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Japanese Beetle Emerging, the Impact to Field Crops is Usually Minimal – (John Obermeyer) -

- **Annual grub feeding is over, now it's the beetle's turn**
- **Watch for activity on soybean, and later on corn silks**
- **Management considerations below**

Japanese beetle adults are emerging throughout the state, seemingly spurred on overnight by the much needed rains last week. These adults are the result of eggs that were laid by female beetles last summer. After eggs hatch, the grubs immediately began to feed on roots and decaying organic matter in the soil. They continue their feeding from late summer into the fall. The grubs overwintered several inches deep in the soil and returned to near the soil surface to feed early this spring.

A "pretty" picture of Japanese beetle and dandelion

Adult Japanese beetles will feed on more than 300 different species of plants, but are especially fond of roses, grapes, smartweed, soybeans, corn silks, flowers of all kinds, and overripe fruit. Beetle damage to cultivated crops is often minimal and defoliation (leaf removal) on soybean usually looks much worse than it is. The beetles often congregate in several areas of a soybean field, feeding on and mating in the upper canopy. This is often observed by producers from the cabs of their trucks. The beetles iridescent, metallic color catches the attention of those doing "windshield" field inspections. Closer inspections will often reveal that weeds, especially along the fence lines, have made fields even more attractive to the beetles.

Although soybean can sustain economic damage from the feeding of the beetles, soybean has the amazing ability to withstand considerable damage (defoliation) before economic losses occur. The impact of defoliation is greatest during flowering and pod fill because of the importance of leaf area to photosynthesis, and ultimately to yield. Therefore, nearly 50% soybean defoliation before bloom or 15-25% defoliation from bloom to pod fill can be tolerated before yields are economically affected. This average defoliation must occur for the whole plant, not just the upper canopy. In corn, Japanese beetle feeding on corn silks is usually minimal and spotty. Field inspections will often reveal that this feeding is not prevalent much beyond the field borders. If beetles are feeding on corn silks, an insecticide should be applied only if silks are being cut off to less than 1/2 inch before 50% pollination has taken place. Beetles are often attracted to dead or dying silks to feed, obviously beyond 50% pollination.

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Western Bean Cutworm Moth Flight Begins – (John Obermeyer) -

- **Moths have begun emerging from soil, mating and egg laying follows**
- **Scouting for egg masses should commence once moth captures are increasing daily**
- **Most Bt corn is protected**

Pheromone trapping began for western bean cutworm moths on Thursday June 23, and several have been captured since then, refer to "Western Bean Cutworm Adult Pheromone Trap Report."

This is just the beginning of an extended moth emergence and flight, with their peak presence expected 2-3 weeks from now. Those in high-risk areas, i.e., sandy soils, high moth flight and WBC history, should be gearing up for field scouting of non-traited corn.

Western bean cutworm egg mass next to larval feeding damage

Scouting should begin once moths are being captured nightly. In five different areas of a field, inspect 20 consecutive plants for egg masses which are laid on the upper surface of the top leaves of corn and/or larvae that may have hatched and crawled to the whorl and begun to feed. Usually the newest, vertical leaf is the best place to look for egg masses. Young larvae need pollen to survive, and female moths are most attracted to cornfields that are just about to pollinate. Moths will lay eggs on whorl stage corn when pre-tassel/pollinating corn is not available. Larvae may initially be found in leaf axils, feeding on pollen that has accumulated there. Later damage from larvae, as they feed deep in the whorl (attacking the tassel to get at pollen), will resemble corn borer or fall armyworm damage. Initially the damage will be subtle and not economically important (or even noticeable). Later stage larvae enter the ear and feed on corn kernels and can cause economic damage, and also can exacerbate ear rots, including Gibberella ear rot. In fields where Bt corn is

planted, scouting and supplemental control should not be necessary. The proteins expressed in most currently available Bt corn hybrids (including Herculex, Smartstax, and Viptera hybrid lines) have been shown to be highly effective in controlling this cutworm species, although very light surface scraping will be seen on a few kernels at harvest time.

