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# Insects, Mites, and Nematodes

**Use of Soil Insecticides for Corn Rootworm at Reduced Rates** – (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) –

- Rootworm egg hatch and most corn planting may coincide this year
- Reduced granular soil insecticide rates may be possible
- Applicators need to be calibrated carefully

Heat unit models for corn rootworm have projected egg hatch about May 16 for central Indiana. Wet soil conditions throughout the state and short-term weather forecasts indicate that corn planting will not get into full swing until mid to late May at best. Since rootworm egg hatch will likely coincide with the next round of corn planting, consider using reduced rates of some soil insecticides for larval control.

Data from soil insecticide research conducted in producers' fields in Indiana have shown that little to no loss in root protection occurs where the rate of Counter CR and Lorsban 15G is 3/4 the labeled rate. Data on all other granular soil insecticides suggest that the labeled rates are close to the minimum rates needed to provide adequate protection.

The use of Counter CR and Lorsban at below labeled rates is an option that some producers may choose to try. If using reduced rates it is important that:

- Insecticide applicators on planters and/or cultivators can be precisely calibrated and set up to deliver the insecticide at the targeted rate and proper location.
- The rate not be reduced by more than 25% below the labeled rate.

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- Untreated areas should be left in the field so that root damage and yield comparisons can be made.
- Hybrids that have prolific root systems and good regeneration ability should be considered.

Producers who experiment with reduced rates do so with the understanding that they are solely responsible for the performance of the product. The soil insecticide manufacturer is under no legal obligation when their product is applied at less than labeled rates. Other soil insect pests may not be controlled with reduced insecticide rates. Also, Purdue University is not responsible for the performance of insecticides used at reduced rates.

Data for liquid soil insecticides (i.e., Capture, Furadan, and Regent) used at reduced rates are not available. The consistency of performance of these liquid products has been erratic at full rates so lowering the rate on any of these products is not recommended.

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**Black Cutworm and Preventive Treatments** – (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) -

- Black cutworm moths and winter annuals don't always equate to economic corn damage
- Rescue treatments are generally more effective than preventative treatments
- Even black cutworm "outbreaks" are not that extensive on a large-scale basis

*The following article was originally written by Marlin Rice, Iowa State Extension Entomologist, for the "Integrated Crop Management" newsletter (May 6, 2002). With his permission, we have modified the information for Indiana's conditions and situation.*

Because of the constant wet conditions this spring, most corn fields yet to be planted have not had tillage or herbicides applied. Winter annual and spring weeds are thick! In addition, black cutworm moths continue to arrive with these many storm fronts. For the majority of fields that have yet to be planted, the question of whether to use a preventive insecticide for black cutworm with the burn-down herbicide is valid. Below are several points to consider before purchasing and applying an insecticide solely for the prevention of black cutworm.

**Concern 1: Necessity of preventive insecticide treatments**. The basic principles of integrated pest management ask the following questions: Can the insect be scouted for? Can the economic damage be predicted based on field scouting? Can a rescue insecticide be applied, if needed? and Can the rescue insecticide provide equal or better control when compared to the preventive insecticide? The answer to all four questions is "yes." The use of an insecticide applied as a preventive treatment cannot be economically or environmentally justified when a rescue treatment can provide equal or better control.

**Concern 2: Black cutworm migration and egg laying are spotty**. Black cutworm adults (moths) are migratory and fly into Indiana from southern regions. Captures of male black cutworm moths in pheromone traps tell us when they arrive, but the trap captures do not tell us in what fields females lay their eggs, how many eggs they laid, what the cutting potential is, or whether the moths stayed within the county where individuals were trapped. In fact, the moths may continue their migration the following night into Ohio, Michigan, or Ontario Canada. For moths that do remain in Indiana, they may not lay eggs in all fields. Previous crop residue (soybean is preferred over corn), tillage, soil moisture, and winter annual weed growth all affect where moths will lay eggs.

**Concern 3: Potential for cutworm damage is low**. The last significant black cutworm outbreak occurred in Indiana in the year 2000, before that was 1994. Information collected in 1978, considered the "mother" of cutworm years throughout the Midwest, strongly suggests that the threat of black cutworm damage on a large scale is overrated. During that outbreak season, "severely" affected counties in Indiana were surveyed. It was found that 5% of the fields sampled had detectable levels, NOT economic levels! Said another way, 95% of cornfields didn't have detectable levels.

**Concern 4: Insecticide cost is expensive**. These insecticides are not cheap. For the low- and high-end label rates, cost could range from $5.00 to $17.00 per acre, depending on the product used and dealer incentives, application costs, etc.

**Concern 5: Insecticide performance guarantees**. One company may guarantee that its insecticide provides control of cutworms when applied as a preemergence treatment, whereas another company may state that with one preplant application for cutworms, you have one less problem to worry about. Do not be lulled into a false sense of security with insecticide guarantees or claims. Any guarantee or claim is subject to the condition that the field must be scouted for insect damage. Just because an insecticide was applied to the field at planting does not preclude the possibility of crop injury by the insects later in the season.

