Purdue Cooperative Extension Service

May 9, 2008 - Issue 6

In This Issue

Insects, Mites, And Nematodes

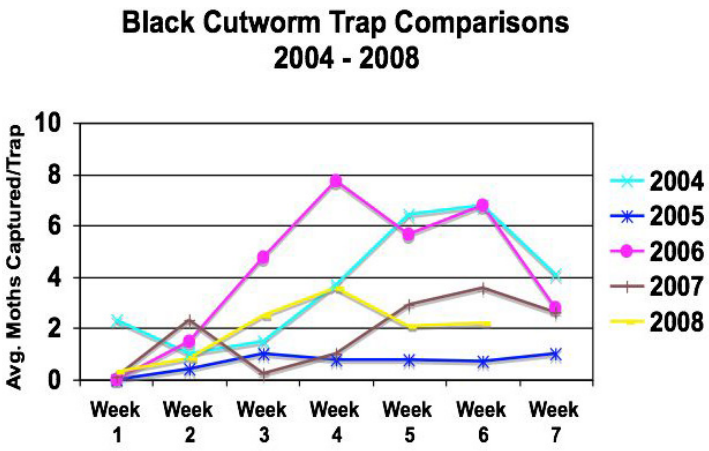
Low Black Cutworm Moth Catches, Armyworm Another Matter – (*John Obermeyer and Larry Bledsoe*)

- Cutworm moth captures have been low this spring.
- Few weather fronts have originated from the Southwest this season.
- Armyworm moth captures up, worth watching in a couple weeks.
- Scouting is the only way to know if cutworm are present and damaging the crop.

Black cutworm pheromone trap cooperators continue to faithfully report their week's catches and the numbers have been far from impressive. We are still waiting for our first "intensive capture," that being 9 or more moths captured over two nights. Comparing moth captures from the previous four years, refer to accompanying graph, it is obvious that black cutworm moth arrival into Indiana has been lower than normal. On the other hand, armyworm moth captures in black light traps located at the Purdue Agricultural Centers throughout the state are starting to pick up significantly. Doug Johnson, University of Kentucky, has been reporting large numbers captured in their pheromone traps for several weeks.

Obviously making predictions from pheromone and/or black light captures is not an exact science, considering all the variables such as trap numbers, larval survival, crop development, weedy growth, etc., but it has worked nicely in the past. With that disclaimer said, it looks as though armyworm will be a pest to contend with in the next 2-3 weeks. It should be mentioned, that current moth captures are well below the numbers of 2001, the last year of a widespread armyworm outbreak. We will continue to watch this situation as it develops in Kentucky and Indiana.

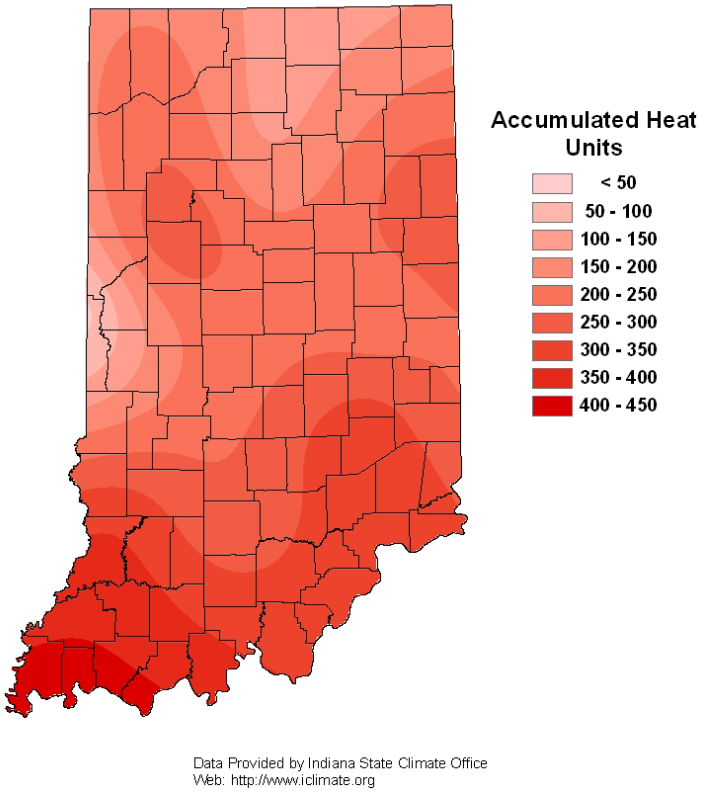
We advocate scouting in emerging fields to "ground truth" the science. As we learned in 2006, don't rely on seed-applied insecticides to fully protect the stand from black cutworm. Too, we know from experience how quickly armyworm can damage fields of wheat, grass pastures, and corn. Happy scouting!



