Pest & Crop

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In This Issue

Insects, Mites, and Nematodes

What's Happening With the Early Planted Seed? - (*John Obermeyer and Larry Bledsoe*) -

- Early corn planting and cool soils increase likelihood of wireworm and/or grub damage
- Wireworms often kill the plant they infest
- Grub damage varies from nothing to plant death
- Identification of the grub species is important
- No rescue treatments are available for either pest

The first thing that came to mind when hearing about producers planting last week is that it will likely be a "good" year for grub and wireworm activity. According to the Indiana Agricultural Statistics Service, 9% of the intended corn acreage is now in the ground. Grub and wireworm damage increases with early planting. Delayed crop emergence and growth will increase the opportunity for these pests to come into contact with and feed-on seedling roots.

Wireworm are more tolerant of cool soils are can be quite active early in the season. They are attracted to volatiles given off by sprouting seeds and have the ability to move readily throughout the soil profile. Typically wireworm problems are patchy in a field as they "drill" into seed and seedlings, often causing plant death.

Annual white grubs (Japanese beetle our most predominant species) move to the upper soil profile in the spring and feed mostly on decaying organic matter, but will feed-on seedling roots that are nearby. The length of this spring feeding period and grub populations determines if economic damage will occur. In other words, a cornfield planted early where many grubs exist may have significant damage even with a soil insecticide. Grubs feed mainly on the fine roots of seedling plants and occasionally the mesocotyl. Root feeding may lead to stunted and/or discolored seedlings, mesocotyl damage will likely cause plant death. Producers who find grubs should collect several to take to their county extension educator, crop consultant, or agriculture chemical/

fertilizer dealer for positive identification. Species identification will determine whether this is an annual grub or the true white grub that may be in the soil for another season or two.

Late April and early May corn planting reduces the chance of economic wireworm and grub damage. Since rescue treatments are not available, the most effective way to control these pests in corn is to apply a soil insecticide at planting. If wireworm and/or grub populations are observed in a cornfield that has already been planted and the stand is threatened, a soil insecticide should be used as part of a replant operation providing the pests are still present. Replanting, however, is not recommended unless a critical level of plants is being significantly damaged or destroyed. Remember that a number of factors can cause stand reductions. If a stand is declining, determine if the grubs or wireworms are still actively feeding before making a replant decision. If planting very early to soybean, consider that no at-plant soil insecticides are registered and altering cropping rotations may be needed. Delaying soybean planting to mid May is an effective management option.

The following chart may help when making replant decisions. For example, corn planted on April 25 but with only 16,000 plant per acre because of wireworm/grub damage, is at 86% optimum yield. Replanting on May 21 and obtaining a population of 25,000 plants per acre should increase your optimum yield approximately 10%. One must consider factors such as seed and machinery costs, hybrid maturity, and extended weather forecasts before replant decisions are made.

Black Cutworm, Pheromone Trapping, and Predictions - (*John Obermeyer and Larry Bledsoe*) -

- Black cutworm moth flights this spring have been impressive in areas
- Time of cutting can be predicted by accumulating heat units (base 50˚F) from the time of an intensive capture
- Insecticide at planting for cutworm control is a poor economic choice
- Timely scouting is the key to decision making and control of black cutworm

Those observing the weekly "Black Cutworm Adult Pheromone Trap Report" should have noted that some of our cooperators have been busy counting black cutworm moths in their traps. A few high counts, known as intensive captures, have been reported in several locations since the first week in April. Surrounding states that have similar monitoring programs have reported much the same. Now that black cutworm moths have arrived in Indiana and corn planting has begun, what is the sensible pest management approach?