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

County	Cooperator	WBC Trapped
		Week 1 6/23/16 - 6/29/16
Adams	Kaminsky/New Era Ag	0
Adams	Roe/Mercer Landmark	0
Allen	Anderson/Syngenta Seed	
Allen	Gynn/Southwind Farms	0
Allen	Kneubuhler/G&K Concepts	1
Bartholomew	Bush/Pioneer Hybrids	
Clay	Bower/Ceres Solutions/Brazil	0
Clay	Bower/Ceres Solutions/Bowling Green	0
Clinton	Emanuel/Boone Co. CES	0
Clinton	Foster/Purdue Entomology	0
DeKalb	Hoffman/ATA Solutions	
Dubois	Eck/Purdue CES	1
Elkhart	Barry	6
Elkhart	Kauffman/Crop Tech Inc.	9

Fayette	Schelle/Falmouth Farm Supply Inc.	0
Fountain	Mroczkiewicz/Syngenta	8
Fulton	Jenkins/N. Central Coop-Rochester	0
Fulton	Jenkins/N. Central Coop-Kewana	2
Gibson	Schmitz/Gibson Co. CES	0
Hamilton	Campbell/Beck's Hybrids	
Hamilton	Truster/Reynolds Farm Equipment	0
Hendricks	Nicholson/Nicholson Consulting	
Jasper	Overstreet/Purdue CES	6
Jasper	Ritter/Brodbeck Seeds	
Jay	Boyer/Davis PAC	
Jay	Shrack/Ran Del Agri Services	0
Jay	Temple/Jay County CES	
Jennings	Bauerle/SEPAC	0
Knox	Bower/Ceres Solutions/Vincennes	0
Knox	Bower/Ceres Solutions/Frichton	0
Lake	Kleine/Kleine Farms	6
Lake	Moyer/Dekalb Hybrids, Shelby	25
Lake	Moyer/Dekalb Hybrids, Schneider	19
LaPorte	Rocke/Agri-Mgmt Solutions, Wanatah	50
Miami	Early/Pioneer Hybrids	2
Miami	Myers/Myers Ag Service	
Newton	Moyer/Dekalb Hybrids, Lake Village	39
Porter	Leuck/PPAC	3
Polaski	Capouch/M&R Ag Services	1
Putnam	Nicholson/Nicholson Consulting	
Randolph	Boyer/DPAC	0
Rush	Schelle/Falmouth Farm Supply Inc.	0

Shelby	Fisher/Shelby Co. Co-Op	0
Shelby	Simpson/Simpson Farms	0
Sullivan	Bower/Ceres Solutions/Farmersburg	0
Sullivan	Bower/Ceres Solutions/Sullivan	0
Tippecanoe	Bower/Ceres Solutions	5
Tippecanoe	Nagel/Ceres Solutions	
Tippecanoe	Obermeyer/Purdue Entomology	0
Tippecanoe	Westerfeld/Monsanto	0
Tipton	Campbell/Beck's Hybrids	
Whitley	Walker/NEPAC	1

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Armyworm Pheromone Trap Report – (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	Wk 12	Wk 13
Dubois/SIPAC Ag Center	0	0	348	258	11	6	22	44	35	5	9	13	44
Jennings/SEPAC Ag Center	0	0	15	18	9	1	9	0	1	2	4	35	61
Knox/SWPAC Ag Center	0	6	197	63	17	39	22	22	19	30	31	36	37
LaPorte/Pinney Ag Center	0	25	317	296	63	149	121	29	10	42	46	79	153
Lawrence/Feldun Ag Center	4	97	155	76	42	21	14	14	15	40	74	139	278

