Purdue Cooperative Extension Service
USDA-NIFA Extension IPM Grant

July 27, 2012 - Issue 18

In This Issue

Insects, Mites, And Nematodes

Do Bugs Really Like it Hot? – (*Christian Krupke and John Obermeyer*)

An article being circulated in the popular news this week (originally appearing in USA Today) indicated that insects were flourishing throughout the country in this year's record heat. We were contacted by CBS News and asked to comment, and may have disappointed the reporter by not fanning the flames on this particular story. The article featured quotes from several entomologists (mostly professionals in the pest control industry), that explained how insect development is temperature-dependent, so more heat = more bugs. Sounds simple and seems to make sense at first glance. But as many of you know, there is more to the story.

If you're an avid *Pest&Crop* reader, you've probably noticed the lack of insect pest related articles lately. Whereas, earlier in the year, we were sharing about the accelerated pace of insect development…most insects running 2-3 weeks earlier than historical calendar dates. Our colleagues

Caddisflies, an aquatic non-pest insect, have been abundant in our black light trap near the Wabash River in Knox County

in other systems, e.g., horticulture, fruits, vegetables, etc., were experiencing the same phenomenon. We know that if we were to just consider temperature, in general insects will develop more quickly and potentially have more generations in seasons that are warmer.

Of course, insects need more than heat. The lack of moisture that is causing so much concern in our cropping systems is also detrimental to insects – insects need free water to drink in many cases and they get that from standing water, dew and nectar. All are in short supply this year.

Are you being driven buggy more in this heat?

The USA Today article is really just telling half the story to get the populace to envision massive hordes of mosquitoes, ants and spiders invading their homes. Although there are no hard data to back us up, we actually believe the record heat and drought has caused a dramatic decline in most insects this season, both pests and beneficials. It all starts with healthy, growing plants and those are in short supply in many areas. To put it simply, when crops are stressed, so are the pests that feed on them and their natural enemies.

Many of you are immediately thinking of one pest that is flourishing in this environment …spider mites. No doubt, in many soybean (and some cornfields), this 8-legged spider relative has shown its incredible reproductive potential in recent weeks. Two-spotted spider mite has been the fodder for our articles, and video, for the past several weeks and with good reason. Past droughts, most recently 1988, have taught us that hot and dry conditions will lead to population explosions of spider mites in field crops and this year is reinforcing that for us all.

All things are relative and experience counts for a lot when reacting to insect populations. When talking with a homeowner today about cicada killers flying around her frightened kids, facts are meaningless. Because she's never experienced these intimidating (but non-aggressive) flying machines before, I'm certain she'd agree with the premise that insects are "worse" this year! We're sure it had nothing to do with them recently moving to the country, being surrounded by trees (with cicadas), and recently constructing a soil berm in the backyard. Perfect for the cicada killer, not so for the homeowner.

Black Light Trap Catch Report - (*John Obermeyer*)

	7/10/12 - 7/16/12							7/17/12 - 7/23/12						
County/Cooperator	**VC**	**BCW**	**ECB**	**WBC**	**CEW**	**FAW**	**AW**	**VC**	**BCW**	**ECB**	**WBC**	**CEW**	**FAW**	**AW**
Dubois/SIPAC Ag Center	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Jennings/SEPAC Ag Center	0	0	0	0	0	0	0	0	0	9	0	0	0	7
Knox/SWPAC Ag Center	0	0	0	0	0	0	1	0	0	0	0	3	0	6
LaPorte/Pinney Ag Center	1	0	0	16	0	0	0	2	0	6	11	2	0	2
Lawrence/Feldun Ag Center	1	0	0	0	0	0	8	0	1	0	0	0	0	6
Randolph/Davis Ag Center	3	1	0	0	0	0	9	1	2	0	0	0	0	47
Tippecanoe/TPAC Ag Center	2	2	0	1	2	0	13	1	0	2	1	6	0	8
Whitley/NEPAC Ag Center	0	0	0	0	0	0	1	0	0	0	0	0	0	4