Refer to the "Weather Update" of this newsletter, where we are tracking heat unit accumulations for insect development, corn growth, and soil temperatures. HU50 is the temperature we use to track the development of the black cutworm from the time of an intensive capture to first cutting/damage. Based on the growth development model, it takes approximately 300 heat units (50˚F base) from egg hatch to early 4th instar; this is when black cutworm larvae begin to cut plants. Some

Expected Grain Yield Due to Various Planting Dates and Final Plant Populations

Planting date	Plant population (final) per acre													
	10,000	12,000	14,000	16,000	18,000	20,000	22,000	24,000	26,000	28,000	30,000	32,000	34,000	36,000
	Percent of optimum yield													
10-Apr	62	68	73	78	82	85	88	91	92	93	94	94	93	91
15-Apr	65	71	76	81	85	88	91	94	95	96	97	96	96	94
20-Apr	67	73	78	83	87	90	93	96	97	98	99	98	98	96
25-Apr	68	74	79	84	88	92	94	97	98	99	100	100	99	97
30-Apr	68	74	79	84	88	92	95	97	99	100	100	100	99	97
5-May	67	73	79	83	87	91	94	96	98	99	99	99	98	97
10-May	65	71	77	82	86	89	92	94	96	97	97	97	96	95
15-May	63	69	74	79	83	87	89	92	93	94	95	95	94	92
20-May	59	65	71	75	80	83	86	88	90	91	91	91	90	89
25-May	55	61	66	71	75	79	81	84	85	86	87	87	86	84
30-May	49	55	61	65	70	73	76	78	80	81	81	81	80	79
4-Jun	43	49	54	59	63	67	70	72	74	75	75	75	74	73
9-Jun	36	42	47	52	56	60	62	65	66	67	68	68	67	65

Source: Nafziger. 1994. J. Prod. Ag 7:59-62. Yield response to planting date extrapolated beyond May 25 with concurrence of author.

Note: The highlighted area represents the optimum ranges (98 to100% yield) of plant populations and planting dates for productivity levels greater than about 125 bushels per acre. Optimum plant populations for soils with historical yields less than about 100 bushels per acre will likely not respond to final plant populations greater than about 24,000 plants per acre. (R.L. Nielsen, Purdue Agronomy)

leaf injury may be present before then. Using pheromone trapping of moths and tracking of heat unit accumulations for first cutting is not an exact science, but they do give us a good indication of what to expect. It is not possible to predict if individual fields will be infested.

Unfortunately many agricultural insecticide suppliers will use this information as an opportunity to increase insecticide sales. Some producers will support their cause by buying and applying products that are not needed. There are two ways cutworms can reduce your profits, excessive cutting of young plants and unnecessary insecticide applications. Without a doubt producers are losing money if they are routinely applying prophylactic insecticide treatments for black cutworm. They should only be used where they are needed!

Field scouting is the most efficient and economical way to deal with the black cutworm. Study after study has shown that planting-time insecticides are not as effective as rescue/foliar treatments for cutworm control. Scouting will also reveal that even during a "bad" cutworm year, that less than 5% of the fields have reached economically important levels of infestation. Another consideration is that field scouting often reveals that only a portion of a field needs to be treated.

Again, don't anticipate black cutworm problems with an at-planting insecticide application. Continue to watch the "Weather Update" to determine when to better time your scouting trips, and watch for further cutworm developments throughout the spring season and threshold/control information in future issues of the *Pest&Crop*.

Early black cutworm leaf feeding

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Alfalfa Weevil, Slow But Steady – (*John Obermeyer and Larry Bledsoe*) –

Ron Blackwell's weevil surveys in central Indiana counties reveal that larval activity has picked up a little, even with the cooler temperatures (see "Alfalfa Weevil Larval Survey"). This damage is nothing to what we've seen in the last several years with this pest, but don't be lax in your field surveys and evaluations.

Producers in southern and central counties should continue to monitor fields for weevils and determine the percent tip feeding. Controls, however, should not be applied until thresholds are reached (see *Pest&Crop* #4, April 11, 2003) at approximately 400 HU (48˚F base) or above. The exception is that after 300 HU have accumulated if 3 or more larvae are noted per stem and percentage tip feeding is above 50%. In this case, a field will need to be treated immediately with a residual insecticide.

