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Sampling for Plant Parasitic Nematodes: Your Result is as Good as the Sample You Provide – *(Jamal Faghihi and Virginia Ferris)* -

Plant parasitic nematodes are microscopic worm-like organisms that require water to survive and are sensitive to high temperature. Only living nematodes can be extracted from roots. Through the years we have had many samples submitted to the Purdue Nematology Laboratory with little consistency in the quality of the samples. We have discussed proper sampling procedures at every opportunity but not exclusively until now. Sampling might appear trivial but we believe proper sampling is the most crucial step for correct diagnosis. Because we continue to receive improper samples we address this issue again via this article. Even though procedures for sampling among the most important plant parasitic nematodes are similar, there are differences based on the host and the type of nematodes we are trying to recover.

Corn parasitic nematodes: There are three major groups of nematodes that parasitize corn.

1. Endo-parasites (e.g., Lesion nematodes): These nematodes mostly feed within corn roots. Plant roots along with surrounding soil must be submitted to recover these types of nematodes. A proper soil sample consists of about one quart of sub-samples taken to a depth of 6-8 inches directly from the root zone of affected corn plants Dig up the stunted plants and place with adhering soil and roots in a plastic bag. Attach a label to the outside of the bag. On the label, give sufficient information to identify the sample. Root and soil samples should not become dry or be exposed to high temperature. The best time to sample for these nematodes is mid-season when most of the nematodes have migrated to the inside of the roots. These nematodes continue to feed throughout the growing season. They can be found in all kinds of soil types.
2. Ecto-parasites (e.g., Needle nematodes): These types of nematodes feed from outside of the young roots. The sampling procedure is the same as described above for Lesion nematodes. But, Needle nematode is mostly a problem in sandy soil and can be found early in the season (4-6 weeks after germination). Often they disappear when the soil temperature rises above 80 degrees.
3. Semi endo-parasites (e.g., Lance nematode): These nematodes can feed from inside or outside of the roots. The sampling procedure is the same as that described above for endo-parasites. Lance nematodes feed throughout the season, have no soil type preference and can parasitize corn or soybean.

Soybean parasitic nematodes: Lesion and Lance nematodes parasitize soybean too but Needle nematode does not. The sampling procedure for these nematodes in soybean is similar to the one described for corn. The most economically important nematode affecting soybean is the Soybean Cyst Nematode (SCN). The SCN distribution, as for most of the plant parasitic nematodes, is in patches. So it is very important to take many sub-samples to increase possibility of hitting the concentrated areas. A soil probe or a small trowel should be used to collect the sub-samples. Most of these nematodes are within 6-8 inches of the soil. One sample for every 10 acres is ideal. A quart of soil is sufficient and no root samples are required for SCN. Samples can be taken anytime.

Recommended Optimum Sampling Type and Time for Major Plant Parasitic Nematodes in Indiana.

Host	Target Nematode	Sample Type	Optimum Time to Sample
Corn	Needle	Soil and roots	June-mid July
Corn	Lesion, Lance	Soil and roots	Late June-Late August
Soybean	Lesion, Lance	Soil and roots	Late June-Late August
Soybean	SCN	Soil	Anytime

Turf	All	Soil and roots	June and September
Melons	Root knot	Roots	At harvest
Mint	Lesion	Roots and soil	Late June-September
Mint	Needle	Roots and soil	Late Spring or early fall
Mint	Root knot	Roots	Fall

