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Insects, Mites, and Nematodes

Plant Cutting This Early Not Likely Black Cutworm - (John Obermeyer and Larry Bledsoe) -

- There are many species of cutworms
- Black cutworm is the most common and damaging species
- The dingy cutworm is a foliar feeder and rarely cuts plants
- The dingy cutworm overwinters as a partially grown larva
- Proper ID between black and dingy cutworms is important, see the aides below

Many cutworm species look alike and identification is often confusing. Proper identification is critical because the black cutworm can be an economic threat to corn, whereas other species may not. We already know from its name, the black cutworm will cut or burrow into plants that can ultimately kill corn and cause stand losses. The black cutworm is our most commonly found species, but some fields will have a mixed bag of dingy, claybacked, and variegated cutworms.

Black cutworm do not overwinter in the Midwest, that of course is why we monitor their arrival every spring with pheromone traps. Once they arrive in large numbers (intensive captures) we begin predicting their development and subsequent damage with heat unit accumulations. There have not been enough heat units accumulated this spring for black cutworm to get 1/2 to 3/4 inches long, that being the size where they cut plants. Certainly pest managers in extreme southern Indiana counties could be seeing some leaf feeding from small black cutworm larvae. Refer to the "Weather Update" and the HU50 accumulations for your location.

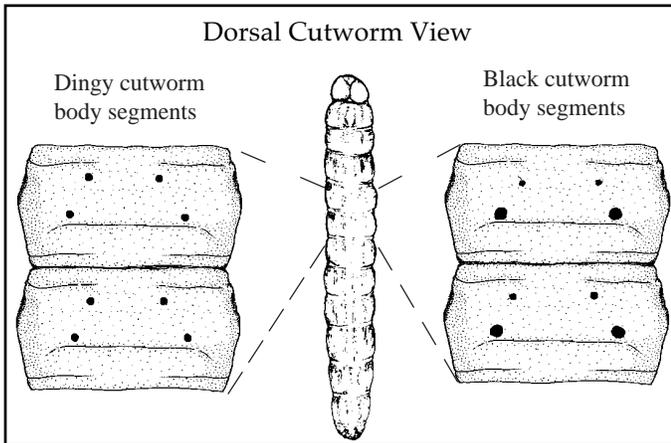
The dingy cutworm, probably the second most common species, is primarily a leaf feeder and will rarely cut plants, and if it does, the cutting is above the ground. Because the corn plant up to 5-leaves can withstand severe defoliation without a yield loss (compare it to frost damage), treatment for the dingy cutworm is rarely justified. To confuse the issue, there are many other species that one may find while scouting. For example, the claybacked cutworm is not as common as the black

and dingy, and its damage is a mix of leaf feeding and plant cutting. The dingy and claybacked cutworms overwinter as partially grown larvae, therefore finding cutworms 3/4 of an inch or more at this time would likely point to these species.

Below are some morphological characteristics that may help differentiate the black and dingy cutworm species.

Identification Features:

- do not use color!
- skin textures are different (black = grainy, dingy = smooth)
- tubercle (black bumps) size on the top center of the body segments are different: the black's outside pair are about twice the size of the inside pair, the dingy's are all about the same size. Refer to the following diagram.



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Cutworm-Like Critters in the Soil - (John Obermeyer and Larry Bledsoe) -

- Several bug-like creatures will be found while digging in the soil, most are non-economic
- Millipedes, ground beetle adults and larvae, crane fly larvae, and "baby" earthworms are addressed below
- Pest managers need to be able to recognize pests and their damage

Often when pest managers are in hot pursuit of black cutworm larvae they dig up a variety of critters, most being innocuous. There is no comprehensive picture journal to reference these "bugs," although the *Field Crops Pest Management Manual* (IPM-1) <<http://www.entm.purdue.edu/entomology/ext/fieldcropsipm/b/ONECP.HTM>> covers many of them. The difficulty is that there are many animal species that

may utilize the soil of a cornfield for all or a short period of their life. Most, having nothing to do with the corn being grown. Listed below are some possibilities as you dig this spring.

