Purdue Cooperative Extension Service

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In This Issue

Insects, Mites, And Nematodes

VIDEO: Alfalfa Weevil: Damage and Scouting - *(Christian Krupke and John Obermeyer)*

Southern Indiana Counties should be scouting alfalfa fields for weevil feeding damage. Sampling an alfalfa field to determine the extent of alfalfa weevil damage and average stage of weevil development is best accomplished by walking through the field in an "M-shaped pattern." Ten alfalfa stems should be examined in each of 5 representative areas of the field for a total of 50 stems from the entire field. Consider that south-facing slopes and/or sandy soils warm sooner and should be included in the sampling. Each stem should be examined for: (1) evidence of tip feeding by alfalfa weevil larvae; (2) maturity of the stem, i.e. pre-bud, bud and/or flowers; and (3) stem length. The average size (length) of weevil larvae should also be noted. Although large alfalfa weevil larvae are relatively easy to find, small larvae are difficult to see; thus very close examination of leaves may be required to detect "pin-hole" feeding, small black fecal pellets and small off-white larvae. This video will further explain the proper sampling for, and show damage of the alfalfa weevil.

VIDEO: Alfalfa Weevil: Damage and Scouting

Armyworm Pheromone Trap Report - (*John Obermeyer*)

County/Cooperator	Wk 1 = 4/3/14 - 4/9/14; Wk 2 = 4/10/14 - 4/16/14; Wk 3 = 4/17/14 - 4/23/14											
	1	2	3	4	5	6	7	8	9	10	11	12
Dubois/SIPAC Ag Center			2									
Jennings/SEPAC Ag Center	0	0	0									
Knox/SWPAC Ag Center	0	0	0									
LaPorte/Pinney Ag Center	0	0	1									
Lawrence/Feldun Ag Center	1	8	10									
Randolph/Davis Ag Center	0	2	1									
Tippecanoe/Meigs			1									
Whitley/NEPAC Ag Center	0	1	2									

Black Cutworm Adult Pheromone Trap Report
Week 1 = 4/10/14 - 4/16/14, Week 2 = 4/17/14 - 4/23/14

County	Cooperator	BCW Trapped		County	Cooperator	BCW Trapped	
		Wk 1	Wk 2			Wk 1	Wk 2
Adams	Kaminsky/New Era Ag	1	2	Knox	Bower/Ceres Solutions/Oaktown	0	0
Adams	Roe/Mercer Landmark	0	4	Knox	Bower/Ceres Solutions/Freelandville	0	0
Allen	Anderson/Syngenta Seed	0	10	Knox	Bower/Ceres Solutions/Vincennes	2	9*
Allen	Gynn/Southwind Farms	0	2	Knox	Bower/Ceres Solutions	0	0
Benton	Babcock/Ceres Solutions	0	5	Knox	Hoke/SWPAC	0	5
Boone	Campbell/Beck's Hybrids	1	5	Lake	Kleine/Kleine Farms	0	0
Boone	Carrell/Lamb Farms	24*	47*	Lake	Moyer/Moyer Seed Sales - Shelby	21*	32*
Clark	Hynes/Clark Co. CES	2	3	Lake	Moyer/Moyer Seed Sales - Schneider	7	33*
Clay	Bower/Ceres Solutions - Brazil	0	8	LaPorte	Barry/Kingsbury Elevator	4	2
Clay	Bower/Ceres Solutions - Bowling Green	0	0	LaPorte	Rocke/Agri-Management Solutions	6	15
Clinton	Foster/Purdue Entomology	1	24*	Miami	Early/Pioneer	0	9
DeKalb	Hoffman/ATA Solutions	3	19*	Montgomery	Stine/Nicholson Consulting	0	2
Dubois	Eck/Dubois Co. CES	7	3	Newton	Moyer/Moyer Seed Sales	3	2
Elkhart	Kaufman/Crop Tech Inc.	28*	23*	Porter	Leuck/PPAC	1	10
Fayette	Schelle/Falmouth Farm Supply	2	8	Putnam	Nicholson/Nicholson Consulting	2	2
Fountain	Mroczkiewicz/Syngenta	9*	15	Randolph	Boyer/DPAC	2	11
Fulton	Jenkins/N. Central Coop - Rochester	4	19*	Rush	Schelle/Falmouth Farm Supply	2	0
Fulton	Jenkins/N. Central Coop - Kewanna	15	43*	Starke	Wickert/Wickert Agronomy Services	0	0
Gibson	Schmitz/Gibson Co. CES		0	Sullivan	Bower/Ceres Solutions - Farmersburg	1	15*
Hamilton	Campbell/Beck's Hybrids	27*	2	Sullivan	Bower/Ceres Solutions - Sullivan E	11*	25*
Hendricks	Nicholson/Nicholson Consulting	2	10*	Sullivan	Bower/Ceres Solutions - New Lebanon	0	2
Jasper	Overstreet/Jasper Co CES	0	1	Tippecanoe	Bower/Ceres Solutions	3	5
Jasper	Ritter/Brodbeck Seeds - 3 E	0	6	Tippecanoe	Nagel/Ceres Solutions	38*	118*
Jasper	Ritter/Brodbeck Seeds - 8 E	0	5	Tippecanoe	Obermeyer/Purdue Entomology	4	7
Jay	Shrack/RanDel AgriServices	5	5	Tippecanoe	Quinton/Monsanto	9	18
Jennings	Bauerle/SEPAC	9*	12*	Whitley	Walker/NEPAC	13*	45*