Don't Forget the Alfalfa – (*John Obermeyer and Larry Bledsoe*)

- Scout alfalfa for weevil damage.
- Warm temperatures have accelerated larval development and activity.

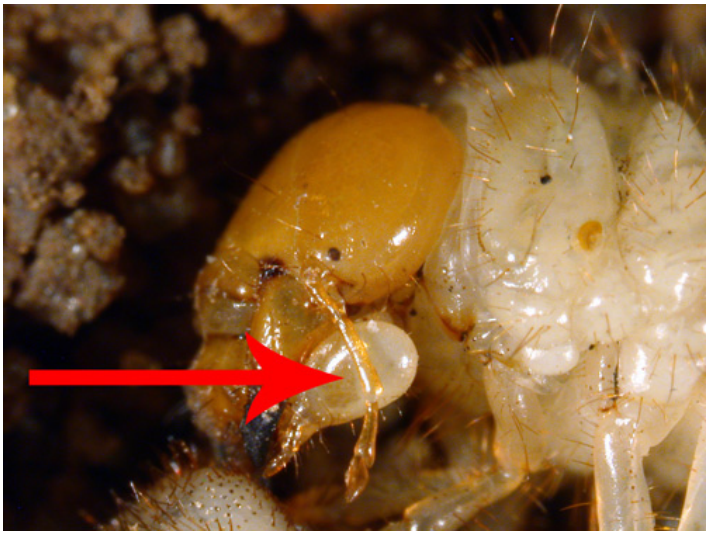
Alfalfa fields in southern and central Indiana need to be inspected immediately for weevil tip feeding and skeletonization of leaves. The current "rain break" should afford you the opportunity to look. Use the following heat unit map to determine the proper management action for your area of the state. See last week's *Pest&Crop* #5, May 2, 2008, for treatment guidelines and recommended insecticides. Happy scouting!



Asiatic Garden Beetle is Back – (*John Obermeyer*)

Brian Willard, Crop Tech Consulting, called this past week to report that some grubs of the Asiatic garden beetle have returned to a field in Elkhart County. Though at this point, the numbers seemed to be lower than last year. For a nice primer of Asiatic garden beetle, see Chris DiFonzo's, MSU extension entomologist, article for their *Field Crop Advisory Team Alert* newsletter (No. 3, April 15, 2008) at <http://www.ipm.msu.edu/cat08field/fc04-17-08.htm>. Please help us know the extent of this pest's distribution in Indiana by reporting suspect grubs, 765-494-4563.

Size comparison of mature grubs of Japanese beetle (left) and Asiatic garden beetle (right) (*Photo credit: John Obermeyer*)



A key characteristic of the Asiatic garden beetle grub, enlarged maxillary palps (*Photo credit: John Obermeyer*)

Black Cutworm Adult Pheromone Trap Report
Week 1 = 4/24/08 - 4/30/08 Week 2 = 5/1/08 - 5/7/08