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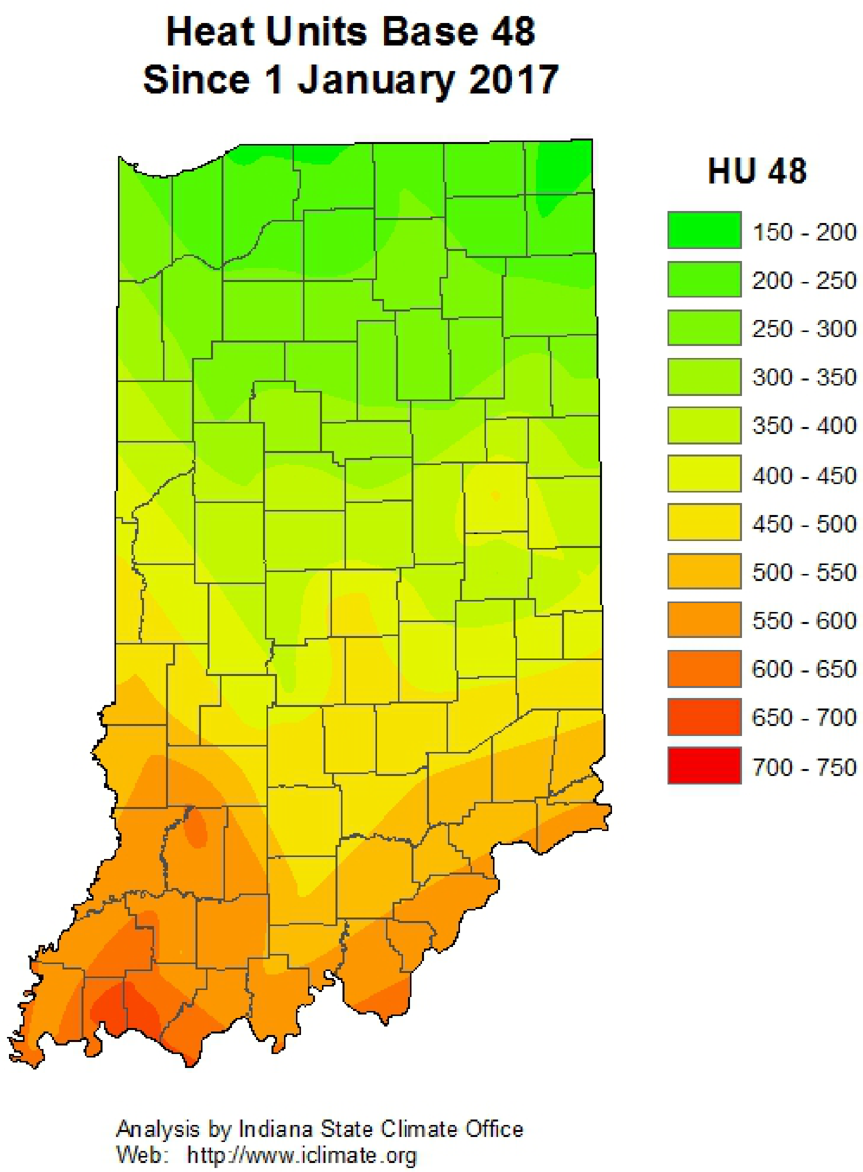
Alfalfa Weevil Development Map


Heat Units Base 48
Since 1 January 2017
HU 48
150 - 200
200 - 250
250 - 300
300 - 350
350 - 400
400 - 450
450 - 500
500 - 550
550 - 600
600 - 650
650 - 700
700 - 750
Analysis by Indiana State Climate Office
Web: http://www.iclimate.org

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Armyworm Pheromone Trap Report

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
Dubois/SIPAC Ag Center	0	0	0	101	193	16						
Jennings/SEPAC Ag Center	0	1	1	56	57	9						
Knox/SWPAC Ag Center	0	13	26	42	189	57						
LaPorte/Pinney Ag Center	0	0	3	352	936	382						
Lawrence/Feldun Ag Center	4	108	216	246	650	348						
Randolph/Davis Ag Center	0	29	41	528	1232	300						
Tippecanoe/Meigs	0	2	15	107	730	243						
Whitley/NEPAC Ag Center	0	34	90	537	1689	1349						

Wk 1 = 3/16/17 - 3/22/17; Wk 2 = 3/23/17 - 3/29/17; Wk 3 - 3/30/17 - 4/5/17; Wk 4 - 4/7/18 - 4/12/17; Wk 5 - 4/13/17 - 4/19/17

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Black Cutworm Adult Pheromone Trap Report