Millipedes: These wireworm-like arthropods, having two pair of legs per body segment, have become more prevalent with the advent of no-till. When found, their numbers are often high. Millipedes typically feed as scavengers, feeding on dead or decaying materials. Occasionally they have been documented as a pest of corn. If very dry conditions exist early in the season, millipedes will feed on corn seedlings, apparently seeking moisture.



Millipede in the soil

Ground beetles: If it's fast moving and shiny, chances are that you've seen a ground beetle scurry by. These beetles range in size from about 1/4 to 1 inch long. Their color is typically light brown to black. The darker colored beetles will appear bright green to blue as the sunshine reflects off their wing covers. Fortunately, nearly all ground beetles are beneficial, feasting on many critters in the field. One exception, the seedcorn beetle, will feed on corn seed and seedlings. Usually this is only a problem when the seed sits for long periods of time in cold, wet soils before emerging.

Ground beetle larvae: Yes, these are the immatures of the ground beetle. They are often confused with wireworm. However, unlike the wireworm they move quickly on the ground and through the soil. Closer inspection, if you are fast enough to catch one, will reveal well developed and sharp mouth parts. Yes, you guessed it again, these larvae are beneficial, feeding most often on soft bodied insects. Even the immature of the seedcorn beetle is beneficial.



Ground beetle larva feeding on corn rootworm larva



Ground beetle on soil surface

Crane fly larvae: Often referred to as “leatherjackets,” these strange looking, overgrown maggots are often confused with the black cutworm. They are the immatures of the crane fly, the one often misidentified as “giant mosquitoes.” Pest managers can easily distinguish them from cutworms by their legless bodies. These maggots are harmless to the corn. They feed on decaying plant matter in the soil.



Crane fly larvae or leatherjackets

Juvenile earthworms: Experienced and inexperienced field personnel alike are not surprised to find earthworms in the soil. However, when one sees “baby” earthworms for the first time it can be confusing. Small, skinny, and almost translucent, these juvenile earthworms are often referred to as “giant nematodes.” Where there is one, there are often many. Obviously, their presence is a sign of good soil health.



Juvenile Earthworm

This list could go on. The important thing for pest managers is not so much that they can identify the obscure critters, but rather pests and their damage. Happy Scouting!

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Aphids In Wheat - (John Obermeyer and Larry Bledsoe)

- Numerous aphids being observed in some SW Indiana wheat
- Transmission by aphids mainly occurs in the fall
- Watch for aphids accumulating on wheat heads

Charles Mansfield, southwest Indiana Purdue Agronomist, alerted us to the presence of aphids in wheat fields. The good news is that aphids at this time aren't likely to infect and spread Barley Yellow Dwarf Virus (BYDV). Plants infested with aphids in the fall are more likely to be infected with BYDV and severely damaged. Insecticide applications applied after wheat reaches Feekes growth stage 4.0 does little good to prevent the transmission of BYDV (refer to “Feekes Growth Stages for Wheat” in *Pest&Crop*, #3, April 4, 2003).

The bad news is that aphid population may increase as wheat heads begin to emerge and fill. The aphids injure developing heads by sucking plant juices. An average of 50 or more aphids per head indicates that an insecticide treatment should be considered. Normally when aphid numbers build to 10 or more per plant, it is not uncommon for predators and parasites to increase

rapidly in response to this increased source of food. Lady beetles (adults and larvae), syrphid fly larvae, lacewing larvae, and several species of parasites are probably now or shortly will be numerous in most fields. These natural control agents should help reduce aphid numbers.