County	Cooperator	BCW Trapped		County	Cooperator	BCW Trapped	
		Wk 1	Wk 2			Wk 1	Wk 2
Adams	Roe/Mercer Landmark	3	2	Lake	Kleine/Kleine Farms	2	2
Allen	Gynn/Southwind Farms	6	3	Marshall	Barry/Fulton-Marshall Co-op	0	9
Clay	Bower/Ceres Solutions, Brazil	2	0	Marshall	Misch/Pioneer	2	3
Clay	Bower/Ceres Solutions, Clay City	3	4	Miami	Sweeten/Advanced Ag Solutions		
Clinton	Foster/Purdue Entomology	4	0	Newton	Ritter/Purdue CES	0	5
Daviess	Venard/Venard Agri-Consulting	1	1	Putnam	Nicholson/Nicholson Consulting	7	1
Elkhart	Willard/Crop Tech Consulting	0	0	Randolph	Boyer/DPAC	0	0
Fayette	Schelle/Fayette County			Rush	Doerstler/Pioneer Hi-Bred	3	2
Fulton	Jenkins/Fulton-Marshall Coop	3	1	Starke	Wickert/Wickert Agronomy Services	0	0
Gibson	Hirsch/Hirsch Family Farms	0	4	Sullivan	Bower/Ceres Solutions, Farmersburg	0	
Green	Byarley/Pioneer-Worthington	0		Sullivan	Bower/Ceres Solutions, New Lebanon	7	
Hamilton	Beamer/Beck's Hybrids	5	0	Sullivan	Bower/Ceres Solutions, Sullivan E	0	
Jay	Shrack/RanDel	0	5	Sullivan	Bower/Ceres Solutions, Sullivan W	0	
Jennings	Biehle/SEPAC	0	1	Tippecanoe	Obermeyer/Purdue Entomology	5	6
Knox	Hoke/SWPAC	0	0	Tipton	Johnson/Pioneer Hi-Bred	0	1
Knox	Bower/Ceres Solutions, Fritchton	3	3	Warren	Mroczkiewicz/Syngenta	0	2
Knox	Bower/Ceres Solutions, Oaktown	0	6	White	Reynolds/ConAgra Snack Foods	1	0
Knox	Bower/Ceres Solutions, Vincennes U	12		Whitley	Walker/NEPAC	3	0
Knox	Bower/Ceres Solutions, Westphalia	1	5				

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

County/Cooperator	4/22/08 - 4/28/08							4/29/08 - 5/5/08						
	VC	BCW	ECB	SWCB	CEW	FAW	AW	VC	BCW	ECB	SWCB	CEW	FAW	AW
Dubois/SIPAC Ag Center								0	0	0	0	0	0	8
Jennings/SEPAC Ag Center	0	0	0	0	0	0	2	0	0	0	0	0	0	0
Knox/SWPAC Ag Center														
LaPorte/Pinney Ag Center	0	0	0	0	0	0	1	0	0	0	0	0	0	3
Lawrence/Feldun Ag Center	0	0	0	0	0	0	47	0	1	0	0	0	0	75
Randolph/Davis Ag Center	0	0	0	0	0	0	73	0	1	0	0	0	0	81
Tippecanoe/TPAC Ag Center	0	1	0	0	0	0	1	0	1	0	0	0	0	30
Whitley/NEPAC Ag Center	0	0	0	0	0	0	89	0	1	0	0	0	0	234

VC = Variegated Cutworm, BCW = Black Cutworm, ECB = European Corn Borer, SWCB = Southwestern Corn Borer, CEW = Corn Earworm, FAW = Fall Armyworm, AW = Armyworm

Weeds

New Narrated Soybean Production and Management Educational Presentations on the Plant Management Network Website - (*Bill Johnson and Glenn Nice*)

The Plant Management Network is a unique resource for the applied plant science research and education. The network is designed to provide plant science practitioners fast electronic access to peer-reviewed research and news releases from industry and universities. The Plant Management Network offers an extensive searchable database comprised of thousands of web-based resource pages from the network's partner universities, companies, and associations. In addition, the network's four peer-reviewed citable journals, *Applied Turfgrass Science*, *Crop Management*, *Forage and Grazinglands*, and *Plant Health Progress*, provide credible current information in areas important to practitioners, policy makers, and the public.

The Plant Management Network recently led the development of educational presentations on various aspects of soybean production and management. The presentations are narrated, Powerpoint presentations, and feature the latest research results and recommendations by soybean production and pest management specialists from across the country. The presentations can be viewed while you are sitting at your computer or they could be projected onto a larger screen for use in a larger meeting. The presentations that are currently posted at the site include:

- Weed Management in Soybean
- The Soybean Checkoff: Shaping the Future of the Industry
- Fungicide Seed Treatments for Soybean
- The ipmPIPE: A New Tool for Enhancing IPM Use in Soybean
- Choosing Specialty Soybeans for the Right Niche Markets
- Soybean Viruses
- Soybean Production
- Asian Soybean Rust
- Sudden Death Syndrome
- Soybean Cyst Nematode: Biology, Scouting, and Management
- Soybean White Mold

New presentations will be added to the site each month. To view the presentations go to this website:

<http://www.plantmanagementnetwork.org/infocenter/topic/focusonsoybean/>

Plant Diseases

New Fungicide Registrations for Wheat - (*Gregory Shaner*)

- Two new fungicides can suppress Fusarium head blight.
- Weather-based risk model indicates head blight poses little threat that is now flowering.