Alfalfa weevil larvae and tip feeding

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Alfalfa Weevil Larval Survey
4/21/03
(Ron Blackwell)

County (Fields) Sampled	Stem Ht. (in.)	Predominant Larval Instar	Total # Larvae*	% Tip Feeding
Clay 1	14.1	3rd	33	56%
Clay 2	15.1	2nd	11	24%
Clay 3	16.4	3rd	9	32%
Morgan 1	17.1	3rd	18	24%
Morgan 2	15.8	2nd	14	32%
Morgan 3	15.7	2nd	15	16%
*Number per 25 stems, extracted by Berlese funnel.				

Black Cutworm Adult Pheromone Trap Report
Week 1 = 4/10/03 - 4/16/03 Week 2 = 4/17/03 - 4/23/03
(Ron Blackwell)

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

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

Weeds

Marestail – Will it Be a Problem This Year? – (*Bill Johnson, Glenn Nice, and Tom Bauman*) -

Last summer, there were a number of product performance issues related to poor herbicide activity on marestail There are a number of reasons why this occurred and the purpose of this article is to provide an overview of these reasons and an update on the current status of marestail in Indiana.

Reasons why marestail was difficult to control in 2002:

1) Marestail is a weed which can emerge both in the fall and in the spring. In essence, it is both a winter and a summer annual. Fall emerging marestail will have a more extensive root system than those that emerge in the spring. Plants with more established root systems can be difficult to control because of resprouting from meristems in the lower part of the stem and roots. This occurs if systemic herbicides are not translocated to these meristems in high enough quantities to inhibit growth. Larger or older plants will have a larger number of active meristematic areas in the plant, thus effective herbicide translocation to all meristems becomes very important.

2) Glyphosate products (Roundup, Touchdown, Glyphomax and others) are relatively weak on large marestail. These products provide fairly good control of small (4 inch or less) seedlings, but control falls off pretty dramatically when marestail is more than 4 inches tall. Many of the control failures with glyphosate products were on plants sprayed when they were greater than 1 foot tall. In many of the same fields, glyphosate was the only product used. The addition of 2,4-D or FirstRate/Amplify to glyphosate would have improved control of larger marestail.

3) Weather conditions. Typically, weeds growing in very wet or very dry soils have slower rates of metabolism than weeds growing in less extreme conditions. It is highly likely that the reduced rate of metabolism of weeds growing in these conditions resulted in compromised herbicide activity. We observed this with glyphosate on common lambsquarter in 2002 as well. Common lambsquarter, much like marestail, is difficult to control with glyphosate when it is more than 4 inches tall. So the combination of reduced plant metabolism, plus the fact that glyphosate efficacy on large marestail is variable anyway resulted on control failures.

4) Glyphosate-resistant marestail has been comfirmed in Jackson, Bartholomew and Jefferson counties and is suspected in several other counties in southern Indiana. Glyphosate resistant marestail has also been confirmed in Ohio, Kentucky, and Tennessee. It appears initially that this problem will continue to grow because of widespread adoption of glyphosate use in soybean and the potential for growth in use of glyphosate in corn. In addition, marestail seed is well suited to dispersal by wind. Once a population is established, it will spread very quickly if resistant plants are allowed to go to seed.

The Good News. Our observations so far this year is that the marestail populations are lower than they were last year. There are a number of reasons for this.

1) The past fall was relatively dry and seedlings did not emerge.

2) The past winter was relatively harsh compared to previous years. While I was at the University of Missouri conducted studies to monitor winter weed populations in the fall, winter and early spring months. I was relatively surprised by the relatively high rate of mortality of many winter annual weeds, even during relatively mild winters. Typically, henbit and chickweed populations were 50 to 75% lower in the spring compared to the previous fall. So, it is highly likely that any marestail that emerged in the fall would have suffered a similar fate, which would further reduce populations.

3) Spring has been relatively dry in many parts of the state, so spring emergence of marestail is low.

