Purdue Cooperative Extension Service
USDA-NIFA Extension IPM Grant

April 4, 2014 - Issue 1

In This Issue

Insects, Mites, And Nematodes

Insect Pest Survival During a Harsh Winter - (*Christian Krupke and John Obermeyer*) -

- Most corn and soybean insect pests overwinter beneath the soil surface.
- Soil and snow insulates insects from wild temperature fluctuations.
- Insects change their body chemistry to withstand freezing.

The questions abound from farmers and homeowners alike, did the Polar Vortexes of the 2013/2014 winter reduce insect populations? Though the correct answer is, nobody knows with certainty, but it pays to consider some basic facts.

Insects have adapted to varying environments throughout the world, ranging from desert to frozen tundra. They utilize various means to survive harsh temperature extremes, or some die out and return every year, see table below. Insect pests that overwinter in Midwest, do so under plant residues or in the soil, in order to insulate from wild fluctuations. Most of our key pests have lived in the area for many decades. Once the cold sets in, chemical changes within their body occurs that prevent freezing, and allows for them to "sleep" through the winter. Being induced to "wake up" too early, by unseasonable temperatures during the winter, uses precious body fat reserves. Should this happen multiple times, then death by starvation is likely. So in some ways a long, cold winter has advantages in that the temps are relatively consistent.

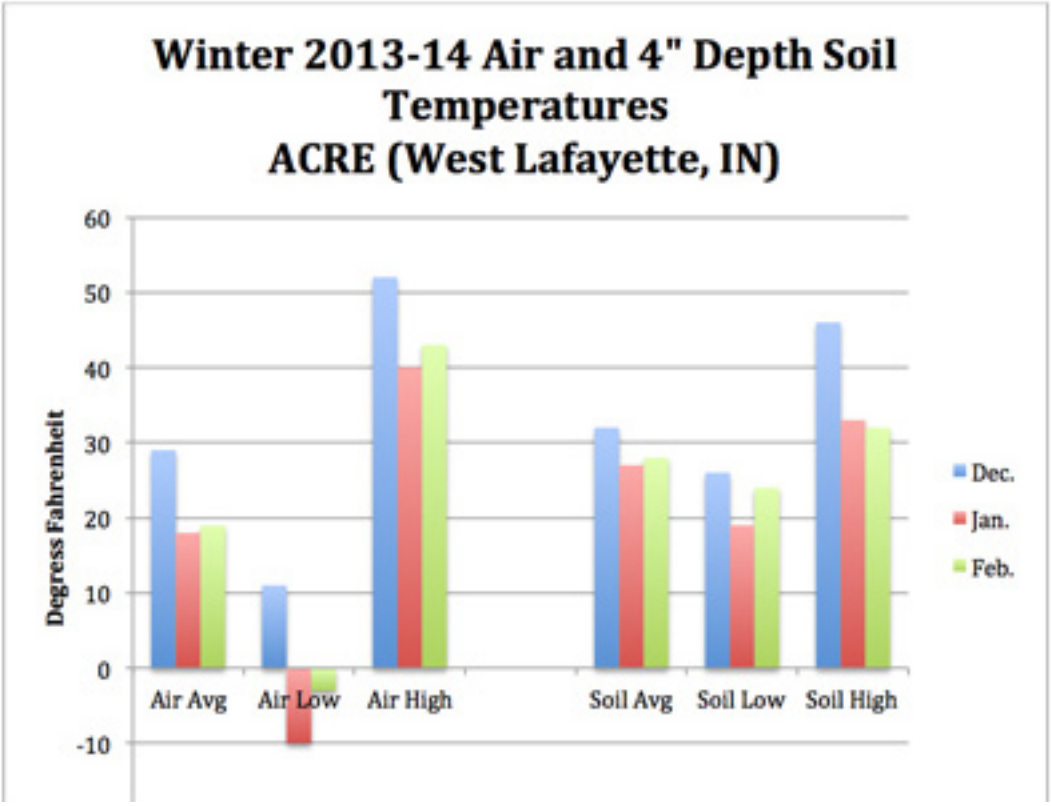
White grub in wintering earthen cell

Refer to the chart below. Air and soil (4" depth), temperatures are compared at the Purdue ACRE farm in Tippecanoe County. Average and high/low temperatures are given for the months of December through February. This shows that temperature fluctuations of the air (what we experienced) made for an unbearable winter. Contrast that to the soil temperatures. With the probe just a few inches in the soil, the temperature extremes are greatly tempered. Add to consideration is the snow that was present for much of the state throughout the winter. As you would expect, another insulating blanket to assist the overwinter insect. However, insects that overwinter above the ground, including soybean aphids and bean leaf beetles, will suffer higher mortality as a result of a harsh winter.