English grain aphid in wheat head

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Alfalfa Weevil Update – (John Obermeyer and Larry Bledsoe) –

Ron Blackwell’s alfalfa weevil survey this week in west central Indiana shows that feeding activity continues northward in the state, but far below the previous

years’ devastating damage. Most fields in the last couple week’s surveys have been below treatment threshold. This indicates that winter temperatures did negatively impact the weevil’s overwintering eggs. Most spring laid eggs should hatch around 400 heat units (48°F base), that will be a critical time to assess for tip feeding.

| Alfalfa Weevil Larval Survey 4/29/03 (Ron Blackwell) | | |
|--|----------------|---------------|
| County (Fields) Sampled | Stem Ht. (in.) | % Tip Feeding |
| Fountain 1 | 13.8 | 16% |
| Fountain 2 | 16.5 | 8% |
| Parke 1 | 20.9 | 28% |
| Parke 2 | 19.8 | 44% |
| Parke 3 | 22.4 | 8% |
| Parke 4 | 14.7 | 52% |

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| Black Cutworm Adult Pheromone Trap Report Week 1 = 4/17/03 - 4/23/03 Week 2 = 4/24/03 - 4/30/03 (Ron Blackwell) | | | | | | | |
|---|----------------------------------|-------------|------|------------|------------------------------------|-------------|------|
| County | Cooperator | BCW Trapped | | County | Cooperator | BCW Trapped | |
| | | Wk 1 | Wk 2 | | | Wk 1 | Wk 2 |
| Adams | Roe/Price Ag Services | 10 | 9* | LaPorte | Pinkowski/Pioneer (1) | 5 | |
| Allen | Gynn/South Wind Farms | 8 | 1 | LaPorte | Pinkowski/Pioneer (2) | 8 | |
| Clay | Smith/Growers Co-op (Bzl) | 3 | 0 | Marshall | Pinkowski/Pioneer | 14 | |
| Clay | Smith/Growers Co-op (CC) | 8 | 4 | Marshall | Barry/Marshall Co. Co-op | 7 | 2 |
| Clinton | Blackwell/Purdue | 71* | 31* | Parke | Rule/Midland Co-op | 0 | 11 |
| Elkhart | Kauffman/Crop Tech (1) | 4 | 6 | Porter | Mueller/AgriIiance | 3 | 2 |
| Elkhart | Kauffman/Crop Tech (2) | 10 | 11 | Putnam | Nicholson Consulting | 4 | 1 |
| Fayette | Schelle/Falmouth Farm Supply | 1 | 0 | Randolph | Jackson/Davis-Purdue Ag Center (S) | 3 | 0 |
| Fountain | Mroczkiewicz/Syngenta | 0 | 1 | Randolph | Jackson/Davis-Purdue Ag Center (N) | 3 | 3 |
| Fountain | Hutson/Purdue | 2 | | Rush | Tacheny/Pioneer | | 21* |
| Gibson | Hirsch Farms | 0 | 12* | Starke | Pinkowski/Pioneer | 2 | |
| Green | Maruszewski/Pioneer | 9 | 7 | Sullivan | Smith/Growers Co-op (Farmersburg) | 3 | 1 |
| Hamilton | Dobbins/FMC (1) | 15* | | Sullivan | Smith/Growers Co-op (E) | 7 | 0 |
| Hamilton | Dobbins/FMC (2) | 16* | | Sullivan | Smith/Growers Co-op (W) | 0 | 10 |
| Hendricks | Whicker/Midland Co-op | 0 | 2 | Sullivan | Smith/Growers Co-op (NwLb) | 1 | 6 |
| Henry | Schelle/Falmouth Farm Supply | 7 | 4 | Tippecanoe | Obermeyer/Purdue | 15 | 19* |
| Jasper | Manning/Jasper Co. Extension (S) | 4 | | Tipton | Johnson/Pioneer | 15* | 15* |
| Jasper | Manning/Jasper Co. Extension (W) | 2 | 1 | Vermillion | Hutson/Vermillion Co. Extension | 3 | |
| Knox | Smith/Growers Co-op (Oaktown) | 3 | 1 | Vigo | Smith/Growers Co-op | 5 | 6 |
| Knox | Smith/Growers Co-op (Whitnd E) | 2 | 0 | White | Reynolds/ConAgra Popcorn 1K | 5 | 2 |
| Knox | Smith/Growers Co-op (Whitnd W) | 0 | 3 | White | Reynolds/ConAgra Popcorn 2P | 3 | 1 |
| Lake | Kliene (1) | 1 | 5 | Whitley | Walker/NEPAC | 2 | 0 |
| Lake | Kliene (2) | 3 | 2 | | | | |