Randolph/Davis Ag Center	0	0	0	24	122	162	101	14	11	29	16	70	49
Tippecanoe/Meigs	0	4	141	101	45	50	55	114	32	16	58	0	566
Whitley/NEPAC Ag Center	7	21	619	1,091	376	682	612	173	78	56	82	81	293

Wk 1 = 3/31/16 - 4/6/16; Wk 2 = 4/7/16 - 4/13/16; Wk 3 = 4/14/16 - 4/20/16; Wk 4 = 4/21/16 - 4/27/16; Wk 5 = 4/28/16 - 5/4/16; Wk 6 = 5/5/16 - 5/11/16; Wk 7 = 5/12/16 - 5/18/16; Wk 8 = 5/19/2016 - 5/25/16; Wk 9 = 5/26/16 - 6/1/16; Wk 10 = 6/2/16 - 6/8/16; Wk 11 = 6/9/16 - 6/15/16; Wk 12 = 6/16/16 - 6/22/16; Wk 13 = 6/23/16 - 6/29/16

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Saturated soils and supplemental nitrogen: Research update – (Jim Camberato and RL 'Bob' Nielsen) -

Excessive wet weather can cause substantial N loss and damage corn plants. With plentiful and persistent rainfall in 2015 we were able to examine crop response to supplemental and lateapplied N at three locations.

Economic Optimum N Rates (EONR) calculated for various combinations of N fertilizer cost and grain price are listed in Tables 2 - 7 for regions of the state.

Location 1: Corn was planted May 23 in a 30-acre field with silt loam soils near Romney, IN. Starter fertilizer was 21 lb N/ac in 2x2 placement.

Rainfall in May was 5.6 inches with 3 inches after planting. June and July rainfall totaled almost 15 inches.

Soil nitrate-N in mid-July was extremely low, only 2 and 4 parts per million in the 0-1 and 1-2 foot soil depths. Nitrogen deficiency symptoms associated with differences in N loss related to soil properties was easily seen prior to fertilization (picture below).

7 Aug.; Romney, IN

(image airSCOUT)

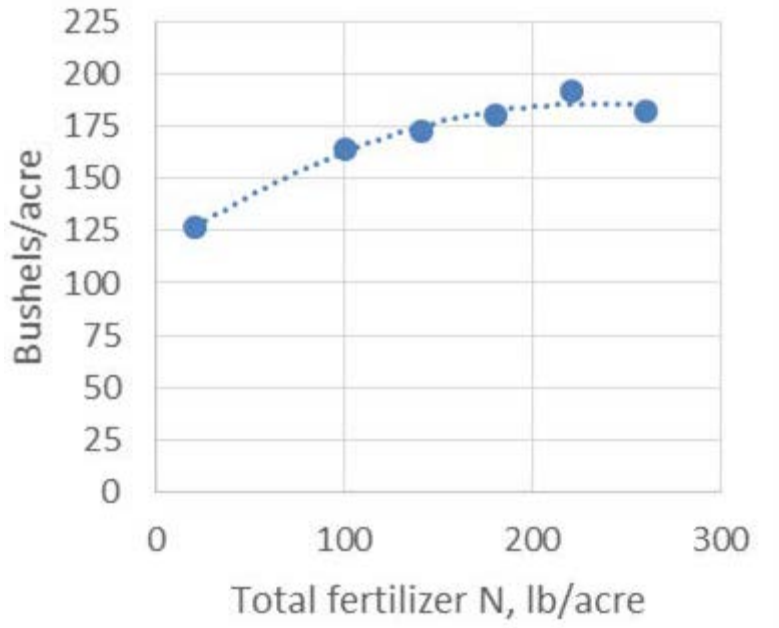
Liquid nitrogen (28-0-0 UAN) was applied on August 5 to 12-row plots about 1,200 feet long with drops on a high-clearance applicator at rates of 0, 80, 120, 160, 200, and 240 lb N/ac. Each treatment was repeated 6 times in the field.