So, will insect pests numbers be reduced by the memorable winter of 2013/14? Yes, but they are every winter. For example, rootworm eggs that are laid at, or just below the soil surface, likely desiccate from air exposure. For the female beetles that ventured down soil cracks, earthworm holes, etc. to depths of 6" or more, their eggs will be ready for this season's corn roots. Same can be said for the assortment of grubs, wireworms and maggots many of which overwinter far below the surface where soil temps are relatively consistent.

Insect Pest	Overwintering Stage	Where
Seedcorn maggot	pupa	soil
Japanese beetle	larva (grub)	soil
Wireworm	primarily larva	soil
Black cutworm	*	-
Other cutworm species	larva	soil
Western bean cutworm	pre-pupa (larva)	soil
Armyworm	*	-
Slugs	eggs/adults	under residues
Corn rootworm	egg	soil
Bean leaf beetle	adult	under residues
Potato leafhopper	*	-
Twospotted spider mite	adult	under grassy residues

* Don't overwinter in Indiana



Weeds

Spring Greenup Applications and Winter Annual Burndowns - (*Travis Legleiter and Bill Johnson*) -

The harsh winter is finally winding down and we are bound to have warmer days and spring in the near future. As we look at towards the warmer weather there a few field activities that are going to start quickly, including winter wheat greenup applications and winter annual burndown applications. There are few things to keep in mind as these activities ramp up in a delayed and likely compacted spring.

Spring Greenup Applications:

There have already been reports of greenup fertilizer applications on wheat acres that survived the harsh winter and many more will likely follow as the temperatures rise. While making these applications or prior to making these applications it may be useful to look for winter annual weeds that occur on those wheat acres that may require a spring herbicide application. In typical years winter annual pressure in wheat is of less concern, but with potentially weakened wheat stands the pressure from winter annuals will be of more concern. When planning a spring herbicide application on wheat make sure you consider the wheat stage as well as soybean plant back restrictions for field with a planned double crop soybean rotation.

A desirable option for wheat producers is to combine the spring herbicide application with the topdressing pass by using liquid nitrogen as a carrier. Many of the herbicide labels do allow for liquid nitrogen to be used as a carrier, but may have differing adjuvant requirements and growth stage restrictions as compared to applying with a water carrier. The use of liquid nitrogen as a carrier also posses an increased risk of crop injury for the majority of herbicides applied to wheat in the spring. Refer to our previous article, Spring Herbicide Applications on Winter Wheat, for more information <https://ag.purdue.edu/btny/weedscience/Documents/spring_wheat.pdf>.

Winter Annual Burndowns:

The jury is still out on how the past winter affected winter annual weeds that emerged last fall and where not controlled with a fall herbicide application. Either way it is likely that spring burndowns will need to be made to control some winter annual weeds and in particular marestail. Fields that did not receive a fall burndown will likely require an earlier application as established winter annual weeds, especially marestail, will begin growing rapidly as the weather warms up. The key for spring burndowns is the timing of the burndown with considerations of weed size and air temperatures. Applications need to be made when weeds are actively growing, but when plants are still small or prior to bolting in the case of marestail. To ensure that plants are actively growing make applications when nightly temperatures have maintained above 45°F for four to five days. It will also take time for soil temperatures to warm to a level that will encourage active weed growth.

We encourage the use of residual herbicides, especially in no-till soybean fields with marestail and pigweed species. If planning on using residuals, maximize the residual control into the cropping season by applying the products preemerge rather than tank mixing it with early spring burndown. No-till soybean fields with marestail pressure are going to require multiple spring burndowns as well as a residual product to achieve maximum control of marestail.

For more information about winter annual burndowns as well as marestail control in no-till soybeans refer to the article and publication below.

Spring Burndown Applications to Weeds and Cover Crops <https://ag.purdue.edu/btny/weedscience/Documents/SpringBurndown.pdf>

Control of Marestail in No-till Soybean <https://ag.purdue.edu/btny/weedscience/Documents/marestail%20fact%202014%20latest.pdf>

A “pretty” field in the spring!

Vertebrates

Melting Snow Reveals Tiny Trails – (*Timothy J. Gibb, IPM Specialist and Judy Loven, Vertebrate Control Specialist*) –

With the winter snows finally melting away many are often surprised to find a series of tiny trails on the surface of their lawns and turfgrass fields. These are vole highways.

Voles are often called meadow or field mice. While they are similar to a house mouse in general size and shape, they have some important differences. Voles have small eyes and ears, stocky bodies and short tails when compared to other mice, but even more important is that they very seldom invade homes. Rather, they prefer to live in grassy fields or landscape beds.

Voles are herbivores. They eat seeds as well as leaves and stems of grasses and sometimes other green vegetation and occasionally, roots and bulbs. Often voles are attracted to, and take up residence under bird feeders where the seed is scattered and litters the ground. Removing or limiting this food source will, in turn, limit the voles in that area. Some have found that moving the bird feeders to areas that are less susceptible to vole damage is the preferred approach.