In previous issues of *Pest&Crop* (nos. 2 and 5) I discussed fungicides available for use on wheat and the current disease situation. In the past week, there has been little change in the status of leaf blotch. If lesions can be found on the third or fourth leaf below the flag leaf, then the disease could become a problem if we experience warm, wet weather over the next couple of weeks. However, the disease is almost non-existent in fields where I have my research plots (Tippecanoe and Jennings Counties). Wheat in these plots is approaching the boot stage, so there is time for disease to develop, but the absence of any infection on lower leaves suggests that leaf blotch will not be a problem this year.

The weather-based risk model for Fusarium head blight (scab) that I discussed in last week's issue of *Pest&Crop* still shows low risk for all of Indiana. Wheat in the far southern part of the state has reached the flowering stage. As wheat farther north reaches the flowering stage (Feekes 10.51) over the next few days, look at the model to see if the risk level changes.

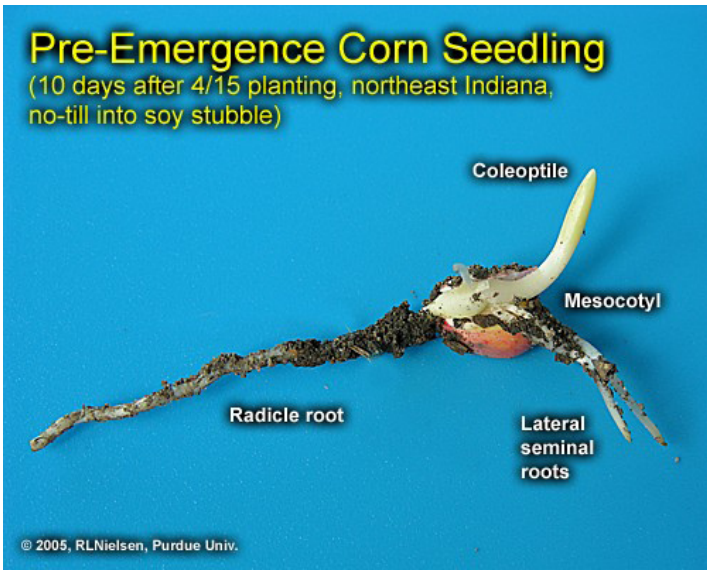
If head blight does become a threat, there are two newly registered fungicides available to suppress the disease. These are Folicur (tebuconazole) and Caramba (metconazole). Apply these products at Feekes 10.51 to suppress head blight. Labels for both of these products point out that they are toxic to aquatic life and give specific directions for avoiding contamination of surface water. Follow these directions carefully.

Agronomy Tips

Germination Events in Corn - (*Bob Nielsen*)

Germination is the renewal of enzymatic activity that results in cell division and elongation and, ultimately, embryo emergence through the seed coat. Germination is triggered by absorption of water through the seed coat. Corn kernels must absorb (imbibe) about 30 % of their weight in water before germination begins. Less than optimum absorption of water (perhaps due to a rapidly drying seed zone) may slow or stop germination. Repeated wetting/drying cycles can decrease seed viability.

By comparison, soybeans must imbibe about 50 % of their weight in water. But since soybeans are approximately 2/3 the weight of corn kernels, the total amount of absorbed water required for germination is relatively similar.



The visual indicators of germination occur in a distinct sequence. The radicle root emerges first, near the tip end of the kernel, within two to three days in warm soils with adequate moisture. In cooler or drier soils, the radicle root may not emerge until one to two weeks after planting.

The coleoptile (commonly called the “spike”) emerges next from the embryo side of the kernel within one to many days of the appearance of the radicle, depending on soil temperature. The coleoptile initially negotiates its way toward the dent end of the kernel by virtue of the elongation of the mesocotyl. The coleoptile is a rigid piece of plant tissue that completely encloses the four to five embryonic leaves (plumule) that formed during grain development of the seed production year. The plumule leaves slowly enlarge and eventually cause the coleoptile to split open as it nears the soil surface.