Rainfall after the late N application was only 0.7 inches in the first 2 weeks after application yet a strong response to applied N can be seen in the aerial photo (picture on below). Only 2.5 inches of rainfall occurred in the next 5 weeks.

20 Aug.; Romney, IN

(image airSCOUT)

Despite tremendous rainfall early that resulted in delayed fertilization, less than ideal plant health, and dry weather after N application the crop responded strongly to the N applied near tasseling time. After harvest the economic optimum N rate was about 175 lb N/ac and yield achieved was over 180 bu/ac (graph below). Left unfertilized grain yield was about 125 bu/ac.



Location 2: Corn was planted April 30 on sandy soils near LaCrosse, IN. Rainfall was 9.3 inches in May. Liquid N (28-0-0 UAN) was applied at 180 lb N/acre at the end of May, followed by nearly 11 inches of rain in June.

Supplemental N was applied July 1 at 0, 75, and 125 lb N/ac with a regular liquid N applicator. About one week earlier, the corn was yellow-green and stunted with significant death of the lower leaves (picture to left), but the root system appeared relatively healthy. Not all the N was lost from the soil, however. Nitrate-N was 20 ppm in the upper foot of soil and 9 ppm in the 2nd foot. Grain yield averaged about 100 bu/ac and there was no benefit to supplemental N.

Crop appearance, LaCrosse, IN; 23 June

<u>Location 3:</u> Corn was planted May 7 near Morristown, IN on poorly drained soils with 31 lb N/acre applied preplant. Split N applications were V4, V14, and R1 (silking) (see table below for rates). Rainfall was about 11 inches between the V4 and V14 applications. Another 5 inches fell between V14 and R1. Despite the waterlogged conditions and likely N loss from the V4 application there were no differences in yield among timing treatments, which averaged 206 bu/ac. Only 1.2 inches of rain fell in August and 1.8 inches in September. Dry soils may have limited the response to the later applied N.

Saturated soils, Morristown, IN; 27 May

Growth stage at time of sidedress application			
V4	V14	R1	Grain yeild
Sidedress N, lb N/ac			Bu/ac
200			204
100	100		208
100	50	50	204
50	150		208
50	75	75	206

Summary

Previous research found corn has a tremendous capacity to respond to late-season N provided the plant is N deficient, but otherwise healthy.1 When N loss occurs because of excessively wet conditions, lower yield potential due to the water-logged damaged root system complicates the decision to apply additional N fertilizer.

Results differed substantially among the three experiments we conducted in areas of excessive rainfall, apparent N loss, and likely impacts on crop health.

In one case a 50 bu/ac increase in yield occurred with 175 lb N/ac applied about tassel time to highly N deficient plants on soils depleted of nitrate-N.

In the 2nd situation the root system of the crop appeared relatively healthy, but yield of 100 bu/ac suggested this assessment was too optimistic, and supplemental N did not increase yield.

In the third case an evaluation of split N timing was intended from the beginning of the season. Although V14 and R1 (silking) applications were made after 11 and 16 inches of rain had fallen after the V4 application there was no difference in yield among N timing treatments.

Response to supplemental N after excessive rainfall can be quite variable. Measuring response by

leaving several untreated strips or applying more than one supplemental rate of N will not only allow one to assess the profitability this year's response, but enable better assessments in future year's on potential response to supplemental N.

We gratefully acknowledge the support provided for research by the Indiana Corn Marketing Council, Pioneer Hi-Bred Int'l, airSCOUT, A&L Great Lakes Laboratories, Purdue Univ. Office of Ag Research Programs, and all of the Purdue Ag Center staff.