Voles do not hibernate during the winter months. They are active even during the winter and when snow is on the ground. They seem perfectly happy and actually do very well under the protection of the snow cover chewing away on the turfgrass plants. When the snow retreats what is left is a series of surface runways through turf areas. These measure about 2 inches wide and sometimes many feet in length. Fortunately, although these runs are an eye-sore now, they do not significantly damage the turfgrass in most cases. However, erosion may become an issue on slopes or in low-lying areas. With the spring growth, these paths will fill in and the voles will soon be forgotten.

Even more damaging than the trails that they make in turfgrass, however, is the potential injury they may wreak on other plants. Voles can seriously injure trees, shrubs (and sometimes plastic irrigation lines) when they gnaw on them. And gnawing is what rodents do best! Rodents, including voles, seem to gnaw on everything, either for food or for fun. If given enough time to gnaw on the base of a tree, voles may completely girdle it, which will kill even a large tree.

When controls are required it is important to remember that voles are a major food source of many vertebrates including birds of prey. Their main protection from these predators is snow or dense vegetative cover. While we have little control over snow, an effective way to manage voles is to reduce their vegetative cover. Mow tall grasses in the fall so that they do not fall over and create vole habitat during the winter. Trim trees and shrubs including low lying plants such as arborvitae, yews, junipers such that they are up off the ground.

When possible, use rock mulch rather than bark mulch in the flower gardens and beds because this is much less favorable to voles.

Mouse snap traps, baited with peanut butter and placed in the vole run, also can be used to control small, pesky, populations. When major infestations have to be controlled immediately, rodenticides may also be effective. Extreme caution must be exercised when employing them. These are mostly formulated as baits to be placed into burrow openings. Remember that other animals (including dogs and cats) dig for and prey on voles and will become exposed to baits if not used sparingly and properly. Always consult state regulations and use all pesticides strictly in accordance with label restrictions. Happy trails!!!

Bits & Pieces

2014 Popcorn Agri-Chemical Handbook – (*Genny Bertalmio, The Popcorn Board*) -

The 2014 Popcorn Agri-Chemical Handbook is now available to ensure everyone in the popcorn industry is informed about products registered for use on popcorn or in popcorn storage facilities. The handbook lists agri-chemicals registered and the regulatory status or special use restrictions, if any.

The handbook continues to provide appendix information on residue tolerances, as may be found in the International Maximum Residue Level (MRL) Database, which includes popcorn and denotes established levels by the US, Codex, EU and 87 markets.

The handbook has begun to note the Mode or Mechanism of Action (MOA) numerical classification of each listed chemical when used on a product label. The classification schemes are published by the Insecticide Resistance Action Committee, the Herbicide Resistance Action Committee and the Fungicide Resistance Action Committee. The handbook has also begun to highlight the Signal Word "Danger" when used on a product label as required by the EPA's Label Review Manual.

The Popcorn Board urges you to provide the above links to growers or download, print and distribute the updated version of this critical information to them. Contact Genny Bertalmio, +1.312.821.0217 or gbertalmio@smithbucklin.com, for further information.

The Popcorn Board accepts voluntary contributions to ensure continued funding of its efforts to provide this important information to the popcorn industry. Checks should be mailed to The Popcorn Board, 8333 Solutions Center, Chicago, IL 60677-8003.

Corn Rootworm Management Webinar Now Available – (*Susan Ratcliffe, Director, North Central IPM Center*) -

The archived webinar entitled "Corn Rootworm Management in the Transgenic Era" is now available by visiting <https://www.ncipmc.org/videos/index.cfm> and clicking on the link for the webinar. Please let me know if you have any problems viewing this webinar.

Corn rootworm management in the transgenic era <https://connect.unl.edu/p6takhu5vu2/> A free webinar was held on Feb. 20 to provide information on current rootworm management options. This program was supported by a USDA-NIFA North Central IPM program grant. Topics covered include: Rootworm biology and behavior -- Dr. Joe Spencer, Illinois Natural History Survey; Resistance evolution and IRM for rootworm -- Dr. Aaron Gassmann, Iowa State University; Adult management options -- Dr. Lance Meinke, University of Nebraska-Lincoln; Larval management options -- Dr. Bob Wright, University of Nebraska-Lincoln; and Decision tree for grower management options -- Dr. Ken Ostlie, University of Minnesota.