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

Plant Diseases

Managing Wheat by Growth Stage - (*Kiersten Wise*) -

The spring is off to a slow start, but wheat is progressing and now is a great time to review the Purdue Extension publication ID-422 "Managing Wheat by Growth Stage". <http://www.extension.purdue.edu/extmedia/ID/ID-422.pdf>

Herbicide, fungicide, and fertilizer applications are most efficacious when applied at the correct growth stage. This publication describes the key wheat growth stages and provides images to help with accurate growth stage identification. The bulletin also provides a printable one-page table that outlines management decisions by growth stage.

Agronomy Tips

To Plant or Not to Plant Corn: A Moot Question? – (*Bob Nielsen*) -

The 2014 corn planting season is certainly off to a slow start in Indiana and elsewhere across the U.S. Midwest, primarily due to delayed drying and warming of soils. The April 21 USDA-NASS crop report estimated that 1 percent of Indiana's corn crop had been planted as of April 20, compared to the 5-year average planting progress of 14%.

The current 8 to 14-day weather forecast from NWS (4/24) predicts cooler than normal temperatures through the 7th of May for Indiana and surrounding states. The current Weather Channel 10-day forecast for Lafayette (4/24) predicts temperatures next week ranging from daily highs in the low 60's°F to the low 50's°F and daily lows from the low 40's°F to around 50°F. If accurate, these forecast temperatures are certainly cooler than the "normal" daily highs in the high 60's and daily lows in the low 50's for this time of year.

Average daily bare soil temperatures (4-inch depth) for the past 7 days (iClimate.org) have ranged from low 40's to the low 50's in central and northern Indiana; slightly warmer in southern Indiana from low 50's to the low 60's. The cooler than normal air temperature forecast, if accurate, does not favor a rapid warming of soils for the next week to 10 days.

Corn requires 115 to 120 Growing Degree Days (GDDs) to emerge after planted into moist soil (Nielsen, 2010; Nielsen, 2012c). Under "normal" temperature conditions for this time of year, it takes 6 to 7 days to accumulate those 115 to 120 GDDs. That translates to daily GDD accumulations of 18 to 20. Recent daily GDD accumulations, based on soil temperatures, have been much lower than that, especially in central and northern Indiana, ranging from zero to about 5 GDDs per day. Emergence of corn with daily soil temperature-based GDDs of only 5 per day would occur in about 24 days (120 divided by 5).