Alternative to insecticides. There is a better alternative to black cutworm management than buying unnecessary insecticide and increasing on-farm input costs. This alternative is to have the fields scouted when first cutting is expected. Watch for black cutworm cutting projections in this and future issues of the *Pest&Crop* in the "Weather Update." Then you should scout the field, look for early signs of injury, and determine whether the

economic threshold has been reached. Based on your findings, insecticide can be applied if it is really needed. Remember that black cutworm females may not lay eggs in your field and that it is to your advantage to use insecticides wisely and economically. SCOUT YOUR FIELDS!!

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**A Wet Spring, Delayed Planting and Southwestern Corn Borers** – (*Ric Bessin, University of Kentucky Extension Entomologist*) -

The wet spring of 2002 has delayed corn planting in many corn fields around Kentucky. While growers pray for more favorable planting weather, the clock is ticking. Research has shown that yield potential may begin to drop when corn is planted after May 15. Additionally, there is also an increased risk of insect attack due to southwestern corn borer. Recent research at the UK substation in Princeton has shown that when corn is planted early or on time, the risk of losses due to southwestern corn borer is very low. However, when corn is planted after May 10 in the western half of the state, there is a significant risk of losses due to this pest. The later the planting date, the larger the potential risk.

Corn planted before mid May is still attacked by southwestern corn borer, but will generally escape the worst of the damage. Late planted corn is still in the field when the southwestern corn borer begins to girdle corn plants in September. This is the most serious damage caused by southwestern corn borer. Larvae girdle the stalk by chewing a complete or partial internal groove around the stalk near the base. This leaves only a thin outer layer of the stalk for support. These stalks fall to the ground with only a mild wind.

There is some good news for 2002. As reported in a March issue of the Kentucky Pest News, the southwestern corn borer spring survey indicated that there was low survival of overwintering larvae. This means that the first generation moth populations should be reduced. However, growers planting corn after May 15 should have a plan to manage southwestern corn borer if it appears late in the season in their fields. Early harvest is one option. Early harvest reduces the exposure to stalk girdling in September. Shorter maturing hybrids and grain drying facilitate early harvest. Late planted fields should also be scouted for southwestern corn borer in late July and August. There are several insecticides that are effective against this pest.

Bt corn offers corn producers a practical control for southwestern corn borer with late planted corn. While Bt corn has been developed for European corn borer control, the full-season protection afforded by some Bt corn also provides excellent southwestern corn borer protection. Before using Bt corn, be sure that the market for your grain will readily accept this grain. In some parts of the state, this is not a serious issue but in others it is.

*This article reprinted with permission from the "Kentucky Pest News," Number 950, May 6, 2002. The information is appropriate for Southern Indiana.*

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**Black Light Trap Catch Report**
**(Ron Blackwell)**

| County/Cooperator | 4/23/02 - 4/29/02 | | | | | | | 4/30/02 - 5/6/02 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | VC | BCW | ECB | GC | CEW | FAW | AW | VC | BCW | ECB | GC | CEW | FAW | AW |
| Clinton/Blackwell | 0 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 9 | 0 | 0 | 0 | 0 | 14 |
| Dubois/SIPAC | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 9 |
| Fountain/Mroczkiewicz | Trap damaged in storm | | | | | | | 0 | 0 | 4 | 0 | 0 | 0 | 0 |
| Jennings/SEPAC | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 3 | 0 | 0 | 0 | 3 |
| LaPorte/Pinney Ag Center | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | | | | | | |
| Lawrence/Feldun Ag Center | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 1 | 0 | 0 | 0 | 0 | 26 |
| Randolph/Davis Ag Center | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 21 |
| Vermillion/Hutson | 1 | 5 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| Tippecanoe/TPAC | | | | | | | | 0 | 2 | 0 | 0 | 0 | 0 | 4 |
| Whitley/NEPAC | 0 | 7 | 0 | 0 | 0 | 0 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 83 |

BCW = Black Cutworm ECB = European Corn Borer GC = Green Cloverworm CEW = Corn Earworm
AW = Armyworm FAW = Fall Armyworm VC = Variegated Cutworm