4) 2,4-D provides good control of marestail and is one of the cheapest herbicides we have. In some areas of the state, there is/was a reluctance to use 2,4-D as part of a burndown program for no-till crop production. Crop advisors, representatives with companies that sell glyphosate products, and Purdue University extension specialists have taken an active role in educating our clientele about this issue over the winter months. It appears initially, that much more 2,4-D is being used as a component of the burndown program. This is a wise strategy as it provides another mode of action on this and other weeds and will slow the development of more resistant weed populations.

So, to answer our question above, it appears that the marestail problems are of a lower magnitude so far this year. But weather conditions which prevent spraying and/or soil preparation over the next couple of weeks could result in a different story. Stay tuned….

Final Comment. Weed Scientists at Purdue University are very concerned about this issue and will be monitoring the distribution and spread of glyphosate-resistant marestail in Indiana. If you think you have a suspect population, please contact your county Extension Educator. We will be collecting seed later this summer and fall from across the state for glyphosate tolerance screening and would to collect seed from as many populations as we can manage.

Marestail infested soybean field

Agronomy Tips

Corn Segregation: A Necessary Evil in Today's Biotech Age? - (*Bob Nielsen*) -

The recent approval by the US EPA (2003) of the new rootworm-resistant Bt corn technology raises again the important issue of corn segregation or identity-preservation for the purpose of minimizing uncertainty in the marketplace. This latest plant-incorporated protectant for corn, developed by Monsanto™, is referred to as the YieldGard® Rootworm trait and contains the "MON 863" transgenic event that results in the production of the Bt protein known as "Cry3Bb1."

Contrary to the earlier marketed Bt traits, this one targets the pesky corn rootworm insect rather than the European corn borer. There is no question that many Indiana corn growers have been waiting impatiently for this new transgenic trait and are eager to test out hybrids containing this trait. Supply of hybrid seed for the 2003 season is rather limited, but will increase markedly in coming years.

As with some other transgenic corn traits (e.g., Herculex® Bt, Roundup Ready®, most Bt/RR stacked hybrids), Indiana growers need to temper their enthusiasm with the recognition that the MON 863 trait has not received global approval in the marketplace, especially with the European Union (EU). Consequently, some grain buyers may not be willing to purchase grain of these transgenic hybrids or non-transgenic grain that contains detectable levels of transgenic contamination. It will be imperative for growers of the new Bt hybrids to identify buyers who will accept the grain at harvest time.

The intentions of major grain buyers regarding acceptance of grain from hybrids not yet approved by the EU is available on the Web (National Corn Growers Assoc, 2003). In addition, the American Seed Trade Association (2003) maintains a grain buyer database that helps growers identify "grain handling facilities that have indicated a willingness to purchase, receive, and handle genetically enhanced corn products that have full U.S. registration for food and feed use, but are not yet approved for import into the European Union."

As with the earlier Bt traits, production of corn hybrids with the MON 863 event will require planting a non-Bt corn hybrid as a refuge to minimize genetic selection pressure on the pest that may otherwise result in the development of pest resistance to the Bt protein (Monsanto, 2003). The refuge design is similar to that for Bt corn borer hybrids, but may change in the future. According to the US EPA, "A 20% non-Bt corn refuge is sufficient for a 3 year interim period while additional information is being gathered. The non-Bt corn refuge should be planted as continuous blocks adjacent to the MON 863 fields, as perimeter strips, or as non-transgenic strips planted within the transgenic field. A 20% non-Bt corn refuge is necessary to produce an adequate number of CRW susceptible to the Cry3Bb1 protein. Considering the limited movement of CRW larvae, planting refuges close to transgenic fields in large blocks is preferred to narrow strips. If a 20% refuge is planted as row strips within a corn field, then the strips must consist of at least 6 to 12 consecutive rows."

This lengthy introduction finally leads to the important issue of grain segregation for the express purpose of keeping grain of non-transgenic hybrids (or transgenics with full market approval) segregated from grain of transgenics that may require delivery to specific buyers. The US EPA is requiring that Monsanto make available Cry3Bb1 strip tests to grain handlers by September 2003. These qualitative tests will be used by some buyers to detect the presence of the Bt protein in loads of grain that are purportedly not from MON 863 fields.