County	Cooperator	BCW Trapped				
		Week 1 3/23/17- 3/29/17	Week 2 3/30/17- 4/5/17	Week 3 4/5/17- 4/12/17	Week 5 - 4/13/17 - 4/19/17	Week 6 - 4/20/17-4/26/17
Adams	Kaminsky/New Era Ag			13	35	
Adams	Roe/Mercer Landmark	11	17*	7	42	28*
Allen	Anderson/Syngenta Seed		0			
Allen	Gynn/Southwind Farms	2	1	0	15	21*
Allen	Kneubuhler/G&K Concepts - Trap 1		0	19*	36	60*
Allen	Kneubuhler/G&K Concepts - Trap 2		9	2		0
Bartholomew	Bush/Pioneer Hybrids	1	13*	13	17	28*

Clay	Bower/Ceres Solutions - Clay City	0	0	7	4	2
Clay	Bower/Ceres Solutions - Bowling Green	0	0	0		1
Clay	Bower/Ceres Solutions - Brazil	0	0	0		0
Clinton	Emanuel/Boone Co. CES	8	9	6	10	5
DeKalb	Hoffman/ATA Solutions	0	0	0	1	0
Dubois	Eck/Purdue CES	14	28*	41*	4	4
Elkhart	Kauffman/Crop Tech Inc.	0	0	6	16	28*
Fayette	Schelle/Falmouth Farm Supply Inc.	5	33*	5		3
Fountain	Mroczkiewicz/Syngenta	7	18*	31*	93*	43*
Fulton	Jenkins/N. Central Coop - Talma	0	5	10	13	6
Fulton	Ranstead/NCC Coop - Rochester	0	0	0	3	6
Gibson	Schmitz/Gibson Co. CES				0	0
Hamilton	Campbell/Beck's Hybrids	14	13	18	55*	30*
Hamilton	Truster/Reynolds Farm Equipment		1		1	
Hendricks	Nicholson/Nicholson Consulting	0	3	4	11	17*
Jasper	Overstreet/Jasper Purdue CES	2	5	0	5	10
Jasper	Ritter/Brodbeck Seeds	1	3	10	32	28*
Jay	Boyer/Davis PAC		3	14	19	19
Jay	Shrack/Ran-Del Agri Services	1	3	5	9	8
Jay	Temple/Jay County CES					
Jennings	Bauerle/SEPAC	0	0	0	0	0
Knox	Bower/Ceres Solutions - Freelandville	0	0	0	13*	4
Knox	Bower/Ceres Solutions - Vincennes	0	0	0		2
Kosciusko	Klotz/Etna Green	0	0	4	9	5
Lake	Kleine/Kleine Farms	4	16*	60*	83*	90*
Lake	Moyer/Dekalb Hybrids - Shelby	5	5	20*	27	6

Lake	Moyer/Dekalb Hybrids - Schneider	2	5	5	12	20
LaPorte	Rocke/Agri-Mgmt Solutions			4	41	9
Madison	Truster/Reynolds Farm Equipment		0			
Marshall	Harrell/Harrell Ag Services		0			
Marshall	Klotz/SR 10 & SR 331	0	0	0	8	9
Marshall	Miller/North Central Coop	0	0	0	2	1
Miami	Early/Pioneer Hybrids	0	0	0	3	2
Newton	Moyer/Dekalb Hybrids - Lake Village	2	6	2	8	8
Porter	Leuck/PPAC	5	3	18	25	8
Pulaski	Capouch/M&R Ag Services	0	0	1	10	10
Pulaski	Leman/North Central Coop		0	10	21	30*
Putnam	Nicholson/Nicholson Consulting		2	6	2	8
Randolph	Boyer/DPAC		1	0	1	2
Rush	Schelle/Falmouth Farm Supply Inc.		6	10	1	3
Shelby	Fisher/Shelby County Co-op	2	3	5	5	0
Shelby	Simpson/Simpson Farms	7	49*	41*	67*	37
Starke	Capouch/M&R Ag Services	0	0	6	28	21*
Starke	Wickert/Wickert Consulting - California Twnshp	1	1	3	4	11
Starke	Wickert/Wickert Consulting - Railroad Twnshp	0	0	0	0	9
St. Joseph	Barry/Helena			1	3	15*
Sullivan	Bower/Ceres Solutions - Farmersburg	0	1	2	14	18*
Sullivan	Bower/Ceres Solutions - Sullivan	6	21*	14*	16*	6
Tippecanoe	Bower/Ceres Solutions	0	0	0	7	3
Tippecanoe	Westerfield/Monsanto Research Farm	0	0	13	11	16
Tippecanoe	Nagel/Ceres Solutions	30	47*	44*	89	14
Tippecanoe	Obermeyer/Purdue	2	5	11	5	20*