**Black Cutworm Adult Pheromone Trap Report**
**Week 1 = 4/25/02 - 5/1/02 Week 2 = 5/2/02 - 5/8/02**
**(Ron Blackwell)**

| County | Cooperator | BCW Trapped | | County | Cooperator | BCW Trapped | |
|---|---|---|---|---|---|---|---|
| | | Wk 1 | Wk 2 | | | Wk 1 | Wk 2 |
| Adams | Roe/Price Ag Services | 9 | 6 | Lake | Kliene (1) | 0 | 0 |
| Bartholomew | Ludwig/Growers Service | 8 | 0 | Lake | Kliene (2) | 0 | 0 |
| Bartholomew | Weinantz Farm/Pioneer | 4 | 0 | Marshall | Pinkowski/Pioneer | 27* | 13 |
| Benton | Schellenberger/Jasper Co. Co-op | 19* | 6 | Marshall | Barry/Marshall Co. Co-op | 1 | 21* |
| Clay | Smith/Growers Co-op (Bzl) | 0 | 12* | Newton | Babcock/Jasper Co. Co-op | 29* | 6 |
| Clay | Smith/Growers Co-op (CC) | 2 | 8 | Parke | Rule/Midland Co-op | 8 | 2 |
| Clinton | Blackwell/Purdue | 50* | 29* | Porter | Mueller/Agriliance | 0 | 3 |
| Decatur | Miers Farm/Pioneer | 25* | 1 | Putnam | Nicholson Consulting | 6 | 5 |
| Elkhart | Kauffman/Crop Tech (1) | 4 | 4 | Randolph | Jackson/Davis-Purdue Ag Center (S) | 17* | 3 |
| Elkhart | Kauffman/Crop Tech (2) | 3 | 6 | Randolph | Jackson/Davis-Purdue Ag Center (N) | 8 | 1 |
| Fayette | Schelle/Falmouth Farm Supply | 24* | 2 | Rush | Peggs/Pioneer | 4 | 17* |
| Gibson | Hirsch Farms | 1 | 6 | Starke | Pinkowski/Pioneer | 8 | 3 |
| Fountain | Mroczkiewicz/Syngenta | 0 | 0 | St. Joseph | Pinkowski/Pioneer | 15* | 6 |
| Fountain | Hutson/Purdue | 1 | 0 | Sullivan | Smith/Growers Co-op (W) | 1 | 15* |
| Hamilton | Dobbins/FMC | 35* | 15* | Sullivan | Smith/Growers Co-op (E) | 0 | 24* |
| Hendricks | Whicker/Midland Co-op | 20* | 2 | Tippecanoe | Obermeyer/Purdue | 67* | 64* |
| Henry | Schelle/Falmouth Farm Supply | 23* | 0 | Tipton | Johnson/Pioneer | 9 | 0 |
| Jasper | Manning/Jasper Co. Extension (S) | 0 | 15* | Vermillion | Hutson/Vermillion Co. Ext. (N) | 1 | 0 |
| Jasper | Manning/Jasper Co. Extension (W) | 1 | 0 | Vermillion | Hutson/Vermillion Co. Ext. (S) | 1 | 0 |
| Johnson | Truster/Ag Excel Inc. | 10 | 0 | Vigo | Smith/Growers Co-op | 1 | 0 |
| Knox | Smith/Growers Co-op (Oaktown) | 1 | 2 | Warren | Shields/Jasper Co. Co-op | 4 | 0 |
| Knox | Smith/Growers Co-op (Edwardsport) | 1 | 0 | White | Reynolds/Orville Redenbacher 1K | 14* | 2 |
| Knox | Smith/Growers Co-op (Whtlnd 1) | 4 | 6 | White | Reynolds/Orville Redenbacher 2P | 5 | 3 |
| Knox | Smith/Growers Co-op (Whtlnd 2) | 1 | 8 | Whitley | Walker/NEPAC | 11 | 4 |

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

# Weeds

**Delayed Fieldwork A Recipe For Spray Drift Problems** – (*Steve Leer, Agricultural Communication Service*) -

When the skies eventually clear and farmers are able to proceed with fieldwork they'll need to be careful not to fill the air with herbicides that could blow onto a neighbor's field or yard.

Ill-timed rainfall in April and early May has hindered many Indiana farmers from getting corn and soybeans planted. The pent-up frustration could cause producers to rush herbicide applications when the precipitation ends and fields dry. That could lead to unintended spray drift problems, say two Purdue University Cooperative Extension Service specialists.

"Farmers are under a lot of pressure to get things done, which means that when things break loose everybody's schedule is going to be the same," said Fred Whitford, coordinator of the Purdue Pesticide Program. "Every farmer is going to want to have his field sprayed by a commercial business or they're going to want to spray their property themselves, and they're going to do it immediately.

"The problem is that they're going to be making applications in the spring when the winds are going to be high, and there lies the problem — that everybody's going to be out there doing this, whether the conditions are the best or not the best."

Weeds already are beginning to appear in fields, and farmers will want to knock them out with herbicides as soon as possible. But the same chemicals considered safe for use on row crops can cause serious damage to vegetable plots, fruit trees, vineyards and home landscapes if the wind carries them to surrounding land, said Bruce Bordelon, Purdue Extension grape and small fruits specialist.

"At this time of the year with sensitive crops like grapes and tomatoes already being leafed out and planted in the ground, they're at their fastest growth phase and they're very sensitive to the 2, 4-D and dicamba-type growth regulator herbicides," Bordelon said. "Exposure at this time of the year through drift or volatility can cause shoot stunting and, in many cases, a dropping of the flower clusters, resulting in an almost complete loss of the crop for the season."

Damage can extend beyond a single crop year, Bordelon said. "There can be some long-term damage," he said. "A direct drift application onto tomatoes or grapes might either kill the plants or set them back so that it might — in the case of grapes — take two or three years for those plants to grow normally again."

Spray drift occurs when herbicide droplets hang in the air and are blown acres, or sometimes miles, away from the application site. The problem is worse on humid, breezy days.

Laws permit farmers to treat their fields with herbicides in a responsible manner. The Office of the Indiana State Chemist regulates herbicide use and can fine farmers for spray drift violations. About 50 spray drift complaints are filed each year with the state chemist, Whitford said.

The applicator is liable in all cases, he said. A commercial applicator hired by a farmer to treat a field cannot pass the responsibility on to his client.

"This is really a private property rights issue," Whitford said. "In the state of Indiana we have the right to make applications on the property that we own, so a farmer can make those applications or can hire somebody to do it.

