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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.

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

* Don’t overwinter in Indiana
**Springs 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 poses 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.

**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**

**Control of Marestail in No-till Soybean**

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 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!!!
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-NIFANorth 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.
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