The lateral seminal roots emerge last, near the dent end of the kernel. Even though these and the radicle root are technically nodal roots, they do not comprise what is typically referred to as the permanent nodal root system. The first set of so-called “permanent” roots begins elongating at approximately the V1 leaf stage (1 leaf with visible leaf collar) and is clearly visible by V2.

Click here to view “Visible Indicators of Germination in Corn”

Troubleshooting Considerations

When temperatures are optimum, these three parts of the seedling may emerge from the kernel on nearly the same day. Excessively cool soils may delay the appearance of the coleoptile and lateral seminal roots for more than a week after the radicle root emerges. It is not uncommon in cold planting seasons to dig up kernels two weeks after planting and find only short radicle roots and no visible coleoptiles.

When excessively cold and/or wet soils delay germination and/or emergence, the kernel and young seedling are subjected to lengthier exposure to damaging factors such as soil-borne seed diseases, insect feeding and injury from pre-plant or pre-emergent herbicides and carryover herbicides from a previous crop.

Related References

Hardman, L.L. and J.L. Gunsolus. 1998. Corn Growth and Development & Management Information for Replant Decisions. Univ. of Minnesota Ext. Service Pub. No. FO-05700. [On-Line]. Available at <http://www.extension.umn.edu/distribution/cropsystems/DC5700.html>. (URL accessed 5/7/08).

Nielsen, RL (Bob). 2008a. The Emergence Process in Corn. Corny News Network, Purdue Univ. [On-Line]. Available at <http://www.kingcorn.org/news/timeless/Emergence.html>. (URL accessed 5/7/08).

Nielsen, RL (Bob). 2008b. Requirements for Uniform Germination and Emergence of Corn. Corny News Network, Purdue Univ. [On-Line]. Available at <http://www.kingcorn.org/news/timeless/GermEmergReq.html>. (URL accessed 5/7/08).

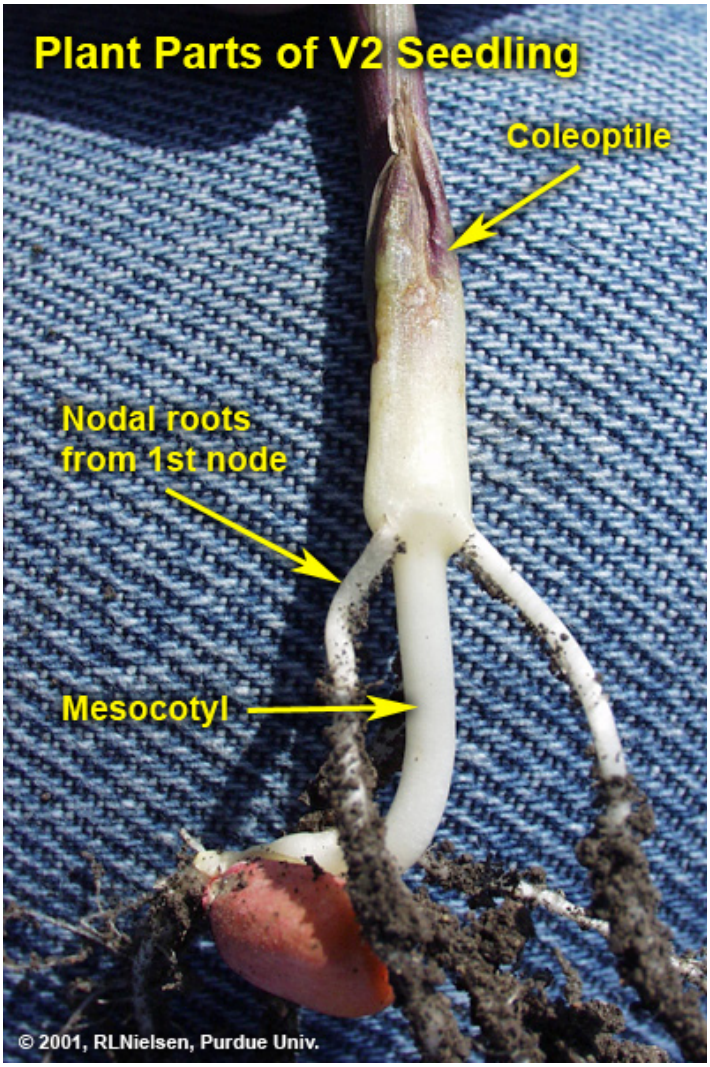
Ritchie, S.W., J.J. Hanway, and G.O. Benson. 1993. How a Corn Plant Develops (SP-48). Iowa State Univ. [On-Line]. Available at <http://www.extension.iastate.edu/hancock/info/corn.htm>. (URL accessed 5/7/08).