"On the other hand, we are responsible to protect somebody else's property. If you can imagine a fence line, whether it's a real fence line or imaginary fence line, once that spray crosses over then the commercial applicators are responsible for what they put out. The labels basically say, 'Don't drift.' Even if farmers pressure the commercial guys to make those applications, the commercial person is always responsible for their actions."

Surveys Whitford conducted with 2,000 farmers in 2001 show producers are aware of spray drift issues. More than one in 10 said they've had a property owner complain about spray drift, and a large majority conceded they'd applied herbicides in less-than-ideal conditions.

"About 13 percent of our farmers have experienced a drift complaint where they allegedly damaged somebody's property," Whitford said. "We've estimated that we're probably well in excess of a million dollars worth of property damage every year statewide.

"In the surveys farmers understood that their neighbors had private property rights the same as they did. They told us that they would respond to phone calls when somebody alleged that they'd damaged their property, and that they understood that the best application is when the winds are not blowing toward other people's property. About 70 percent acknowledged that they'd made pesticide applications even when weather conditions were not favorable."

Farmers can reduce spray drift in many ways, including

- Evaluating surrounding land and taking note of wells, homes, susceptible crops, gardens, landscape plants and sensitive neighbors.
- Selecting spray nozzles that produce large, heavier droplets that are less likely to drift.
- Lowering the spray boom and increasing the spray volume.
- Adding a drift control agent to the herbicide.
- Avoiding herbicide applications on days the wind is blowing toward sensitive cropfields or residential areas.

Farmers who receive spray drift complaints from neighbors are advised to respond immediately, gather information about and take photos of the alleged affected area and contact their insurance agent as soon as possible.

Fruit and vegetable growers have a role to play, as well, Bordelon said.

"Educating the applicators and the farmers around them is the best thing they can do," Bordelon said. "If everybody understands the potential for damage, I think that everyone will try to avoid having a problem. That's the main thing, to get out and talk to folks and try to be a good neighbor."

Bordelon added, "Certainly the number of vineyards and tomato plantings are relatively small compared to the acreage of corn and soybeans in the state, so it's difficult for a farmer to understand that 'Just because you wanted to grow grapes next to my field that I have to change my practices.'"

For more information on spray drift, read the Purdue Pesticide Programs Extension Bulletin No. PPP-51, "Stay on Target: Prevent Drift." The publication is available online at <http://www.btny.purdue.edu/Pubs/PPP/PPP-51.pdf>.

# Agronomy Tips

**Too Late to Seed Cool-Season Grasses and Legumes for Forage?** - (*Keith Johnson*) -

- More risk with a late seeding

We are at the point of the season that a forage producer has to seriously ask whether the cool-season grass and legume forages intended for a late March or April seeding should be kept in the seed bag until August 2002 or late March/April 2003.

What stresses increase with a late seeding?

- Weed control can be more challenging in a young forage stand as warm-season annual grass and broadleaf weeds are sprouting, too. Labeled herbicide choices are none or slim for grass weed control in seedling stands of cool-season grasses and for control of weeds in most forage crop species. Spring oats has been a traditional companion crop that can reduce weed encroachment in forage seedings; however, the oats or uncontrolled weeds in the stand could prove detrimental to young seedlings if soil moisture does become limiting in the next month or two.

- Scouting for potato leafhopper in all alfalfa fields is important, but especially critical when a young alfalfa seedling emerges late in the spring season only to find that it has hungry leafhoppers in line waiting to "suck the sap" out of your young existence. The experience of many producers also suggests that even potato leafhopper resistant alfalfa varieties are at risk to the stress of leafhopper feeding when seeded at a later than desired date. I recall from a multi-state research project where potato leafhopper feeding had much less negative impact when the seeding was in early April in Indiana as compared to a delayed mid-May seeding in Ohio because of wet soil conditions.

- If summer does not provide above average rainfall, young seedlings will be subject to drought stress. Young root systems that are located in a very dry upper soil profile cannot keep above ground growth in good water status.

If seed is on hand and you do delay seeding, store seed in a good environment. High heat and high humidity are not conducive to good long-term seed quality. You should contact the seed vendor to see if he has good seed storage facilities if you do not. Seed tags should be checked to see if legume seed was preinoculated with rhizhobia and when the expiration date occurs. Preinoculated seed that has expired can be reinoculated at the time of seeding by applying "fresh" inoculant. Individuals seeding "friendly endophyte" tall fescue should also be advised that this endophyte dies with time in storage, as does the unfriendly endophyte responsible for fescue toxicosis.

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**Delayed Planting & Hybrid Maturity Decisions** - (*Bob Nielsen*) -

- Delayed planting shortens the available growing season for corn
- Fortunately, corn hybrids adjust to shortened growing seasons
- Adapted hybrid maturities can be planted in Indiana until late May

After a weekend of wonderful drying weather, the rainfall that began again Monday morning threatens to delay corn planting throughout the state even further. One of the obvious decisions that farmers need to be considering as planting is further delayed is whether or when to switch from their normal "full season" hybrid maturities to earlier maturity ones in response to the ever-shortening growing season.