VC = Variegated Cutworm, BCW = Black Cutworm, ECB = European Corn Borer, WBC = Western Bean Cutworm, CEW = Corn Earworm, FAW = Fall Armyworm, AW = Armyworm

Alternatives for Mite Control in Field Corn – (*Christian Krupke and John Obermeyer*)

Two-spotted spider mites have been well-covered by our publication and others in recent weeks. Most of those articles have dealt with soybeans, primarily because mites tend to be more problematic in beans than corn, and soybeans are still more "salvageable" in most areas. However, some irrigated corn fields in northern Indiana are infested with mites as well. One alternative to the organophosphorus insecticides (chlorpyrifos, dimethoate), is a miticide, trade named Comite (active ingredient propargite). Labeled for field and sweet corn, this product is best applied using ground sprayer if possible. Information from our colleagues in the Western Corn Belt certainly indicate that control of this species of mite is optimistic, but with good canopy penetration, should reduce the population enough to get the corn to the dent stage.

Western Bean Cutworm Adult Pheromone Trap Report
Week 1 = 6/7/12 - 6/13/12 Week 2 = 6/14/12 - 6/20/12 Week 3 = 6/21/12 - 6/27/12 Week 4 = 6/28/12 - 7/4/12 Week 5 = 7/5/12 - 7/11/12 Week 6 = 7/12/12 - 7/18/12 Week 7 = 7/19/12 - 7/25/12

County	Cooperator	WBC Trapped						
		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Adams	Kaminsky/New Era Ag - Monroe	0	7	5	11	3		8
Adams	Roe/Mercer Landmark - Pleasant Mills	0	0	3	2	5	2	0
Allen	Anderson/Syngenta - Churubusco	2	0	16	7	5	30	10
Allen	Gynn/Southwind Farms - Ft. Wayne	0	5	13	7	28	23	0
Benton	Babcock/Ceres Solutions - Boswell	0	2	7	9			
Boone	Dennis Carrell - Lebanon	0	3	5	1	0	0	0
Clay	Bower/Ceres Solutions - Clay City	0	1	0	0	0	0	0
Clay	Bower/Ceres Solutions - Brazil	0	0	0	0	0	0	0
Clinton	Foster/Purdue Entomology - Rossville	1	9	5	14	1	0	0
DeKalb	Hoffman/ATA Solutions	3	3	7	17	25	15	2
DuBois	Eck/Purdue CES - Jasper	0	0	0	0	1	0	0
Elkhart	Kaufmann/Crop Tech - Elkhart	6	9	16	22	36	16	18
Fayette	Schelle/Falmouth Farm Supply - Falmouth	0	0	0	0	0	0	0
Fountain	Mroczkiewicz/Syngenta - Rob Roy	5	22	52	43	38	3	0
Fulton	Childs/Specialty Hybrids	144	234	123	93	42	14	5
Fulton	Jenkins/North Central Co-op - Kewanna	27	153	298	246	169	31	5
Fulton	Jenkins/North Central Co-op - Rochester	26	96	80	108	121	24	2
Hamilton	Campbell/Beck's Hybrids - Atlanta	0	1	0	2	0	1	0
Hamilton	Campbell/Beck's Hybrids - Sheridan	0	0	1	0	0	0	0
Hendricks	Nicholson/Nicholson Consulting - Danville	1	2	2	1	0		0
Henry	Schelle/Falmouth Farm Supply - New Castle	0	0	0	1	0	0	0
Henry	Schelle/Falmouth Farm Supply - Millville	0	0	0	3	4	0	0
Jasper	Overstreet/Purdue CES - Wheatfield	20	100	49	84	69	15	3
Jasper	Parker/Purdue - Stanley		157	196	39	50	2	0
Jasper	Parker/Purdue - Green		58	124	24	13	0	0
Jasper	Parker/Purdue - Hamstra		68	38	41	42	2	0
Jasper	Parker/Purdue - Kikkert		166	163	59	122	9	2
Jasper	Parker/Purdue - Fair Oaks		576	432	246	33	16	3
Jasper	Parker/Purdue - Rodibaugh		50	93	40	36	4	3