PURDUE EXTENSION FIELD CROP SPECIALISTS
Telephone, E-mail Addresses and Specialty

Entomology

Yaninek, Steve	(765) 494-4554	yaninek@purdue.edu	Head, Dept. of Entomology
Bledsoe, Larry	(765) 494-8324	lbledsoe@purdue.edu	Field Crop Insects, CAPS
Faghihi, Jamal	(765) 494-5901	jamal@purdue.edu	Nematology
Hunt, Greg	(765) 494-4605	hunt@purdue.edu	Beekeeping
Krupke, Christian	(765) 494-4912	ckrupke@purdue.edu	Field Crop Insects
Loven, Judy	(765) 494-8721	loven@purdue.edu	USDA, APHIS, Animal Damage
Mason, Linda J.	(765) 494-4586	lmason@purdue.edu	Food Pest Mgmt. & Stored Grain
Obermeyer, John L.	(765) 494-4563	obe@purdue.edu	Field Crops Insects & IPM Specialist
Tammy Luck	***(765) 494-8761***	***luck@purdue.edu***	***Administrative Assistant***
	FAX: (765) 494-2152		

Dept. Ext. Web Sit: http://extension.entm.purdue.edu/

Agronomy

Anderson, Joe	(765) 494-4774	janderson@purdue.edu	Head, Dept. of Agronomy
Brouder, Sylvie	(765) 496-1489	sbrouder@purdue.edu	Plant Nutrition, Soil Fertility, Water Quality
Camberato, Jim	(765) 496-9338	jcambera@purdue.edu	Soil Fertility
Casteel, Shaun	(765) 494-0895	scasteel@purdue.edu	Soybean and Small Grains Specialist
Gerber, Corey	(765) 496-3755	gerberc@purdue.edu	Director, Diagnostic Training Center
Joern, Brad	(765) 494-9767	bjoern@purdue.edu	Soil Fertility, Nutrient Management
Johnson, Keith D.	(765) 494-4800	johnsonk@purdue.edu	Forages
Mansfield, Charles	(812) 888-4311	cmansfie@purdue.edu	Small Grains, Soybean, Corn (SWIN)
Nielsen, Robert L.	(765) 494-4802	rnielsen@purdue.edu	Corn, Sorghum, Precision Agriculture
Steinhardt, Gary	(765) 494-8063	gsteinha@purdue.edu	Soil Management, Tillage, Land Use
Vyn, Tony	(765) 496-3757	tvyn@purdue.edu	Cropping Systems & Tillage
West, Terry	(765) 494-4799	twest@purdue.edu	Soil Management & Tillage
Lisa Green	***(765) 494-4783***	***lgreen06@purdue.edu***	***Extension Secretary***
	FAX: (765) 496-2926		

Dept. Ext. Web Site: http://www.ag.purdue.edu/agry/extension/Pages/default.aspx

Botany and Plant Pathology

Goldsbrough, Peter	(765) 494-4615	goldsbrough@purdue.edu	Head, Dept. of Botany & Plant Pathology
Creswell, Tom	(765) 494-8081	creswell@purdue.edu	Director Plant & Pest Diagnostic Laboratory
Egel, Dan	(812) 886-0198	egel@purdue.edu	Southwest PU Ag Ctr., Vegetable Diseases
Johnson, Bill	(765) 494-4656	wgj@purdue.edu	Weed Science
Legleiter, Travis	(765) 496-2121	tlegleit@purdue.edu	Weed Science
Ruhl, Gail	(765) 494-4641	ruhlg@purdue.edu	Plant & Pest Diagnostic Laboratory
Whitford, Fred	(765) 494-4566	fwhitford@purdue.edu	Purdue Pesticide Programs
Wise, Kiersten	(765) 496-2170	kawise@purdue.edu	Field Crop Diseases
Woloshuk, Charles	(765) 494-3450	woloshuk@purdue.edu	Mycotoxins in Corn
Amy Deitrich	***(765) 494-9871***	***amymd@purdue.edu***	***Extension Assist./P&PDL Lab Coordinator***
	FAX: (765) 494-0363		

Dept. Ext. Web Site: http://www.ag.purdue.edu/btny/Extension/Pages/default.aspx

Agricultural & Biological Engineering

Engel, Bernie	(765) 494-1162	engelb@purdue.edu	Head, Dept. of Ag. & Bio. Engineering
Frankenberger, Jane	(765) 494-1194	frankenb@purdue.edu	GIS and Water Quality
Kelley, Lyndon	(269) 447-5511	kelleyl@msu.edu	Irrigation Educator
Stroshine, Richard	(765) 494-1192	strosh@purdue.edu	Post Harvest Grain Quality
Ileleji, Klein	(765) 494-1198	ileleji@purdue.edu	Post Harvest Grain Quality
Ni, Jiqin	(765) 496-1733	jiqin@purdue.edu	GIS and Water Quality
Carol Weaver	***(765) 494-1174***	***sikler@purdue.edu***	***Extension Assistant***
	FAX: (765) 496-1356		

Dept. Ext. Web Site: https://engineering.purdue.edu/ABE/index.html