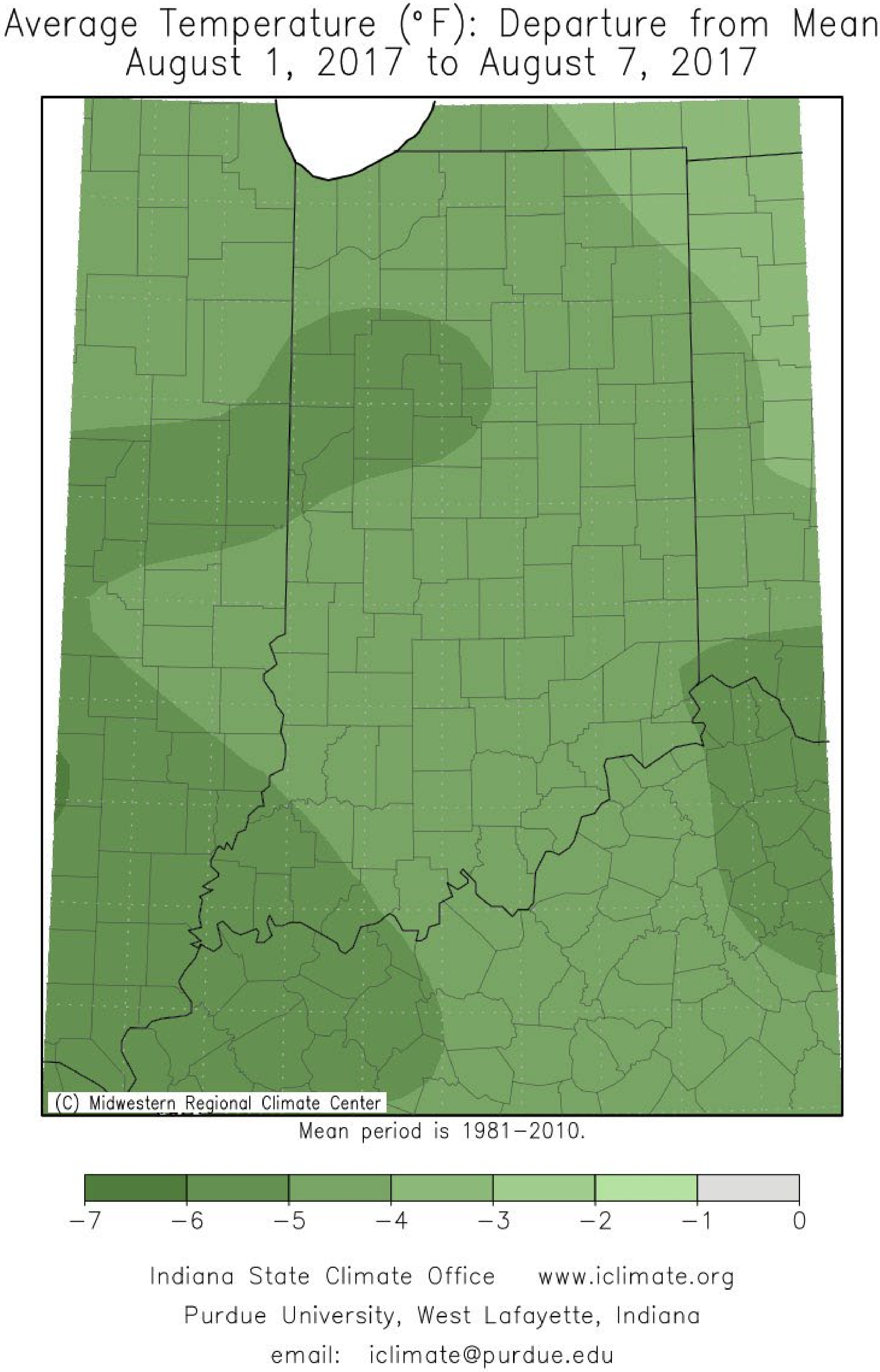
Temperature


Average Temperature (°F): Departure from Mean
August 1, 2017 to August 7, 2017
(C) Midwestern Regional Climate Center
Mean period is 1981–2010.
−7
−6
−5
−4
−3
−2
−1
0
Indiana State Climate Office www.iclimate.org
Purdue University, West Lafayette, Indiana
email: iclimate@purdue.edu

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THANKS FOR READING

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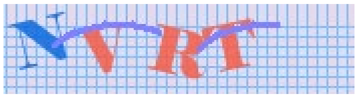

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