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Late June Crop Water Needs – (Lyndon Kelley, Michigan State and Purdue Universities) -

Much of North / Northwest Indiana and Southern Michigan are below the mean for precipitation since crop emergence so we would expect the need for irrigation in some areas. To avoid getting behind on available water, irrigators are encouraged to apply irrigation water to make up the deficit between crop water use and rainfall for the previous week. Purdue Extension Educator Bob Yoder of Marshal County Indiana was quick to remind me of a common 2012 situation, many producers in spring of 2012 forced their crop to grow roots into moisture at soil depth to meet their water needs, but as the drought continued into the summer it was difficult to irrigate enough water to supply the plant without the soil moisture reserve.

Reference Evapotransportation (rET.) was about 1.3" for most of Northern Indiana and Southern Michigan in the third week of June. In Indiana rET. estimates from ET Gages are available from the Purdue Agricultural Center stations and can be found at: (http://www.iclimate.org). Michigan Enviroweather network has links for rET. estimates and related tool for each of the 87 sites found at : http://www.enviroweather.msu.edu/homeMap.php This data could be used in the county it originates from or adjacent counties as long as actual rainfall information from the field is available.

Early season rooting depth of our crops limits our irrigation application volumes. Application of

0.75” or less are common this time of year to avoid pushing water below the effective roots zone, but avoid making too many small (less than 0.4”) application that are less effective and may aggravate disease. Corn at V-6 stage has an expected effective rooting depth of 20”. At V-10 stage we would expect corn to have a 23” effective rooting depth. By VT-16 (tassel) stage we would expect corn to have full effective rooting depth of 36” or more. Soybeans at V-3 stage have an effective rooting depth of 16”. Soybeans at R-1 stage have almost all of their effective rooting depth of 24”.

Forage crop nearing full growth and earlier season crop like potatoes have water use at or just above rET. and would have used about 1.3” of water last week. Soybeans at v-3 stage would have used 60% of the rET. for a weekly water use of just over 0.75”inches. Some soybean fields will near R-1 stage this week and will have a water removal equal to our rET. of 1.3” for the week.

Corn at v-6 stage would have used 40% of the rET. for a weekly water use of just over 0.5”inches. Corn at V-10 stage would have used 75% of the reference E.T. for a total water use of just less than an inch for the week. Some corn will be at V-12 stage by the end of this week and will have a water removal equal to our rET. of 1.3” for the week.

For more information on irrigation water use and when to irrigate see fact sheet #3 “Irrigation Scheduling tools” at:
http://msue.anr.msu.edu/uploads/235/67987/FactSheets/3_IrrigationSchedulingTools5.14.pdf

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Purdue Offers Herbicide Resistant Weed Screening – (Travis Legleiter and Bill Johnson) -

The Purdue Weed Science group is again offering herbicide resistance screening for Palmer amaranth, waterhemp, and giant ragweed for the 2016 growing season. The resistance screens include glyphosate (group 9) and ALS-inhibitor (group 2) assays for giant ragweed, as well as glyphosate (group 9) and PPO-inhibitor (group 14) resistance screening for waterhemp and Palmer amaranth

Leaf tissue samples can be submitted for molecular DNA analysis that will allow results to be generated within a few weeks of submission. It is important to follow the directions on the submission form for collecting, storing, and shipping leaf tissue samples as this can have a large impact on the accuracy of the results.

Seed samples can also be submitted for analysis of herbicide resistance. This allows us to also screen for glyphosate resistance in giant ragweed. It is also important to follow the directions on the submission form for seed collection from the appropriate number of plants to assure quality results. The seed samples will take several months to return results as plants will need to be grown from seed in the greenhouse.

The submission form with instructions for collection, storage, and shipping can be found at the following link:
https://ag.purdue.edu/btny/weedscience/Documents/2016HerbicideResistancescreeningform.pdf.
The submission form can also be found on the front page of the Purdue Weed science website:
https://ag.purdue.edu/btny/weedscience/Pages/default.aspx.

Please contact Julie Young (young294@purdue.edu, 765-494-0891) with any questions or concerns you have when sampling or shipping a sample.