The Emergence Process in Corn - (*Bob Nielsen*)

Successful germination alone does not guarantee successful emergence of a corn crop. The coleoptile must reach the soil surface before its internal leaves emerge from the protective tissue of the coleoptile. Growth stage VE refers to emergence of the coleoptile or first leaves through the soil surface (Ritchie et. al., 1993).

As with all of corn growth and development, germination and emergence are dependent on temperature, especially soil temperature. Corn typically requires from 100 to 120 GDD (growing degree days) to emerge (Nielsen, 2008b; Nielsen, 2008c). Under warm soil conditions, the calendar time from planting to emergence can be as little as 5 to 7 days. Under cold soil conditions, emergence can easily take up to four weeks.

Elongation of the mesocotyl elevates the coleoptile towards the soil surface. The mesocotyl is the tubular, white, stemlike tissue connecting the seed and the base of the coleoptile. Technically, the mesocotyl is the first internode of the stem.



Useful Tip: Physiologically, mesocotyls have the capability to lengthen from at least a 6-inch planting depth. Realistically, corn can be planted at least three inches deep if necessary to reach adequate moisture.

As the coleoptile nears the soil surface, exposure of the mesocotyl to the red light portion of the solar radiation spectrum halts mesocotyl elongation. Continued expansion of the leaves inside the coleoptile ruptures the coleoptile tip, allowing the first true leaf to emerge above the soil surface. Since the depth at which the mesocotyl senses red light is fairly constant, the resulting depth of the crown (base) of the coleoptile is nearly the same (1/2 to 3/4 inch) at seeding depths of one-inch or greater.

Useful Tip: When corn is seeded very shallow (less than about 1/2 inch), the crown of the coleoptile will naturally be closer to the soil surface if not right at the surface. Subsequent development of the nodal root system can be restricted by exposure to high temperatures and dry surface soils.

Click here to view "Coleoptile Appearance During Emergence"

Troubleshooting Considerations

Several factors can cause the coleoptile to split prematurely, allowing the leaves to emerge underground. Usually, more than one of the following factors are present when this problem occurs, making it difficult to place the blame on any one factor.

Exposure to light at deeper soil depths than usual due to cloddy seedbeds, dry seedbeds, sandy soils, or open slots in no-till.

Injury from certain herbicides, particularly under stressful environmental conditions. Symptoms include corkscrewed coleoptile, swollen mesocotyl and true leaves emerged from side of coleoptile.

Surface crusting, cloddy seedbeds, rocky seedbeds, planter furrow compaction, or otherwise dense surface soil that physically restrict mesocotyl elongation and coleoptile penetration. The pressure of the expanding leaves within the coleoptile eventually ruptures the side of the coleoptile. Symptoms include corkscrewed coleoptile, swollen mesocotyl and true leaves emerged from side of coleoptile. Note the similarity to those symptoms from herbicide injury.

Cold temperature injury, either from exposure to long periods of soil temperatures around 50F or from exposure to wide daily swings (25 to 30F) in soil temperatures. Symptoms include absence of emerged coleoptile, corkscrewed mesocotyl or coleoptile and true leaves emerged from side of coleoptile. Note the similarity to those symptoms from herbicide injury.

Useful Tip: The mesocotyl should remain firm, white and healthy through at least the 6-leaf stage, if not longer. If it is mushy, discolored, or damaged prior to this stage, then it is likely part of the crop problem being investigated.

Related References

Nielsen, RL (Bob). 2004. Corkscrewed Corn Seedlings. Corny News Network, Purdue Univ. [On-Line]. Available at <http://www.kingcorn.org/news/articles.04/Corkscrew-0501.html>. (URL accessed 5/7/08).

Nielsen, RL (Bob). 2008a. Germination Events in Corn. Corny News Network, Purdue Univ. [On-Line]. Available at <http://www.kingcorn.org/news/timeless/GerminationEvents.html>. (URL accessed 5/7/08).