	Entomology					
Tipton	Campbell/Beck's Hybrids	10	17	11	73*	33*
Vermillion	Bower/Ceres Solutions		0	0		0
Wabash	Enyeart/North Central Coop				0	
Whitley	Walker, Richards/NEPAC1 - Main	10	28*	37*	81*	87*
Whitley	Walker, Richards/NEPAC2 - Kyler	3	8	17*	36*	33*

* = Intensive Capture...this occurs when 9 or more moths are caught over a 2-night period

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Managing Fusarium Head Blight (Scab) in Wheat – *(Kiersten Wise)* -

Wheat growth stages vary greatly across the state, but as wheat is flowering in southern Indiana, or approaching flowering, it is important to consider the risk for Fusarium head blight (FHB), or scab, development.

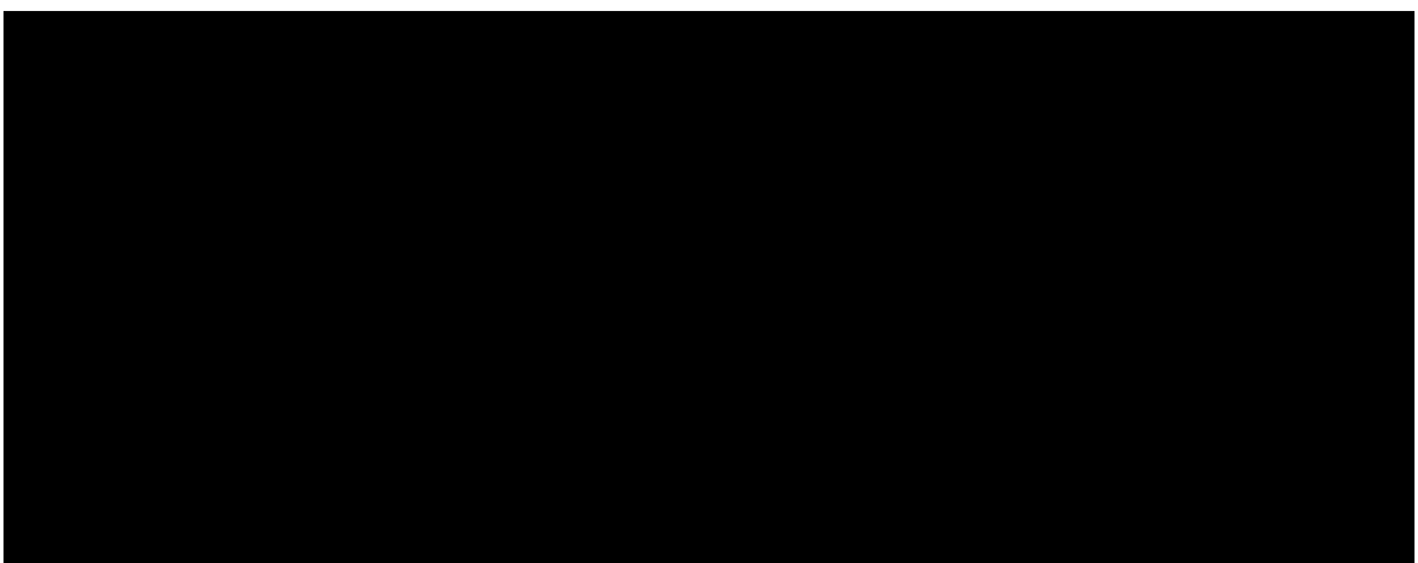
The fungus that causes FHB, ***Fusarium graminearium***, infects wheat during flowering, beginning at FGS 10.5.1. Symptoms appear later in the season and include bleached spikelets on the head (Figure 1), and small or shriveled grain kernels, commonly called “tombstones”. The fungus also produces mycotoxins, such as deoxynivalenol, or DON, which can accumulate in the infected grain.