The more calendar days it takes for corn to emerge, the more time the seeds and seedlings are exposed to potential stresses of disease and insects, not to mention the risk of potential outright injury to seed or plant tissue to cold soil temperatures. These potential stresses can result in poor or non-uniform emergence of corn that may require replanting later on. These consequences of delayed or uneven emergence are the key concerns in growers' minds at the moment as they debate whether to get serious about planting or wait even longer.

It's useful to remember that planting date, in and of itself, is not a reliable predictor of absolute grain yield at the end of the season (Nielsen, 2013). The past few years have reinforced that statement. Remember the record early planting year of 2012 and yields that were not particularly good in that year of the drought? Remember last season's near record delayed planting of corn statewide and yields that set new high records for many growers?

So, is there a black and white correct answer to the question whether to plant or not to plant corn at the moment? Not really. It's all about each grower's assessment and acceptance of the risks involved with planting now under less than ideal conditions or waiting for future, unpredictable, conditions. Growers with fewer acres of corn to plant have more flexibility to be patient and wait for more acceptable soil temperatures. Growers with a lot of acres to plant clearly feel more pressure to be planting now to minimize the risk of finishing "too late".

Given that the end of April is upon us, that soil conditions (other than temperature) are relatively "fit" for tillage or planting, and that weather forecasts are notoriously inaccurate; I think many growers will cautiously begin or continue with planting until excessive rainfall forces them to stop. Clearly, soils that remain "on the wet side" should be allowed more time to dry and warm before tilling or planting. One can "hedge your bets" against the consequences of continued cool soil temperatures and slow emergence by planting your best quality seed lots first (based on warm AND cold germination ratings), delaying the planting of your unusually small sized seed lots until later (80,000 seed units weighing 40 lbs or less), and delaying the planting of fields with particularly poor drainage or large amounts of surface residues (typically wetter and cooler soils).

Related Reading

Nielsen, R.L. (Bob). 2010. Requirements for Uniform Germination and Emergence of Corn. Corny News Network, Purdue University. <http://www.kingcorn.org/news/timeless/GermEmergReq.html> [URL accessed 4/24/14].

Nielsen, R.L. (Bob). 2012a. A Recipe for Crappy Stands of Corn. Corny News Network, Purdue University. <http://www.kingcorn.org/news/timeless/CrappyStands.html> [URL accessed 4/24/14].

Nielsen, R.L. (Bob). 2012b. Corkscrewed Mesocotyls & Failed Corn Emergence. Corny News Network, Purdue University. <http://www.kingcorn.org/news/timeless/Corkscrews.html> [URL accessed 4/24/14].

Nielsen, R.L. (Bob). 2012c. Heat Unit Concepts Related to Corn Development. Corny News Network, Purdue University. <http://www.kingcorn.org/news/timeless/HeatUnits.html> [URL accessed 4/24/14].

Nielsen, R.L. (Bob). 2013. The Planting Date Conundrum for Corn. Corny News Network, Purdue University. <http://www.kingcorn.org/news/timeless/PltDateCornYld.html> [URL accessed 4/24/14].

USDA-NASS. 2014 (Apr 21). Crop Progress. USDA - National Agricultural Statistics Service. <http://usda.mannlib.cornell.edu/usda/current/CropProg/CropProg-04-21-2014.pdf> [URL accessed 4/21/14].

Bits & Pieces

Check Your Stored Grain Frequently – (*Klein Ileleji, Post-Harvest Extension Engineer*) -

We have had quite a cold and prolonged winter in the Midwest, which is not bad for stored grain. However, as we move into warmer temperatures, you need to consider closely monitoring the condition of your stored grain. For those who could not dry corn to 15% in the fall, but stored at 17-18%, the warm spring temperature offers the opportunity to dry to a safe storage moisture using natural air in-bin systems. Begin to implement natural air drying immediately if you haven't started already.

Natural air (ambient) in-bin drying can be used to dry corn with up to 20% moisture in the spring using airflow rates of 1-2 cfm/bu. Drying should be started when the air temperature is over 40 to 60°F and 55-75% relative humidity (RH). Also note that the fan motors and compression of the air, especially with axial flow fans, warm up the air 3 to 5°F and in doing so reduce the RH by several percent points, thereby providing good quality drying air. Again, the goal of natural air drying is to remove moisture from stored grain by using the heat energy in natural air.