That decision is somewhat murky because the definitions for "full season" maturity vary from one farmer to the next. The definitions that I use are listed in Table 1 on the geographic basis of USDA Crop Reporting Districts. The hybrid maturities are described both in terms of 'comparative relative maturity' (CRM) and

**Table 1. "Normal" adapted hybrid maturities for geographic areas of Indiana and their corresponding approximate GDD ratings from planting to kernel black layer.**

| Area of Indiana | "Normal" adapted CRM | Approx. GDDs to black layer |
|---|---|---|
| NW | 109 | 2632 |
| NC | 109 | 2632 |
| NE | 109 | 2632 |
| WC | 112 | 2707 |
| C | 112 | 2707 |
| EC | 109 | 2632 |
| SW | 116 | 2807 |
| SC | 113 | 2732 |
| SE | 113 | 2732 |

Hybrid CRM (comparative relative maturity) values and GDD ratings correspond closely with those used by Pioneer Hi-Bred International, Inc.

growing degree days (GDDs). As a reference point, the CRM values and associated GDDs correspond most closely with those used with Pioneer™ brand hybrids.


Some will look at the hybrid maturity values in Table 1 and wonder where on earth I come up with some of the definitions for "full season" maturities for parts of the state. In particular, growers in the northern and east central areas of Indiana often plant hybrids with later maturities than those listed in Table 1 in an attempt to capture higher yields with fuller season hybrids. Such later maturities, though, 'push the envelope' in terms of their riskiness for maturing safely before a typically-occurring first fall frost. The values listed in the table more closely address a goal with normal planting dates for grain maturation to occur about two to three weeks prior to the average first fall frost (32°F).

By contrast, some growers in southern Indiana may wonder why the hybrid maturities listed in Table 1 are so 'early'. Indeed, the available GDDs in southern Indiana would allow the use of hybrid maturities that are five to ten days CRM later than what are listed in the table. Over the years, though, growers have discovered that the earlier maturity hybrids will yield as well as the true 'full-season' hybrids, but will dry down earlier in the season.

Given the "full season" maturities listed in Table 1 for normal late April–early May plantings, when should earlier maturities be substituted as planting is delayed? Some years ago, Peter Thomison (Ohio State Univ.) and I collaborated on field research that investigated the effects of delayed planting on the GDD needs of different hybrid maturities.

That research, conducted by former graduate students Greg Brown and Tony Halter, indicated that delayed planting decreases hybrid GDD requirements from planting to maturity. In fact, as planting is delayed beyond about May 1, the number of GDDs from planting to kernel black layer (physiological maturity) decreases by about 6.8 GDDs per day of delayed planting. The consequence of this research is that adapted "full season" maturities can be planted much later than previously thought and still mature safely prior to the average date of a killing freeze in the fall.

Based on our research, we can more accurately determine when to "pull the trigger" for switching from fuller season to earlier season hybrid maturities with delayed plantings. The good news is that hybrid maturities adapted for Indiana (Table 1) will mature safely when planted throughout most of the month of May. Once planting is delayed further, the ever-shortening growing season (measured by estimated available GDD) finally exceeds the fuller-season hybrids' abilities to adjust their developmental GDD needs.

Table 2 lists the hybrid relative maturity values that should safely mature prior to a fall frost (32°F) when planted from late May through early June in Indiana. These 'safe' hybrid maturities were estimated for the various Crop Reporting Districts according to the available length of growing season for each planting period, the average date of the first fall frost (32°F), and adjustments based on the hybrid GDD response to delayed planting.

**Table 2. Approximate 'safe' hybrid relative maturities for delayed plantings throughout Indiana. Shaded values indicate hybrid maturities that are earlier than normally used for that area of the state (Table 1).**

| Area of Indiana | CRM Appropriate for plantings no later than: | | |
|---|---|---|---|
| | May 27 | June 3 | June 10 |
| NW | 109 | 106 | 103 |
| NC | 107 | 104 | 101 |
| NE | 107 | 104 | 101 |
| WC | 112 | 112 | 111 |
| C | 112 | 112 | 109 |
| EC | 108 | 105 | 102 |
| SW | 116 | 116 | 116 |
| SC | 113 | 113 | 113 |
| SE | 113 | 113 | 113 |

Hybrid CRM (comparative relative maturity) values correspond closely with those used by Pioneer Hi-Bred International, Inc.

BEAR IN MIND that these estimates of safe hybrid maturities are aimed at achieving grain maturation no later than the average (50% probability) date of the first light freeze (32°F) in the fall. Such frost events normally injure corn leaves, but do not kill the corn plant. These dates generally range from the first through the third weeks of October from northern to southern Indiana. Also recognize that northern Indiana farmers who already 'push the envelope' by planting 113-day CRM maturities or greater should begin switching to more adapted maturities of about 109-day CRM maturities by about May 20. • • P&C • •

**Interpreting Hybrid Maturity Ratings** - (*Bob Nielsen*)

Hybrid maturity ratings have always been a sort of mystery to farmers and consultants alike. One factor that contributes to the mystery is that your definition of 'maturity' may not be the same as my definition.

Agronomists usually refer to 'maturity' as that point in time when maximum weight per kernel has occurred. The usual term for this is 'physiological maturity' and is often associated with the development of the black layer at the tip of the mature kernel. Grain moisture content at the onset of physiological maturity ranges between 25 and 35 percent.

Another definition of 'maturity' is that point in time after physiological maturity when a hybrid can be safely harvested with minimal harvest loss, either by kernel loss or kernel damage. My term for this is 'harvest maturity' and is usually associated with a grain moisture content of around 25 percent.