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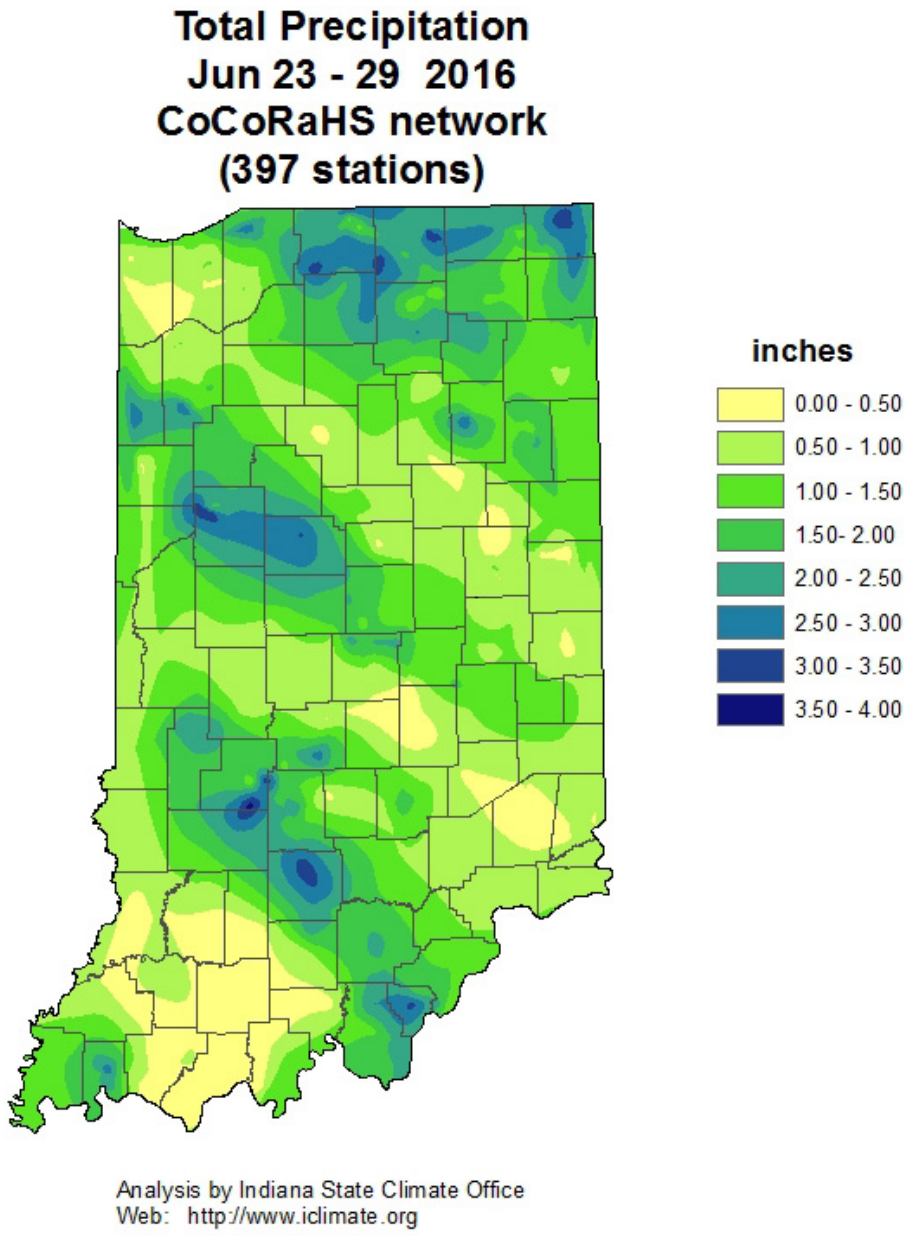
WEATHER UPDATE