Do the following to implement natural air drying:

- *Sample grain bin to determine moisture content and check for signs of spoilage on the surface and at several depths (up to 6 ft) using a grain probe.* Ensure that you follow safe grain bin entry procedures by having more than more person conduct this operation, allowing time for the headspace to be ventilated when the hatch is first opened. Sniff for signs of odors that accompany spoilage prior to entry. Also wear an appropriate dust mask. If the bin has been partially unloaded, it is advisable to use a long pole to poke for bridged grain and use a safety line to enter. Also never enter your bin when the unloading auger is running and enter by following appropriate "log-out/tag-out" procedures.

- *Run fans continuously when ambient temperatures average 40 to 60°F with RH not above 75% while monitoring the movement of the drying front.* Drying speed will depend on grain initial moisture, airflow rate and weather. Turn off fans when it is raining. Monitor the drying front by sampling the grain at several depths with a trier and determining moistures as an indicator of movement of the front. Also, the force required to push the probe down the grain bed is an indicator of the location of the drying front. It should be easier to push the probe through dry grain than through wet grain. Also, monitor the bottom layers closely to identify signs of and to prevent over drying of the bottom layers.

- Be careful not to warm up grain above 60°F if you intend to store through the summer months. Warming grain above this temperature will increase its susceptibility to mold and increase the rate of insect pest proliferation.

- *Ventilate the bin headspace at night to prevent condensation at the surface that could lead to crusting and spoilage.* Connecting a headspace ventilation fan to a simple programmable on/off timer is one approach.

It is best not to warm grain that was dried to safe moisture (14-15%) last fall and cooled through the winter, especially if you intend to hold through the summer. Because grain is a good insulator, the cool temperatures achieved through winter aeration can be maintained during the warm spring months into the summer. Also, the higher the grain moisture and temperature, the lower the storage life of the grain (see Fig. 1). Studies at the Purdue University Post-Harvest Center for Research and Education (PHERC) by Ileleji et al. (2007) showed that leaving the fans off through the spring months so the grain remained cool from winter aeration suppressed the growth of maize weevils. Warming grain would start biological processes earlier. That includes growth of both mold and development of insect pests. It is also advisable to place a cover over the bin fans to prevent passive aeration

of the grain bulk with warm air when wind enters a fan that can freely turn.

Additionally, as temperature increases from the spring to the summer, it is advisable to increase the frequency of monitoring your stored grain. In bins with temperature cables buried in the grain, it is advisable to track the change in grain temperature over time as well as the difference between the ambient temperature and that of the grain bulk. A temperature rise in the grain bulk, especially for a cable in the center of the bin, is an indicator of increased biological activity. The smell of the grain, an indicator of spoilage, can be determined by running the fans a few hours in the evening. For more on natural-air drying, see Grain Quality Fact Sheet#30 found at www.grainquality.org or http://www.extension.umn.edu/agriculture/corn/harvest/natural-air-corn-drying/.

References:

Ileleji, K.E., D.E. Maier, and C.P. Woloshuk. 2007. Evaluation of different temperature management strategies for suppression of *Sitophilus zeamais* (Motschulsky) in stored maize. *Journal of Stored Products Research. Journal of Stored Products Research* 43 (2007) 480-488.

Maximum Storage Time (Months) for Corn and Soybean							
Corn Temperature °F	**Moisture Content Corn (top %), Soybean (bottom %)**						
	13% 11%	**14% 12%**	**15% 13%**	**16% 14%**	**17% 15%**	**18% 16%**	**24% N/A**
40	150	61	29.0	15.0	9.4	6.1	1.3
50	84	34	16.0	8.9	5.3	3.4	0.5
60	47	19	9.2	5.0	3.0	1.9	0.3
70	26	11	5.2	2.8	1.7	1.1	0.2
80	15	6	2.9	1.6	0.9	0.9	0.06
*Based on 0.5% maximum dry matter loss - calculated on the basis of USDA research at Iowa State University. Corresponds to one grade number loss; 2-3% points in damaged seeds. Soybean approximated at 2% lower moisture than corn.							