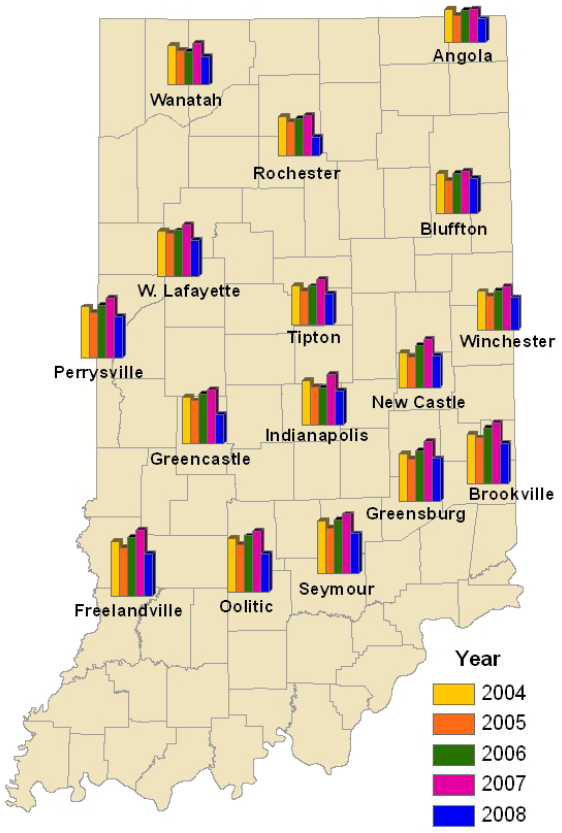
Nielsen, RL (Bob). 2008b. Heat Unit Concepts Related to Corn Development. Corny News Network, Purdue Univ. [On-Line]. Available at <http://www.kingcorn.org/news/timeless/HeatUnits.html>. (URL accessed 5/7/08).

Nielsen, RL (Bob). 2008c. Requirements for Uniform Germination and Emergence of Corn. Corny News Network, Purdue Univ. [On-Line]. Available at <http://www.kingcorn.org/news/timeless/GermEmergReq.html> (URL accessed 5/7/08).

Ritchie, S.W., J.J. Hanway, and G.O. Benson. 1993. How a Corn Plant Develops (SP-48). Iowa State Univ. [On-Line]. Available at <http://www.extension.iastate.edu/hancock/info/corn.htm>. (URL accessed 5/7/08).

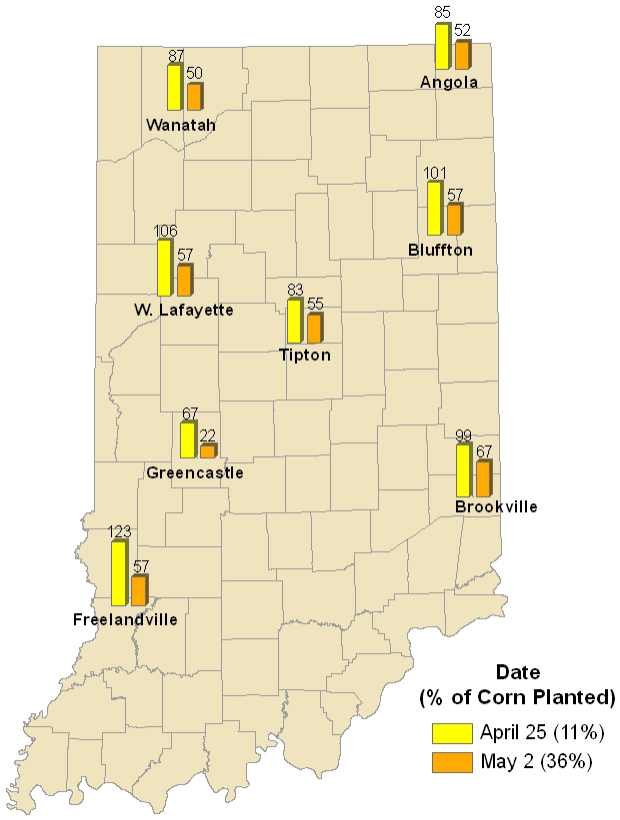
Weather Update

Accumulated Growing Degree Days (86/50) Since January 1



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

Accumulated Growing Degree Days (86/50) by % of Corn Planted



Data Provided by Indiana State Climate Office
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