The traditional method for rating hybrid maturities (i.e., 'days to maturity') is based on comparisons among hybrids near the time of 'harvest maturity', with the assumption that grain moisture loss in the field is about 0.5 percentage point per day. For example, if the grain moisture content of a new hybrid is two percentage points wetter than that of a 'standard' hybrid with an assigned relative maturity value of 110, the new hybrid is assigned a relative maturity value of 114.

Historically, folks have added the word 'days' to this hybrid maturity rating value (i.e., 114-day hybrid), but it is important to recognize that this value does not refer to actual calendar time between planting and harvest maturity. Consequently, traditional relative maturity ratings of hybrids are of little help in determining whether a hybrid will safely mature before a killing fall frost.

The other common method for assigning relative hybrid maturities is based on the thermal time between planting and physiological maturity. Terms used to describe thermal time include 'growing degree days' (GDD), 'growing degree units' (GDU) and 'heat units' (HU). GDD values represent the amount of heat accumulated over a period of time. Since this method depends on actual measurement of thermal time, there is no need to compare hybrids in order to assign maturity rating values. Common values for such maturity ratings range from about 2500 (earlier maturity hybrids) to 2800 (later maturity) for hybrids commonly grown in Indiana.

The relationship between these two maturity rating methods is close but not always exact because each is based on a different definition of 'maturity', the difference being the time period between physiological and harvest maturity. If hybrids vary for rates of grain moisture loss, their comparative maturity values may differ between the two maturity rating methods. Neither method is perfect, either, because of the influences of climatic conditions and plant stress on the grain maturation process.

Another 'fly in the ointment' is the fact that there are no agreed upon standards within the seed industry for the application of either method for assigning relative hybrid maturities. Minor differences in methodologies among seed companies often result in the farmer's frustration in comparing maturity values among different brands of hybrids.

Unfortunately, the lack of industry standardization can make it difficult for growers who need to make a hybrid maturity decision for late planting situations based on remaining GDD availability (see my related article). Fortunately, one of the larger seed corn companies rates their hybrids according to GDD accumulations from planting to kernel black layer. Consequently, we can describe the relationship between their relative hybrid maturity ratings and growing degree days to kernel black layer (Figure 1.)

One can use this relationship to estimate the GDDs from planting to black layer for other companies' hybrids of similar relative maturities. For example, if the relative maturity of a hybrid is comparable to a 112-day (CRM) Pioneer™ brand hybrid maturity, then Figure 1 suggests that the GDDs from planting to black layer would be approximately 2700. With this estimate in hand, growers can then begin the process of determining safe hybrid maturities for late planting situations.

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/>.

[1] Reference to commercial brand names does not constitute an endorsement by Purdue University.

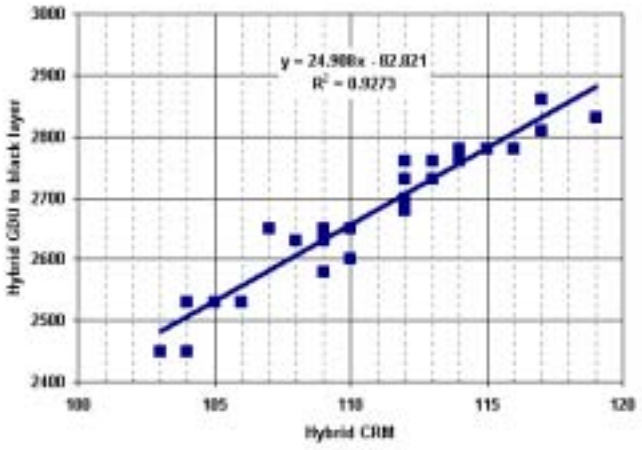


Figure 1. Relationship between hybrid comparative relative maturity (CRM) and hybrid growing degree units (GDU) from planting to kernel black layer for a group of Pioneer™ brand corn hybrids[1]. (Source of data: Pioneer Hi-Bred International sales literature, 2001.)

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**Minimizing Compaction in a Wet Spring** – (*Tony J. Vyn) -*

As the calendar days in May pass with very little of the corn or soybeans planted in Indiana, the temptation mounts to do tillage or planting operations when soil conditions aren't fit. The planting that has been completed thus far has been on fields that dried faster earlier, so the waiting now becomes even more challenging. Does the recommendation for acceptable soil moistures for field operations change between late April and mid-May or late May? In short, the answer is "No". Here are ten guidelines on how to avoid or minimize soil compaction in a wet spring.

1. The risk of yield loss resulting from compaction at the time of tillage or planting does not decline with time in spring. Crop yield loss after soil compaction is most likely when hot and dry weather conditions add to rooting stresses encountered in the first 60 days after planting. The latter weather conditions are more likely after late versus early planting. Regular rains of 1 inch per week from June to August would markedly help corn and soybean response to compaction at planting, but it is not good management to presume such a rainfall distribution will follow an untimely field operation this month.

2. Even in mid-May, potential yield loss from compaction is still greater than that from delayed planting. Waiting two more days for that tillage or planting operation will reduce corn yields by 3% or less, whereas potential yield losses from spring compaction could be as high as 40%.

3. The easiest test to determine soil suitability for tillage is still the "roll" test. Take soil from the one-inch zone around the intended depth of tillage (or seeding) and roll it carefully back and forth between the palms of your hands. If you can form a 4-inch long "worm" of soil with a diameter of 1/8 inch, the decision should be to wait for additional drying.