Jay	Shrack/Ran Del Agri Svc - Dunkirk	0	0	0	1	3	0	0
Jennings	Bauerle/SEPAC - North Vernon	0	0	0	0	0	0	0
Knox	Bowers/Ceres Solutions/Frichton	0	0	0	0	0	0	0
Knox	Bowers/Ceres Solutions/Vincennes	0	0	0	0	0	0	0
Knox	Hoke/SWPAC - Vincennes N	0	0	0	0	0	0	0
Lake	Kleine/Kleine Farms - Cedar Lake	4	34	27	28	16	8	4
Lake	Moyer - Schneider	45	185	222	201	218	20	14
Lake	Moyer - Shelby	11	63	124	195	136	13	13
LaPorte	Barry/Kingsbury Elevator		12	28	43	17	10	0
LaPorte	Rocke/Agri Mgmt Solutions - Wanatah SE	17	140	229	350	179	66	10
LaPorte	Rocke/Agri Mgmt Solutions/LaCrosse E	25	108	146	155	24	3	6
Miami	Early/Pioneer	2	11	23	16	6	8	4
Montgomery	Stine - Wingate	3	2	0	15	31	0	0
Montgomery	Stine - Alamo	0	1	0	0	0	0	0
Newton	Childs/Specialty Hybrids	18	97	74	35	5	0	0
Newton	Childs/Specialty Hybrids	8	19	37	16	15	10	1
Newton	Childs/Specialty Hybrids	0	5	5	4	1	1	0
Newton	Moyer - Lake Village	15	123	194	137	247	71	35
Porter	Leuck/PPAC - Wanatah N	4	18	19	24	55	12	2
Porter	Rocke/Agri Mgmt Solutions - Francesville	20	73	201	193	36		4
Pulaski	Childs/Specialty Hybrids	35	122	137	96	86	36	4
Pulaski	Childs/Specialty Hybrids	71	110	81	44	38	4	0
Pulaski	Childs/Specialty Hybrids	50	71	83	35	22	8	0
Pulaski	Childs/Specialty Hybrids	9	52	25	11	4	8	0
Pulaski	Childs/Specialty Hybrids	8	28	18	9	5	1	0
Pulaski	Childs/Specialty Hybrids	14	48	44	21	5	0	0
Putnam	Nicholson/Nicholson Consulting - Greencastle	1	1	1	1	0	0	1
Randolph	Boyer/DPAC - Farmland	0	0	14	3	6	14	8
Rush	Schelle/Falmouth Farm Supply - Carthage	0	0	1	0	0	0	0
Starke	Childs/Specialty Hybrids	69	150	139	57	20	10	0
Starke	Childs/Specialty Hybrids	48	74	83	35	46	24	1
Starke	Childs/Specialty Hybrids	70	95	89	41	35	25	0
Starke	Wickert/Wickert Agronomy Services - N. Judson	2	11	12	9	47	3	0
Sullivan	Bower/Ceres Solutions - Sullivan E	0	0	1	1	1	0	0
Tippecanoe	Bower/Ceres Solutions - Sullivan W	0	0	6	3	1	1	0
Tippecanoe	Bower/Ceres Solutions - New Lebanon	0		0	0	0	3	0
Tippecanoe	Bower/Ceres Solutions - Farmersburg	3	3	0	0	1	0	0
Tippecanoe	Bower/Ceres Solutions	4	39	6	6	7	4	0
Tippecanoe	Nagel/Ceres Solutions - Otterbein	0	5	8	7	8	0	0
Tippecanoe	Obermeyer/Purdue Entomology - Agry Farm	1	2	4	3	1	3	1
Tippecanoe	Westerfeld/Monsanto	9	9	8	11	8		0
White	Childs/Specialty Hybrids	0	7	12	2	3	2	0
White	Childs/Specialty Hybrids	8	32	12	5	0	8	0
Whitley	Walker/NEPAC - Columbia City	0	4	5	2	14	6	1