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

| Black Light Trap Catch Report (Ron Blackwell) | | | | | | | | | | | | | | |
|---|-------------------|-----|-----|------|-----|-----|----|-------------------|-----|-----|------|-----|-----|----|
| County/Cooperator | 4/15/03 - 4/21/03 | | | | | | | 4/22/03 - 4/28/03 | | | | | | |
| | VC | BCW | ECB | SWCB | CEW | FAW | AW | VC | BCW | ECB | SWCB | CEW | FAW | AW |
| Clinton/Blackwell | 19 | 6 | 0 | 0 | 0 | 0 | 4 | 6 | 1 | 0 | 0 | 0 | 0 | 1 |
| Jennings/SEPAC | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Knox/SWPAC | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| LaPorte/Pinney Ag Center | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Lawrence/Feldun Ag Center | 2 | 1 | 0 | 0 | 0 | 0 | 10 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| Randolph/Davis Ag Center | | | | | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Whitley/NEPAC | 4 | 1 | 0 | 0 | 0 | 0 | 28 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| BCW = Black Cutworm ECB = European Corn Borer SWCB = Southwestern Corn Borer CEW = Corn Earworm AW = Armyworm FAW = Fall Armyworm VC = Variegated Cutworm | | | | | | | | | | | | | | |

Weeds

Poison Hemlock - The Toxic Parsnip – (Glenn Nice, Bill Johnson, Tom Bauman, and Thomas Jordan) -

We often get questions about wild carrot (*Daucus carota* L.) only to find out that the question is actually about poison hemlock (*Conium maculatum* L.). Although these two plants may look similar, poison hemlock is toxic to cattle, horses, swine, sheep, goats, dogs, and people when ingested. The plant produces volatile alkaloids coniine (an alkaloid similar in effect to nicotine) and gamma-coniine. The easiest way to tell the two plants apart is that poison hemlock will have purple spots or blotches on its smooth (hairless) ridged stems. Wild carrot will usually have a covering of hairs.

Description: Poison hemlock can often be found along roadsides, edges of cultivated fields, railroad tracks, stream banks, waste areas, and sometimes along the fence rows of pastures. Like wild carrot poison hemlock is a biennial. This means that it lives its life over two years. In the first year, poison hemlock goes through vegetative growth. In the second year, it will produce small white flowers arranged in umbrella-like cluster, similar to wild carrot. It is in the second year, with its flower, it tends to catch the eye. It can grow 3 to 8 feet tall. The leaves are finely divided having a triangular shape. When comparing both poison hemlock and wild carrot leaves, wild carrot has a more rounded lobe in the leaf. Where as Poison hemlock's leaf reminds me of a sharp arrow head. For more information and pictures of poison hemlock's description go to <http://www.ppws.vt.edu/scott/weed_id/coima.htm> and <<http://www.vet.purdue.edu/depts/addl/toxic/plant28.htm>>.

Symptoms: All parts of the plant can be toxic. Young leaves in the spring are the most toxic and the root the least. The fruit is most dangerous in the fall.

Lethal doses can be small, so it is important not to let animals graze or feed on poison hemlock. In the case of

horses, 4 to 5 pounds of the leaves may be lethal. One to 2 pounds can be lethal for cattle and 4 to 8 oz for sheep. Young animals are more susceptible. Symptoms may appear within 1 hour of ingestion. This starts with a nervous stimulation. This can progress in 2 to 3 hours later into respiratory paralysis. In rare cases the animal may have convulsions. In many cases symptoms include, bloating, incoordination, intestinal irritation, dilation of pupils, rapid and weak pulse, loss of appetite, salivation, and blue coloration about the mouth. Ingestion of poison hemlock in days 55 to 75 of gestation may result in birth defects.