4. Never do two secondary tillage passes under marginal soil moisture conditions. The second pass will only add to the compaction load from the tractor and the implement. For those that choose tillage (instead of no-till or stale seedbed planting), wait just long enough after that operation to have friable conditions in the seedbed zone and then plant. Use harrows or other firming devices behind field cultivators to reduce clod size in the first pass.

5. Avoid the use of tandem disks where possible because of the additional compaction load (pressure) below disk blades, compared to that under the cultivator sweeps. Creating "tillage pans" (layers of increased soil density just below the depth of tillage) restricts both root growth (and water drainage if the rains should continue).

6. Keep the tillage depth as shallow as possible. Soil moisture levels (and potential for soil smearing) increase rapidly with depth after periods of heavy rain when drying soil below field capacity is predominantly by evaporation drying from the surface. There is no inherent yield gain for tillage any deeper than an average of 3 inches.

7. Consider limiting planting and tillage operations to those portions of the fields where soil conditions are "acceptable". Come back and plant those wetter areas later. Yield reductions associated with "mudding" the crop in are still much higher than those resulting from waiting on the wet areas for an additional week.

8. Try to minimize the compaction from the tractor itself. Use a tractor with a lower axle load if it is capable of doing the field operation. Adjust inflation pressure to as low as is appropriate for the tire type. Don't feel compelled to leave duals or even triple tire combinations on the tractor if they are not providing a clear benefit in flotation or in enabling an overall reduction in depth of secondary tillage (e.g. to loosen soil in the wheel tracks). In spring tillage operations, compaction from tractor wheel tracks is often the worst offender in restricting subsequent root elongation.

9. Flexibility surrounding the margins of "acceptable" soil moisture ranges for tillage and planting operations is dependent on overall soil organic matter levels and crop rotation history. Fields with high organic matter and good soil structural stability are less likely to experience yield loss from tillage or planting operations under less-than-optimum conditions. Fields with a history dominated by soybeans or other low-residue producing crops are those that are most suscep-

tible to crop yield loss associated with compaction. Fields with a recent history dominated by perennial forages, grain corn, cover crops and (or) manure are less susceptible to compaction damage even when tillage occurs at similar soil moisture contents.

10. In delayed planting situations, pre-plant ammonia application should be avoided for compaction reasons as well as for the extra time requirement before corn planting. Aside from the wheel-track compaction and smearing alongside the anhydrous knives, increased concentration of ammonia in the knife zone may enhance the risk of injury to corn plants when the soil dries.

In summary, the advancing calendar is generally not sufficient justification to work soils that are too wet, or to "mud" the crop in. Minimizing compaction is just as important in mid-May as it was in late April. Patience is a necessity!

# Bits & Pieces

**Purdue Forage Day** – (*Keith Johnson*) –

The 2002 Forage Day will be held on June 13 at the Milco Dairy Farm near Newcastle, Indiana. The Milco Dairy Farm is operated by Nicco and Millie Niessen. This year's Forage Day is sponsored by the Purdue Cooperative Extension Service, the Indiana Forage Council, and the Indiana Professional Dairy Producers. Forage Day combines educational workshops with equipment demonstrations. Presentations cover various topics in the production, utilization and marketing of forages. Forage Day is the only annual event in the state where one can see a live demonstration of harvesting equipment. Contact Keith Johnson with questions (765) 494-4800 or e-mail: johnsonk@purdue.edu

### Attendees

No preregistration is required. All registration occurs on-site the day of the event. There is no registration fee and lunch will be provided for a nominal cost.

### Tradeshow Opportunity

We invite you to have a booth at forage Day! In past years we have typically had over 400 participants and most of these individuals are farmers. We feel this is an opportunity for you to share your forage-related information with those in attendance. This is an excellent opportunity for industry involvement at the Purdue Forage Day. Please visit our website at <http://www.agry.purdue.edu/ext/forages/forageday> for the registration form or contact Carol Summers at (765) 494-4783.

### Educational Speakers

Concurrent Forage or Dairy sessions. Choose one session to attend.

### Forage Session

"Managing Mother Nature" – Dr. Keith Johnson, Purdue Forage Specialist and Jeremy Sweeten, Purdue Agronomy Graduate Student

"Research Update: Aeration's Effects on Permanent Pasture and Hay Fields" – Brad Shelton, Purdue Agronomy Graduate Student

"Managing Soil Fertility in the Alfalfa Field" – Kess Berg, Purdue Agronomy Graduate Student

"Managing Insects in Your Forage Crops" – Larry Bledsoe, Purdue Entomology Department

### Dairy Session

"Using the Latest Technology to Shorten the Calving Interval" – Dr. Steve Washburn, North Carolina State University

"Boots, Buds, and Blooms…What Do they Mean to Your Livestock?" – Dr. Mark Sulc, Ohio State Forage Specialist

### Schedule

8:00 – 9:00 AM – Register and Visit Tradeshow
9:00 – 11:00 AM – Educational Speakers
11:00 AM – 1:00 PM – Lunch, Visit Tradeshow and Tour Milco Diary Farm Facilities
1:00 – 4:30 PM – Forage Equipment and Harvest Demonstrations