Successful segregation of transgenic and non-transgenic grain includes a number of factors. The most commonly talked about factor is the risk of pollen drift from transgenic corn fields to non-transgenic corn fields. Two recently published on-line newsletter articles address this issue (Gray, 2003; Thomison, 2003), so I won't spend much more time discussing it.

Simply recognize that while it is true that the overwhelming majority of a corn field's pollen load likely drops very close to the source field, experience also tells us that small amounts of pollen can travel a quarter mile or greater and still remain viable (Burris, 2002). Thus, prudence dictates that growers be aware of what is being grown in adjacent fields, monitor the calendar dates of pollination among those fields to determine the risk of cross-pollination, and take appropriate steps at harvest time if necessary to separately harvest and segregate grain along field edges within several hundred feet of a possible contaminant field (Nielsen & Maier, 2001).

Other factors important to successful grain segregation include planter hygiene, harvesting hygiene, transport hygiene, and grain handling hygiene (Maier & Nielsen, 2001). The key consideration here is to identify and eliminate all opportunities for seed or grain commingling between transgenic and non-transgenic hybrids throughout the entire production cycle.

Follow the principle of First-In-Field, First-Out-Field (FIF-FOF). This means that fields of non-transgenic varieties should be planted first to avoid transgenic seed commingling with non-transgenic seed in the nooks and crannies of the planter. Similarly, the non-transgenic

fields should be harvested first in the fall before transgenic fields in order to avoid transgenic grain commingling with non-transgenic grain from the nooks and crannies of the combine. Obviously, the planter and combine should be thoroughly cleaned of remnant seed or grain from previous years prior to their first use this season. Following the FIF-FOF principle will facilitate proper hygiene of the transport, drying, and grain handling activities also.

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Pay Attention to Management Needs of Fertilizer Products - (*John Sawyer, Iowa State Univ., Orig. Published 4/14/03, Integrated Crop Management Newsletter, Iowa State Univ.*) -

With concerns this spring about nitrogen (N) fertilizer availability and pricing, perhaps you are considering an N product you haven't used before. What management considerations should you pay attention to? When properly managed, all N fertilizers can be effective for supplying crop N needs.

Anhydrous Ammonia

· Anhydrous ammonia (NH3) must be injected into the soil to avoid losses due to volatility and can be successfully applied from preplant to sidedress.

· Because free ammonia may be toxic to seedlings, having adequate untreated soil between the band and seedling (depth and location relative to the corn row) is important with preplant applications. If applied close to planting time, consider application at an angle to the row so entire rows or sets of rows are not placed near an ammonia band. Waiting a few days between injection and planting can lower risk of ammonia damage. Lower N rates and narrower knife spacing result in lower N concentration per band.

· Sidedressing ammonia can begin immediately after planting (same for injection of other N fertilizers) as long as the corn row or small seedlings are not covered with soil. Injection between either every row or every other row works. Waiting until after the sampling period for the late spring soil nitrate test allows for rate adjustments.

Urea

· Urea is an organic N compound. It is rapidly converted to ammonium (with concurrent pH increase) in the presence of warm temperatures, moisture, and the urease enzyme (found in soil and plant residue). Therefore, when banded in soil or broadcast on the soil surface ammonia can form. In bands, concentration of this ammonia can lead to root and seedling damage. On the soil surface, free ammonia is lost to the atmosphere (called volatile loss). Conditions that lead to greater volatilization include warm weather, moist and drying soils, high residue, high soil pH, no rainfall after application, and low soil exchange capacity. With worst-case situations, losses have been measured up to 30 percent. Rainfall of 0.25 to 0.5 inch or incorporation with tillage within 2 to 3 days after application moves urea into the soil and minimizes losses. Urea should not be placed with the seed at planting. Urea rates in starter (2 inches by 2 inches) should be limited to avoid ammonia damage. Rescue applications can

be applied with broadcast equipment or flown on. Some urea granules may lodge in corn whorls, but typically cause only minor leaf damage. Cultivation can be used to incorporate the urea.