Source: http://www.extension.iastate.edu/CropNews/2009/1015hurburghelmore.htm
**Values will vary depending on level of damage and prior storage history. It is advisable to use half of these values for grain that was stored wet for quite some time prior to drying*.

Figure 1. Estimated storage life of corn and soybeans.

Weather Update

Weather Outlook by NOAA/NWS – (*Jim Noel, NOAA/ NWS/Ohio River Forecast Center*)

Through April 26 temperatures will be a few degrees above normal with below normal rainfall. Normal highs are in the 60s and normal lows in the 40s for the most part. Normal rainfall is about 0.75 inches. Most locations will receive 0.25 to 0.75 inches of rain. We are also entering the period where we see our last freeze this week in any given year. However, there is the risk still of a late last freeze into early May this year based on years similar to this one. Winter into early spring similar to this one would be winter and early spring of 1962-63, 1978-79 and 1993-94.

The week of April 27- May 3 will be much cooler than normal and wetter than normal. Confidence is moderate. Temperatures will likely be 5-10 degrees below normal. A wet period is expected with chances for rain almost every day. With cold air aloft, there is the risk of some graupel (hard snow or small hail like) showers later next week but it would not amount to anything.

All of this means soil temperatures will remain somewhat below normal into early May. Planting will likely be a few weeks behind normal schedule as the trend of our weather pattern lagging 2-3 weeks from normal continues into early May.

Going forward, May appears to be cooler than normal for the start of the month but will end warmer than normal. It will likely average out not far from normal temperatures therefore, Fig. 1. Rainfall after the first few days appears below normal for several weeks of the month until possibly the end of the month, Fig. 2.