Fusarium head blight.

Rainy, warm, and humid weather conditions favor disease development. It will be critical to watch the FHB risk assessment tool to assess the risk of Fusarium head blight in Indiana as wheat enters flowering over the next few weeks across the state. This model can be accessed through the following link: **http://www.wheatscab.psu.edu/**. This model uses weather information including temperature, rainfall, and relative humidity to calculate risk levels for FHB. The model has been updated in recent years, and now also includes an option to predict risk based on variety susceptibility to FHB. Keep in mind that the model does not provide a guaranteed prediction for whether or not FHB will occur in individual fields, and additional factors such as the local weather forecast, crop conditions, and Extension commentary should be considered when assessing the level of risk. ***Farmers and crop advisors can sign up for alerts courtesy of the U.S. Wheat and Barley Scab Initiative. Alerts can be sent to a cell phone or email, and will be sent out as the risk map updates risk of scab in Indiana. To sign up for alerts, visit:*** **http://scabusa.org/fhb_alert.php**.

If varieties susceptible to FHB have been planted, or farmers are worried about the risk of FHB development, they may want to consider a fungicide application at early flowering for suppression of FHB. Indiana research indicates that applications of the fungicides Prosaro and Caramba are most effective at managing FHB if they are applied at early flowering. Other products are available, but may not be as effective. Fungicides in the quinone-outside inhibitin (QoI) class (commonly called strobilurins) are not labeled for Fusarium head blight suppression. To accurately growth stage wheat and determine when wheat is beginning to flower, please see Purdue Extension publication ID-422 "**Managing Wheat by Growth Stage**".

The foliar disease stripe rust (Figure 2) has been observed in fields in southern IN, but is still at relatively low levels. Purdue Extension Bulletin BP-79-W, "**Identifying Rust Diseases of Wheat and Barley**" is available to aid in diagnosis of stripe rust. It is important to consider variety susceptibility to stripe rust, growth stage, and disease spread before applying a fungicide for stripe rust management. Fungicides applied at flowering for FHB suppression will also provide some level of protection from foliar disease on the flag leaf. If farmers are considering a foliar fungicide application for stripe rust through boot stage, they should keep in mind that applications made prior to flowering will NOT suppress FHB or the associated mycotoxin deoxynivalenol, or DON. If the risk for FHB increases after foliar fungicide applications occur, it may be necessary to make another application at flowering for FHB suppression.