Treatment: If an animal becomes poisoned by poison hemlock, a veterinarian may administer nerve and heart stimulants as soon as possible. Large doses of mineral oil and purgatives are also prescribed to empty the digestive tract. For more information about poison hemlock's toxic characteristics please see <<http://www.vet.purdue.edu/depts/addl/toxic/plant28.htm>>.

Control: Control of poison hemlock is more effective in the first year of its life cycle. In a grass pasture, 2,4-D, Banvel/Clarity (dicamba), or Crossbow (2,4-D and triclopyr) provide control. Crossbow is slightly better than both 2,4-D and Banvel/Clarity. However, be aware that these herbicides will damage any legumes. Spot treatments of glyphosate products (Glyphomax Plus, Roundup WeatherMax, Touchdown, etc) will also control poison hemlock, but be aware that this will also damage any desired vegetation. For grazing restrictions on the products listed above go to <<http://www.btny.purdue.edu/Pubs/WS/WS-16/Feedres03.pdf>>. Always read and follow labels when using herbicides.

For more information on toxic plants of Indiana to livestock and pets see <http://www.vet.purdue.edu/depts/addl/toxic/by_alpha.htm>. For online pesticide label go to <www.cdms.net> or <www.greenbook.net>.

Agronomy Tips

Corn Replant Decision-Making: Emotions vs. Economics- (Bob Nielsen) -

Replanting of crappy (aka less than desirable) stands of corn occurs somewhere in Indiana every year. A decision to replant a crappy stand of corn should be based on a number of criteria, but unfortunately the major influencing factor is often the emotion associated with looking out the kitchen window at the damaged field every morning or driving by the field every afternoon taking the kids to baseball practice. Even worse is the situation where the landlord is the one looking out the kitchen window every morning at the crappy stand of corn.

Make a wise decision about the merits of replanting a damaged field of corn requires more than emotions. In fact, I would rather that emotions be taken out of the equation entirely. Toward that end, I developed a replant decision-making worksheet that assists growers and farm managers in making that important replant decision. The worksheet allows you to determine the damaged field's current yield potential (if left untouched), its replant yield potential, and the dollar returns (if any) from replanting the field.

The worksheet is included in a larger overall publication on corn replanting titled "Estimating Yield and Dollar Returns From Corn Replanting." This Purdue Extension publication (AY-264-W) is available as a PDF-formatted download from the Web at <http://www.agry.purdue.edu/ext/pubs/AY-264-W.pdf>. If you do not have access to the Web, stop by your local Purdue Extension county office and ask the folks there to download and print it for you.

Some of the information that is required to complete the worksheet originates from cropping records and history, including the original seeding rate and planting date for the damaged field. Some of the required worksheet inputs are frankly estimates, including what the field would have yielded under "normal" conditions if it had not been damaged and what market price you expect to receive for the grain after harvest. The expected replanting date and replanting costs are also required for the worksheet calculations.

Finally, some information is required from the damaged field itself. You will need an estimate of the surviving plant population that is representative of the damaged areas of the field. Depending on the nature of the crappy stand, you may also need estimates of after-damage stand uniformity and plant defoliation.

I will be the first to admit that it takes some time and patience to complete the replant worksheet; both of

which are usually in short supply at the time the decision is being made. Recognize, though, that much of the replanting that occurs every year throughout the state is based primarily on emotion and not on estimates of economic returns. Taking the time to work through the steps of my replanting worksheet will help clarify the economic returns (or losses) to replanting and reduce the influence of emotions in this important crop management decision.

Related References:

Nielsen, Bob. 2002. A Recipe for Crappy Stands of Corn. Purdue Univ. Corny News Network. Online at http://www.kingcorn.org/news/articles.02/Crappy_Stands-0327.html [URL verified 5/1/03].