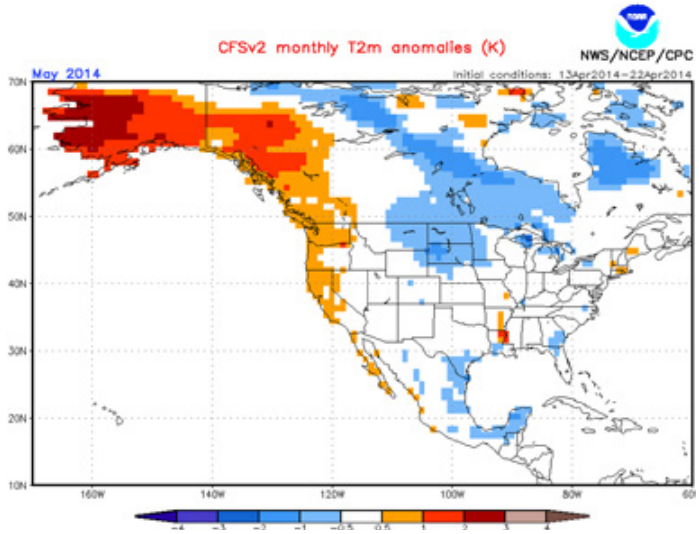


Fig. 1. May Temperatures

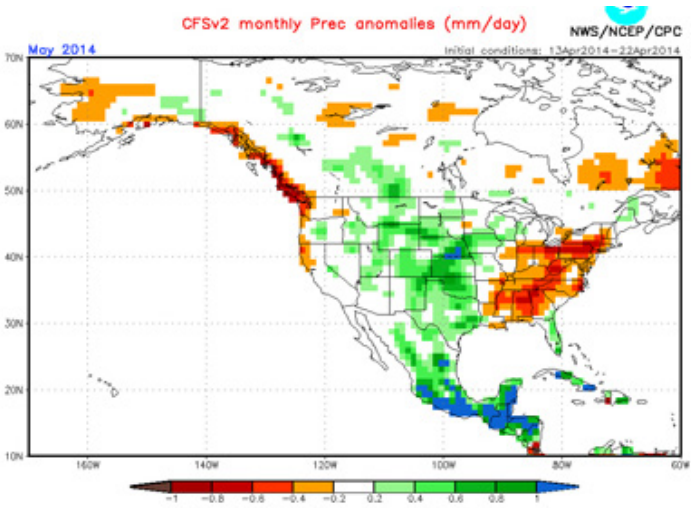
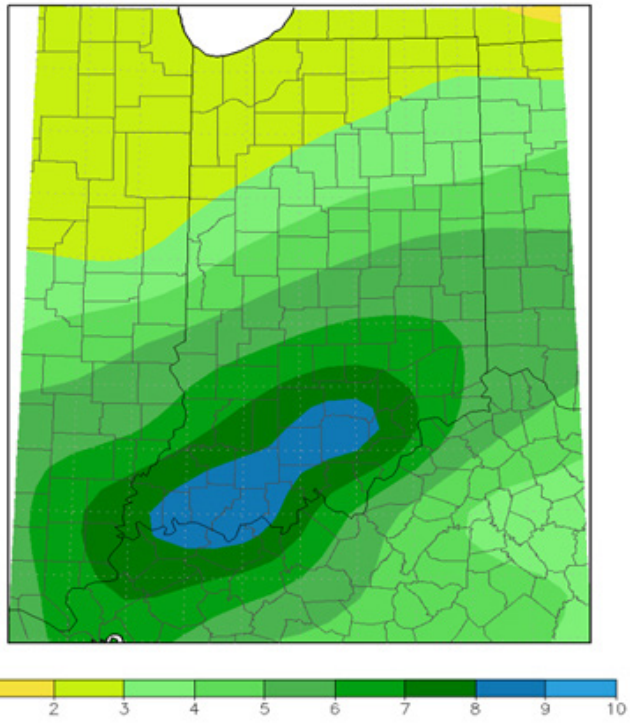


Fig. 2. May Rainfall (NOAA- Climate Forecasting System)

Summer still looks uncertain with the tendency toward near normal temperatures and near or slightly drier than normal weather.

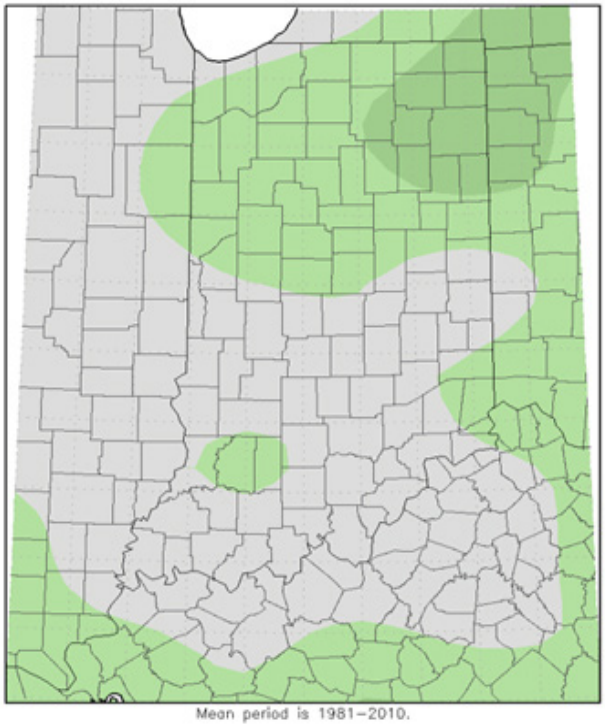
Finally, indications are an El Nino may be in the process of forming. Research by OHRFC and Ohio State University indicates negative impacts on crops yields during El Nino year particularly corn. However, since this El Nino was not going in early spring already and the lag to atmospheric response, impacts may be rather marginal this year.

Accumulated Precipitation (in)
March 24, 2014 to April 22, 2014

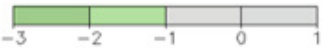


Indiana State Climate Office www.iclimate.org
Purdue University, West Lafayette, Indiana
email: iclimate@purdue.edu

Average Temperature (°F): Departure from Mean
April 16, 2014 to April 22, 2014



Mean period is 1981–2010.



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