Agronomy Tips

VIDEO: Corn Kernel Abortion After Pollination - (*Bob Nielsen*)

Dr. Bob Nielsen, Purdue Extension Corn Agronomist, visits a hot, dry corn field shortly after pollination to determine the success of kernel fill. This stressed corn field did get through pollination fairly well, but now many fertilized kernels are in a process of aborting or shriveling. The moisture level in these plants are so low, that the developing ears are flaccid and rubber-like. At this growth stage, and beyond, one can attempt to estimate grain yield by following procedures in this linked publication: <http://www.agry.purdue.edu/ext/

VIDEO: Assessing Soybean for Drought Stress - (*Shaun Casteel*) -

Dr. Shaun Casteel, Purdue Extension Soybean Agronomist, shows symptoms of drought stress in a R3 growth stage soybean field. He goes through varying degrees of soybean stress, from yellowing of lower leaves to plant death. Most importantly, is how flowers and developing pods are lost, likely leading to yield losses.

VIDEO: Life on the Edge: The Irrigated Corn Interface During Drought - (*Bob Nielsen and Shaun Casteel*) -

Drs. Bob Nielsen and Shaun Casteel, Purdue Extension Agronomists, visit an irrigated corn field in the midst of a drought. While they transverse the interface from irrigated to moisture-starved corn they make several observations of plant response and the differences in air, leaf, and soil temperatures. This video certainly supports the old adage, "rain makes grain."

Irrigation Management In Time of Drought – (*Lyndon Kelley, MSU/Purdue Extension Irrigation Educator, Mike Staton, MSU Extension CURE Soybean Educator, and Steve Miller, visiting specialist Bio system and Agricultural Engineering*)

Michigan and Indiana are in midst of the greatest agriculture water challenge seen for decades. Realizing the challenges and modifying Irrigation management allow producer to get the most from the resource available.

Several factors have led to lower summer water table and surface water levels:

- Lack of solid winter freeze which allowed winter precipitation to infiltrate to the aquifer much earlier than normal.
- Lack of winter- spring rainfalls.
- Early spring green up of natural vegetations which reduced recharge season by 3-4 weeks in many areas.
- Continued hot and dry weather depleting water supplies and increasing demand for water.

Most irrigation systems in Michigan and Indiana were designed to supplement summer rainfall and do not have the long term capacity to keep up with drought condition crop water requirements. This can result in yield and quality reduction when water is restricted. **The need for water is most critical now.** Reducing irrigation to the level that is below basic crops water needs will jeopardize both the investment made on the applied water and purchased crop inputs. Corn exhibits the greatest yield reduction from drought conditions at pollination and the following two weeks.

Soybeans have little yield reduction in when drought conditions occur during the vegetative growth period as long as enough water is available for near normal plant growth. Adequate water is critical through blossom to prevent aborting of developing pods. Greatest yield advantage from irrigation is often achieved from R3 (beginning pod, one pod 3/16 inch long on one of the upper four nodes on the main stem having unrolled leaves) through R6 (full seed, one pod containing green seed that fills the pod cavity on one of the upper four nodes on the main stem having unrolled leaves. Water applied at R3 to R5 encourages flower and pod retention. This increases yield potential by increasing the number of seeds per acre. Irrigation water applied after R5 will primarily improve yields by increasing seed size.

So what can you do as irrigators?

1. If your water supply becomes challenged; prioritize your irrigations to the greatest advantage. Limit irrigation to acreage that you can meet crops water needs, giving priority to the most valuable crop at it critical stages.