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No-Till Corn Planting Trash Talk - (Bob Nielsen) -

Uniform no-till stand establishment of corn can be difficult to achieve if conditions at planting are not ideal. Achieving adequate seed-soil contact during the planting operation is often one of the challenges involved with no-till planting into fields with high levels of surface trash (aka residue).

Adequate seed-soil contact helps ensure optimum moisture absorption by the seed (aka imbibition) that is required for initiating the germination process (Nielsen, 2002b). The consequences of uneven seed-soil contact are uneven germination and emergence.

The consequences of uneven emergence are plants with delayed development that unable to successively compete with neighboring ones that emerged earlier. Yield losses to uneven emergence can easily be as great as 10 percent (Carter et al., 2002), so it is worth making the effort to prevent the occurrence of uneven emergence.

If the surface soil is excessively wet, the press wheels of the planter may not completely close the seed furrow. The intended seed-soil contact may instead consist of excessive seed-air contact in the open furrow. If the planter coulters do not slice cleanly through the surface trash, bits and pieces of the old crop or weed residue may instead be "hair-pinned" into the seed furrow. The intended seed-soil contact may be replaced by excessive seed-trash contact.

Whether it be seed-air or seed-trash contact, the affected kernels are greatly dependent on rainfall to help close the furrows, keep the furrow environment moist, or keep the pinned trash moist so that moisture is available for absorption by the kernel. Without adequate moisture levels, germination and emergence of the kernels will be delayed compared to areas of the row where seed-soil contact is adequate.

Take the time during planting to check that acceptable seed-soil contact is occurring in the furrow (Nielsen, 2002a). Increase the down pressure of the press wheels if necessary to close the furrows or delay planting until the surface soil dries to a more optimum level. Increase the down pressure of the coulters to better slice through surface trash or delay planting until the surface trash is drier and receptive to coulter cutting. If your planter is outfitted with trash cleaners (aka row cleaners, residue managers, trash whippers), change their position to more aggressively clear away the surface trash from the row area to minimize the risk of "hair-pinning" the trash into the seed furrow.

Related References:

Carter, P., E. Nafziger, and J. Lauer. 2002 (Rev.). Uneven Emergence in Corn. NCR Ext. Pub. No. 344. On-line at <<http://cf.uwex.edu/ces/pubs/pdf/NCR344.PDF>> [URL verified 4/29/03].

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Don't forget, this and other timely information about corn can be viewed at the Chat 'n Chew Café on the World Wide Web at <<http://www.kingcorn.org/cafe>>. For other information about corn, take a look at the Corn Growers' Guidebook on the World Wide Web at <<http://www.kingcorn.org/>>.



Weather Update

Temperature Accumulations from Jan. 1 to April 30, 2003

HU48 = heat units at a 48°F base from Jan. 1, for alfalfa weevil development (begin scouting at 200)

HU50 = heat units at a 50°F base from date of intensive moth capture, for black cutworm development (larval cutting begins about 300)

GDD(9) = Growing Degree Days from April 16 (9% of Indiana's corn planted), for corn growth and development