Precipitation



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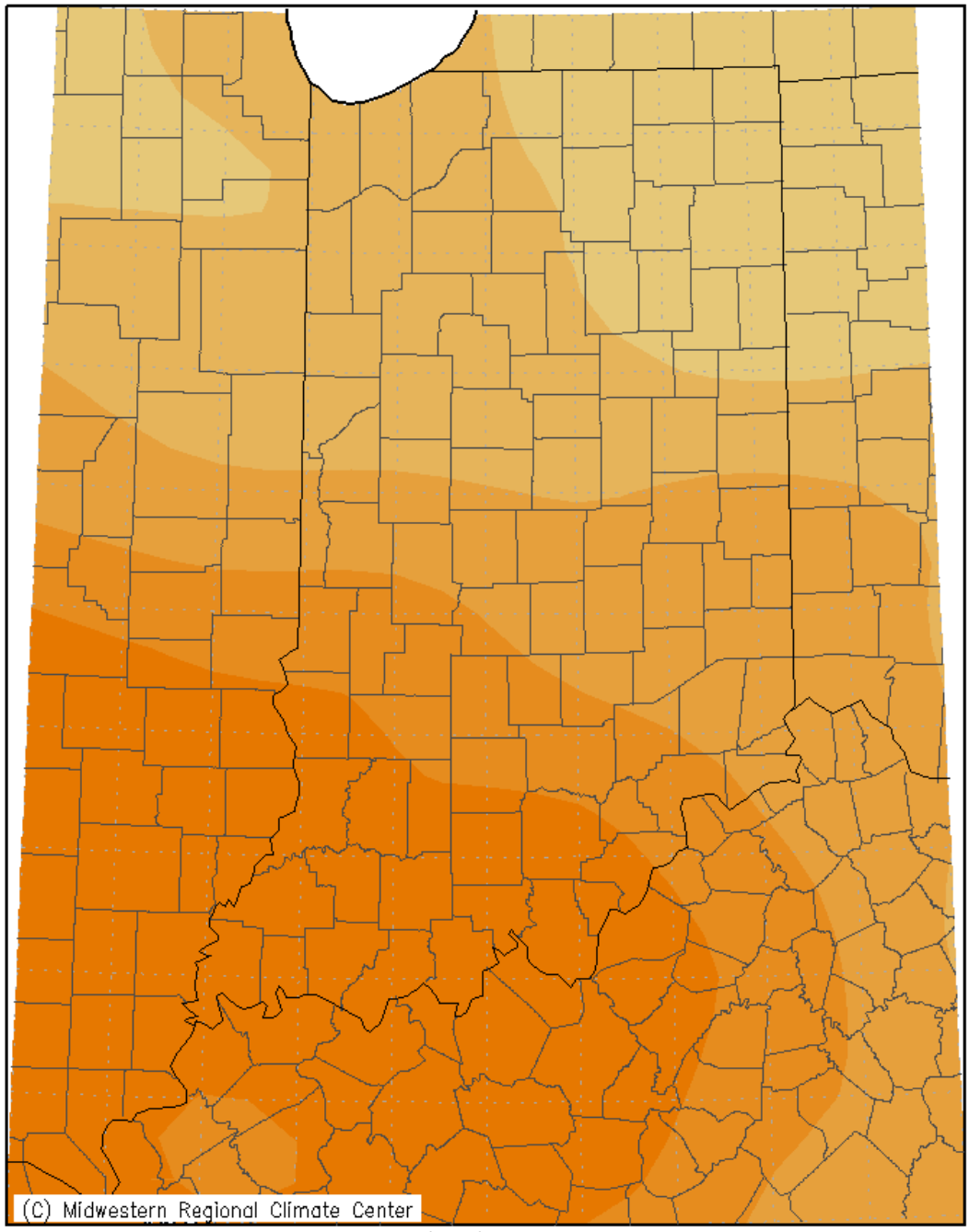
Temperature

Average Temperature (°F): Departure from Mean
June 21, 2016 to June 27, 2016



Mean period is 1981–2010.

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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