*Stripe rust on wheat. (**Picture courtesy Greg Shaner**)*

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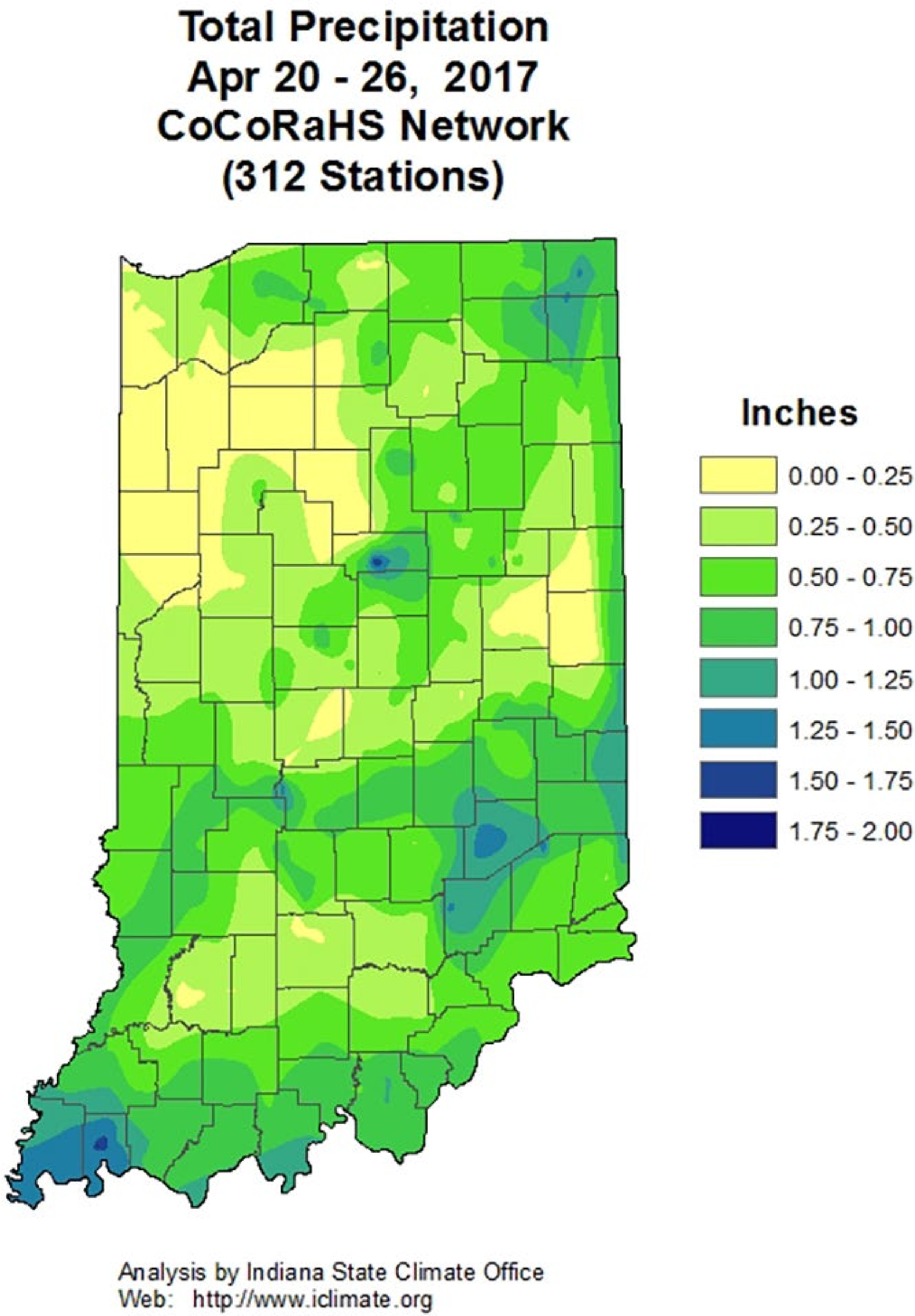
Precipitation


Total Precipitation
Apr 20 - 26, 2017
CoCoRaHS Network
(312 Stations)
Inches
0.00 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.25
1.25 - 1.50
1.50 - 1.75
1.75 - 2.00
Analysis by Indiana State Climate Office
Web: http://www.iclimate.org