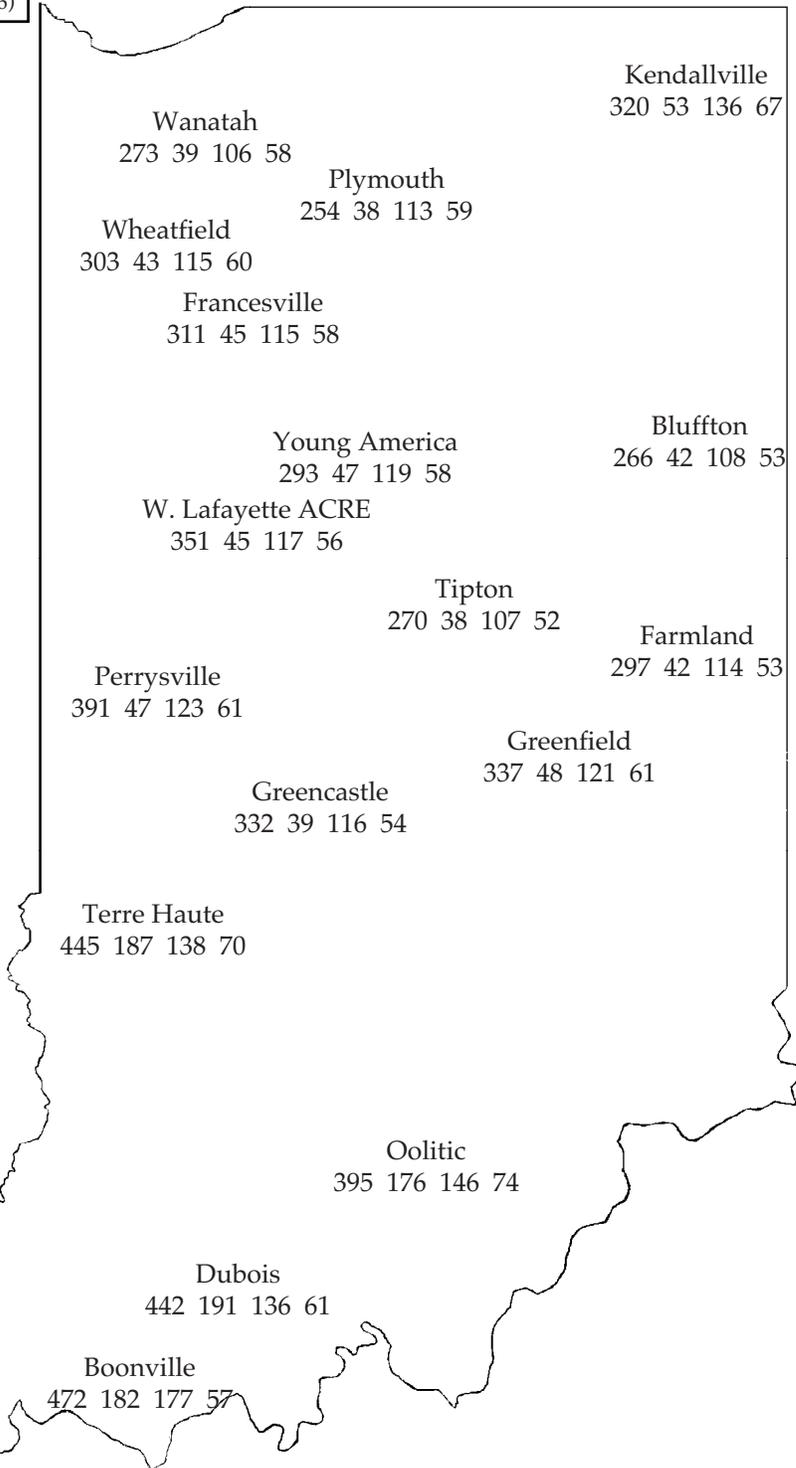
GDD(26) = Growing Degree Days from April 25 (26% of Indiana's corn planted), for corn growth and development

| MAP KEY | | | |
|----------|------|--------|---------|
| Location | | | |
| HU48 | HU50 | GDD(9) | GDD(26) |

4" Bare Soil Temperatures 5/1/03

| Location | Max. | Min. |
|----------------|------|------|
| Wanatah | 64 | 56 |
| Columbia City | 66 | 53 |
| Winamac | 68 | 52 |
| Bluffton | 61 | 55 |
| W Laf Agro | 72 | 57 |
| Tipton | 68 | 60 |
| Farmland | 68 | 50 |
| Perrysville | 63 | 58 |
| Crawfordsville | 69 | 59 |
| Liberty | 72 | 58 |
| Terre Haute | 73 | 59 |
| Oolitic | 71 | 59 |

**Bug Scout says,
"Continue scouting for alfalfa weevil damage!"**



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