Urea-ammonium nitrate solutions (UAN 28 or 32 percent N)

· These materials are comprised of approximately one-half urea and one-half ammonium nitrate. Because of the urea component, UAN is subject to losses due to volatility. Because only one-half of the N is in the urea form, the loss potential is lower than with straight urea. Solution UAN should be either incorporated or injected into soil for greatest efficiency and most reliable results, especially in no-till and high-residue systems. Surface dribble banding reduces volatile loss. Surface applications can work, but there must be either low soil temperatures or rainfall within 2 to 3 days to limit volatility. Also, if soils are dry and no rain occurs, the surface-applied N may be unavailable to plants.

· Solution UAN can be applied preplant, at planting, or sidedress. Solution UAN can be broadcast postemergence, but because of foliar plant burning application should occur before corn reaches the V7 growth stage (no more than 90 lb N/acre for corn smaller than the V3 stage, or 60 lb N/acre if corn is between the V3 and V7 growth stage). Check herbicide labels for any restrictions. In-season applications after that stage should be injected or dribble applied and can be between every other row.

Other N fertilizers

· Examples include ammonium nitrate and ammonium sulfate. Both have limited volatile loss potential, thus are good candidates for surface application. Because ammonium nitrate is one-half ammonium and one-half nitrate, it is more subject to immediate N loss by leaching or dentrification.

· Products used as phosphorus sources are diammonium phosphate, monoammonium phosphate, and ammonium polyphosphate (10-34-0). The N contained in these products is not subject to volatile loss and should be accounted for when figuring the total N application.

With uncertainty surrounding N prices and potential supply issues, it is important to use N fertilizer products in the best manner possible. Be mindful of the unique properties and management needs of each material. Don't get in a rush and waste valuable N just to get the job done.

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Early-Planted Corn & Potential for Freeze Injury - (*Bob Nielsen*) -

Corn planting began in some parts of Indiana during the past couple of weeks. As of 20 April, the USDA-NASS estimated that 9% of the state's corn acreage was already planted. Periods of reasonably warm soil temperatures have encouraged germination of corn and some fields may be approaching emergence or beyond. Such early planting of corn is always accompanied by the risk of injury by frost events or lethal cold temperatures.

Of these two risk factors, lethal cold temperature is the more worrisome one since a corn plant's growing point region is relatively protected from the effects of simple frost while it remains below the soil surface. Lethal cold temperatures (28F or less) can penetrate the upper inch or two of soil, especially dry surface soils, and kill plant tissue directly, including growing points. Non-lethal injury by cold temperatures may cause deformed elongation of the mesocotyl or physical damage to the coleoptile, resulting in a "cork-screw" symptom and subsequent leafing out underground.

Example of the "cork-screw" symptom

Example of subsequent leafing out underground

Air temperatures in some areas of Indiana dipped to potentially lethal levels for several hours early in the morning of 23 April. In many other areas, temperatures were easily in the low 30's F. Given the risk of chilling injury to young corn; it would behoove growers to monitor early-planted fields for stand establishment problems. It wouldn't be surprising if some fields, or areas of fields, will eventually require replanting due to lethal or sub-lethal injury from cold temperatures.