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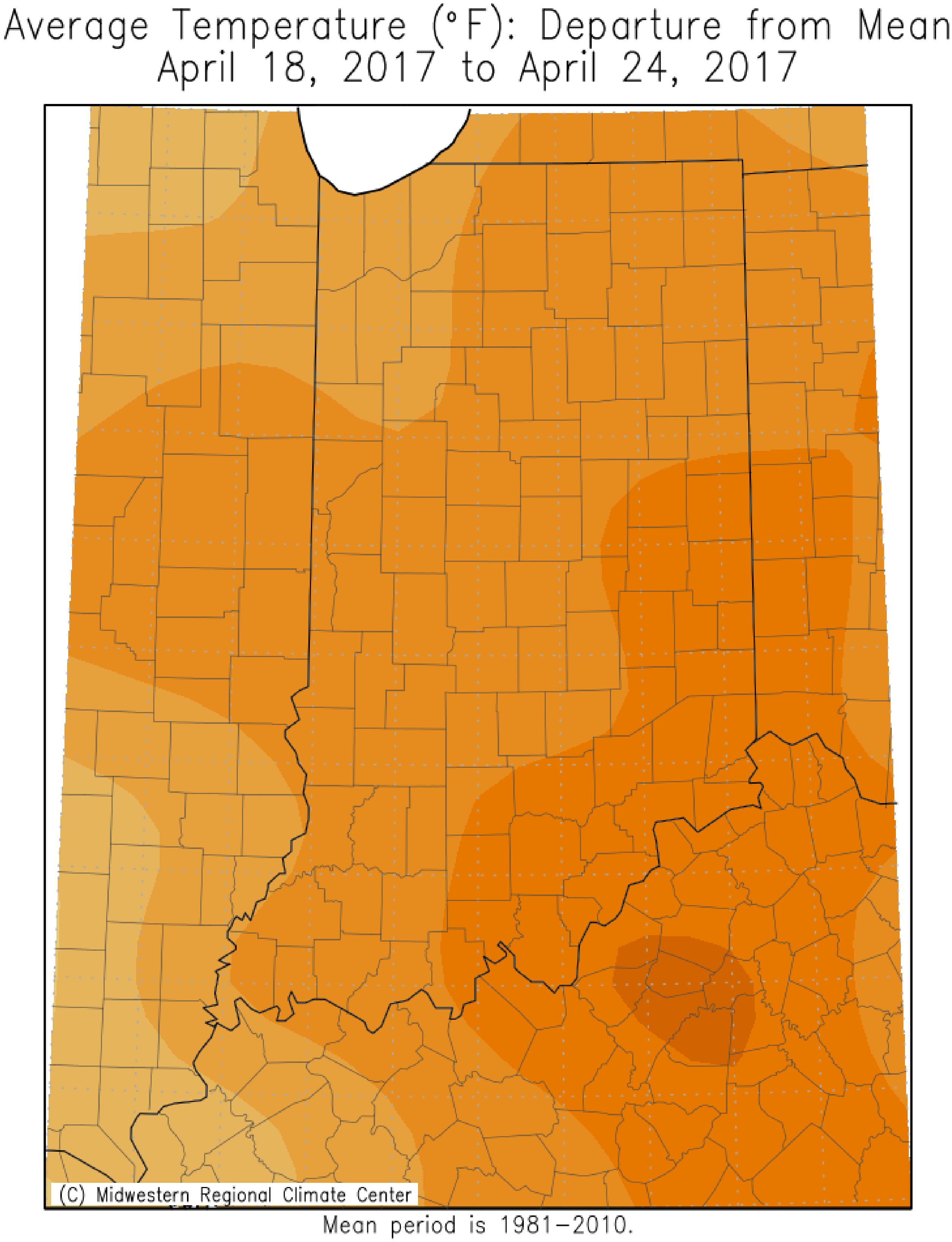
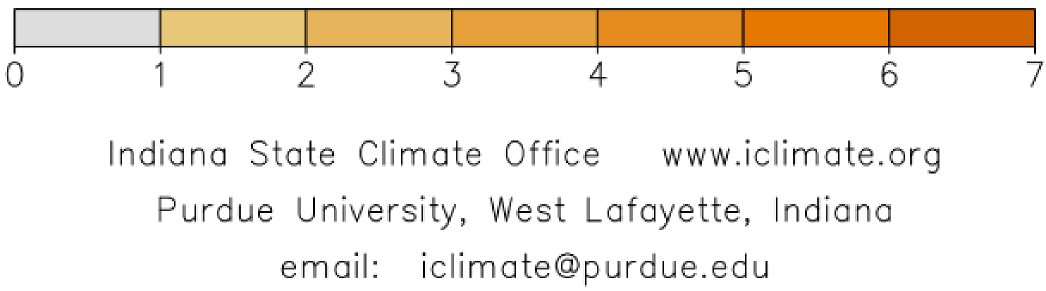
Temperature





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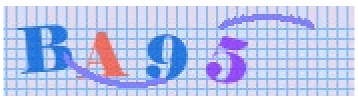

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