2. Consider rebuilding part of the soil reserve if your water supply allows after limited rainfall events. In fields where crops are showing soil moisture depletion like rolling corn or flipped soybean leaves consider building a reserve by irrigating in excess crop E.T. It may be possible to reduce water applications late in the growing season with minimal impact on yield.

3. Maximize the percentage of irrigation water that enters the soil and is available to plant roots. Irrigation water applied at a rate faster than it can infiltrate into the soil can cause runoff. Even if the water does not leave the field it can create under and over irrigated spots. Walk the most venerable sites in your irrigated fields and identify problem areas. Venerable areas have the heaviest (finer textured) soils or most compacted areas. Look for areas were water is applied the fastest by the system, with a focus on near the last tower of a center pivot. If signs of runoff are present, reduce your irrigation application rate. For future year consider changing distribution system to one offering greater wetted areas.

For more information on Avoiding Irrigation Runoff see: <http://www.msue.msu.edu/portal/default.cfm?pageset_id=28706&page_id=361029&msue_portal_id=25643>

4. Maximizing application rates while avoiding runoff. Irrigation water that evaporates directly from the soil or foliage does not effectively meet the plants water needs. During drought condition as much 0.1 inches of each application is caught in foliage and soil upper surface where it evaporates directly to air. Bare soils may have 1.0 to 2.0 inches of topsoil that void root development due to excessive heat. This soil will hold 0.06 to 0.14 inch of irrigation from the plant for each application depending on the type of soil and presents crop residue. An irrigator applying a single 1.5 inch of water instead of three 0.5- inch applications to a soil with a surface that holds 0.1 inches/ inch in the top inch of soil will have saved 0.2 inch of irrigation water.

5. Improving uniformity of irrigation system allows all areas within the field receive close to the same amount of water.

   Adjust end guns, repair leaks and sprinkler malfunctions to provide as uniform application as possible. Eliminating under- or over-irrigated portion of the coverage area allows closer management of water without jeopardizing yields.

   Recent Nebraska research shows minimal irrigation water saving from drop nozzles. These systems greatly increase the potential of irrigation water runoff (because water is applied to a smaller area) and can result in poor uniformity when plant height interferes with distribution pattern.

For more information on test irrigation system uniformity see: <http://www.msue.msu.edu/portal/default.cfm?pageset_id=28706&page_id=361029&msue_portal_id=25643>

6. Verify your actual application by measuring system output over many locations or better yet a complete system evaluation. In testing on over forty systems it was not uncommon for producer's estimate of application to be 20% different than tested application.

7. Plants grown on heavier soils will need as much water as plants in light sandier soils. The crops evapotranspiration needs are the same for the plant. The advantage of heavier soil is that it can store more water so additional water is carried into the summer and larger rainfall events in the summer are more effectively stored. Once the soil moisture is depleted the same amount of irrigation water must be applied to meet crop needs.

8. If water supply in drought is not adequate to run the entire system continuously consider pumping for only part of each day thus allowing time to replenish the pumps draw down area or for ponds to recharge. Reduced pumping volumes may allow a continuously lower than normal pumping volume. Close down the supply line valve, shut off the pivot end gun, or reduce big gun nozzle size to adjust system's application to a lower volume requirement.

9. Private ponds can often improve groundwater recharge by cleaning and expanding their area. Water temperature difference in the pond can be used as an indicator cans the direction of recharge. A local excavator with irrigation pond digging experience is often the best resource in deterring potential pond improvements.

10. A recharge well is sometimes utilized to pump continuously at a low volume into existing pond to store water for irrigation. Since most existing irrigation ponds normally recharge themselves (they are connected to the aquifer), recharge wells are relatively ineffective as water is circulated back to the aquifer.

11. Problems have occurred when impoundments have been created in county drains including blowouts and damage to culverts crossings. Always consult the Drain Commissioner when making changes in a public drain.