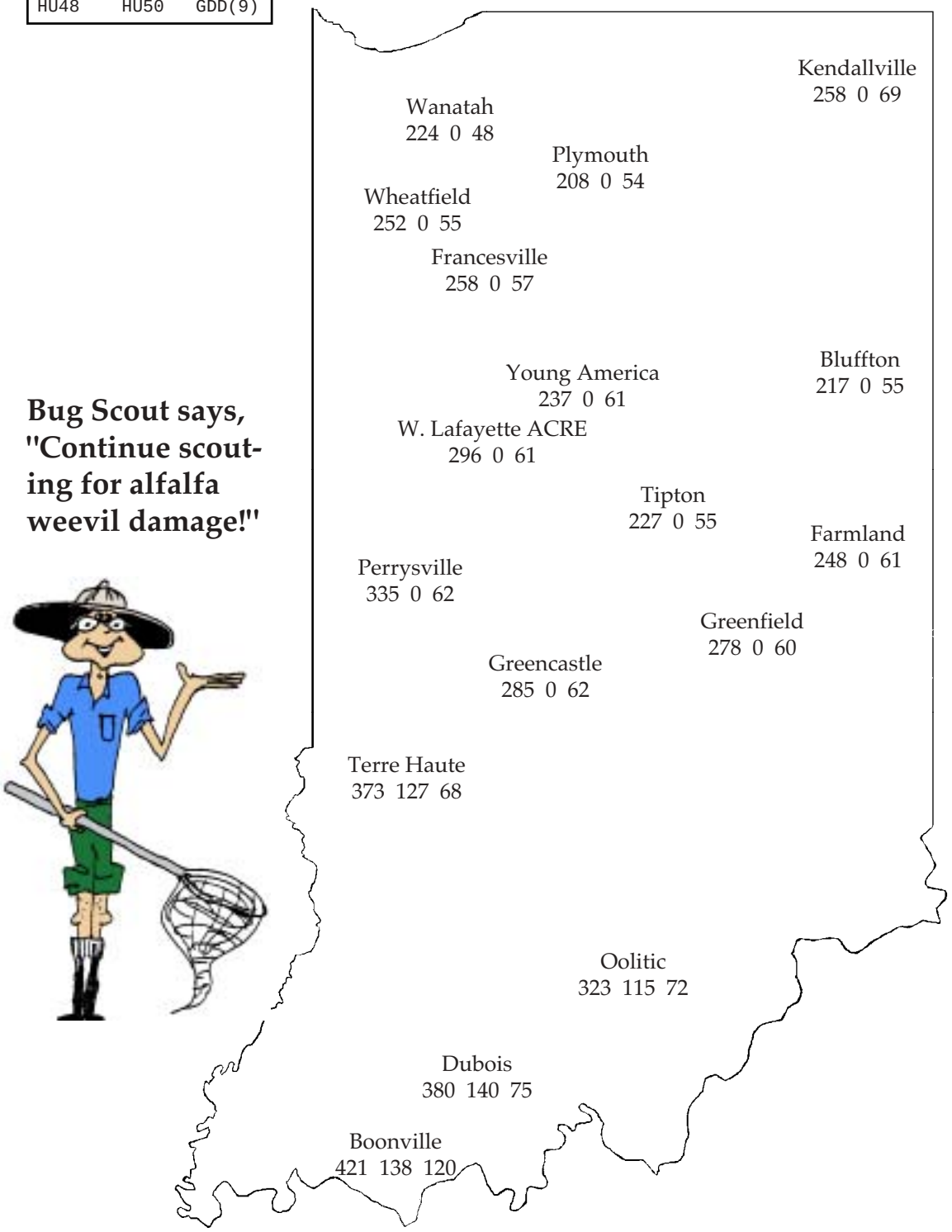
Don't forget, this and other timely information about corn can be viewed at the Chat 'n Chew Café on the World Wide Web at <http://www.kingcorn.org/cafe>. For other information about corn, take a look at the Corn Growers' Guidebook on the World Wide Web at <http://www.kingcorn.org/>.

Weather Update

Temperature Accumulations from Jan. 1 to April 23, 2003

HU48 = heat units at a 48ºF base from Jan. 1, for alfalfa weevil development (begin scouting at 200)
HU50 = heat units at a 50ºF basefrom 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

MAP KEY		
Location		
HU48	HU50	GDD(9)



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

4" Bare Soil Temperatures 4/24/03

Location	Max.	Min.
Wanatah	63	43
Columbia City	61	40
Winamac	61	42
Bluffton	47	42
W Laf Agro	67	44
Tipton	64	40
Farmland	58	36
Perrysville	57	50
Crawfordsville	65	44
Liberty	59	39
Terre Haute	64	47
Oolitic	63	42

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