12. Irrigation scheduling can result in more effective use of the water. See sites below:

For more information on irrigation scheduling see: <http://www.msue.msu.edu/objects/content_revision/download.cfm/revision_id.604557/workspace_id.-30/#3SchedulingTools.pdf/> or <http://www.extension.umn.edu/distribution/cropsystems/components/DC1322_01.html#Checkbook>.

Answers to Common Questions about Irrigating Soybeans – (*Mike Staton, MSU Extension Soybean Educator and Lyndon Kelley, MSU Extension and Purdue Extension Irrigation Educator*)

This article will help soybean producers make profitable irrigation decisions.

I have not applied any irrigation water to my soybeans. Will I see an economic return by irrigating them at this point in the season?

Yes, especially if the plants are healthy and irrigation can begin at pod initiation. In general, the most important time to irrigate soybeans is from R3 (beginning pod, one pod 3/16 inch long on one of the upper four nodes on the main stem having unrolled leaves) through R6 (full seed, one pod containing green seed that fills the pod cavity on one of the upper four nodes on the main stem having unrolled leaves). Water applied at R3 to R5 encourages flower and pod retention. This increases yield potential by increasing the number of seeds per acre. Irrigation water applied after R5 (one pod with1/8 inch long seeds on one of the upper four nodes on the main stem with unrolled leaves) is also beneficial as it improves yields by increasing seed size. In fact, if soybeans can be watered only one time during the growing season, it should be at R5.

I began irrigating my soybeans in June to get them through the drought. Can I stop watering them now that we have received some rain?

You may be able to delay irrigation water applications due to recent rain but plan to apply irrigation water as necessary through seed fill (R6). Failure to continue irrigation may cause more stress on the crop than if no irrigation water had been applied. This is because soybean plants are able to adjust to soil moisture conditions by changing pod number and seed size. Plants may produce fewer and smaller seeds if irrigation is discontinued. The earlier irrigation applications may have also reduced rooting depth. Monitor moisture levels in the top two feet of soil closely and maintain the moisture level above 60% of the available water holding capacity throughout R6.

When can I stop irrigating soybeans without sacrificing yield?

Research from the University of Missouri showed that terminating irrigation too soon can cause yield losses of ¾ of a bushel per acre per day on a sandy soil. The Missouri researchers made the last application around September 20th which was well into the R7 growth stage. However, most universities recommend timing the final irrigation run so that the soil moisture level is near 60% of the available water holding capacity at the beginning of the R7 growth stage.

Precise timing of all irrigation runs, including the final run, requires a working knowledge of basic irrigation scheduling concepts such as the amount of water required for soybeans at various growth stages to reach maturity, available soil water capacity, allowable water depletions, soybean growth stages, effective rooting depth and estimating soil moisture status. Lyndon Kelley and Steve Miller have compiled a list of Irrigation Scheduling Tools <http://www.msue.msu.edu/objects/content_revision/download.cfm/revision_id.604557/workspace_id.-30/%233%20Scheduling%20Tools.pdf/> that explain and utilize these concepts.

This article was produced by the SMaRT project (Soybean Management and Research Technology). The SMaRT project was developed to help Michigan producers increase soybean yields and farm profitability. SMaRT is a partnership between MSU Extension and the Michigan Soybean Checkoff program.

Weather Update

U.S. Drought Monitor

July 24, 2012
Valid 7 a.m. EST

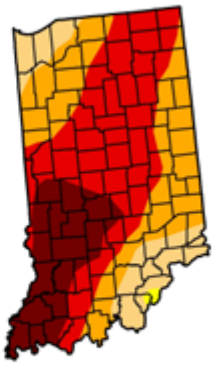
Indiana

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	99.59	87.23	57.75	18.67
Last Week (07/17/2012 map)	0.00	100.00	99.40	87.04	53.61	0.49
3 Months Ago (04/24/2012 map)	76.01	23.99	0.00	0.00	0.00	0.00
Start of Calendar Year (12/27/2011 map)	100.00	0.00	0.00	0.00	0.00	0.00
Start of Water Year (09/27/2011 map)	55.11	44.89	6.08	0.00	0.00	0.00
One Year Ago (07/19/2011 map)	81.91	18.09	0.00	0.00	0.00	0.00

Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional



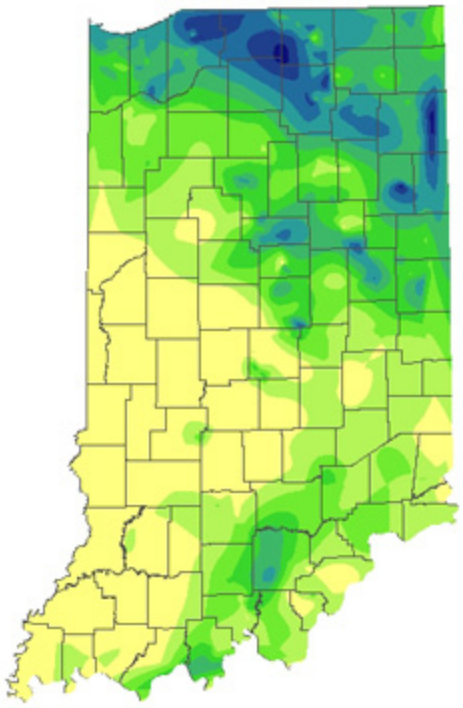
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu

USDA

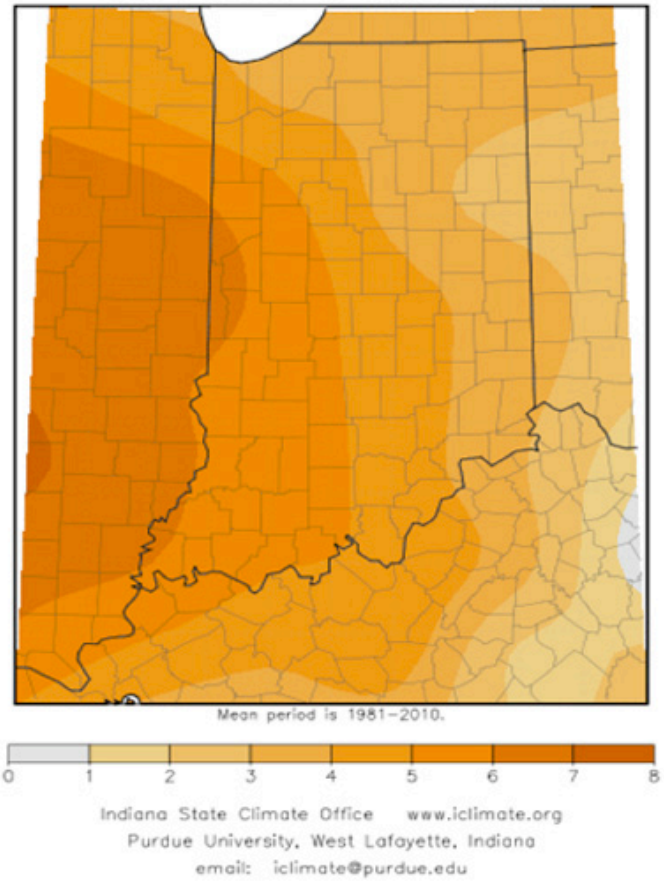
Released Thursday, July 26, 2012
Richard Heim, National Climatic Data Center, NOAA

Total Precipitation
July 19-25 2012
CoCoRaHS Network
(501 stations)



Analysis by Indiana State Climate Office
Web: http://www.iclimate.org

Average Temperature (°F): Departure from Mean
July 18, 2012 to July 24, 2012



Indiana State Climate Office www.iclimate.org
Purdue University, West Lafayette, Indiana
email: iclimate@purdue.edu