### Hay Quality Contest

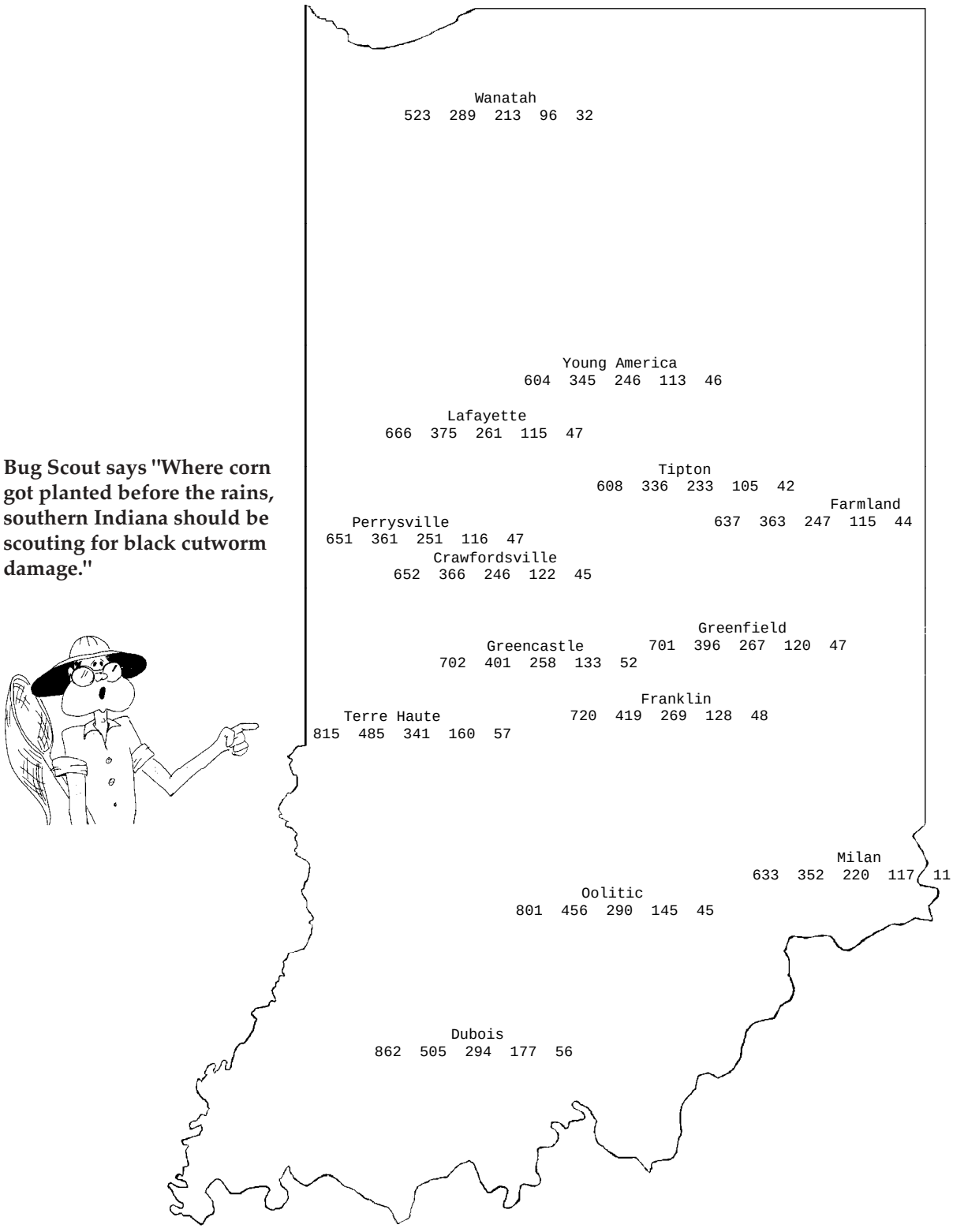
To participate in the contest, bring 1 unbroken bale of hay as your entry. A certificate will be awarded by the Indiana Forage Council and forage-related products will be provided by agribusinesses to the winner of each division (grass, legume, and mixed). Awards will be announced within 10 days following the forage Day. Cored hay samples or silage samples not entered in the contest will be accepted and results sent to producers after the Forage Day. No fee will be assessed for contest samples. A $10.00 fee will be assessed for each non-contest sample.

# Weather Update

| MAP KEY | | | | |
|---|---|---|---|---|
| Location | | | | |
| HU41 | HU48 | HU50 | GDD(2) | GDD(10) |

## Temperature Accumulations from Jan. 1 to May 8, 2002

HU41 = heat units at a 41°F base from Jan. 1, stalk borer egg hatch begins by 600
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(2) = Growing Degree Days from April 21 (2% of Indiana's corn planted), for corn growth and development
GDD(10) = Growing Degree Days from May 5 (10% of Indiana's corn planted), for corn growth and development




**Bug Scout says "Where corn got planted before the rains, southern Indiana should be scouting for black cutworm damage."**



**4" Bare Soil Temperatures 5/8/02**

| Location | Max. | Min. |
|---|---|---|
| Wanatah | 62 | 56 |
| Columbia City | 60 | 53 |
| Winamac | 67 | 48 |
| W Laf Agro | 68 | 60 |
| Tipton | 63 | 60 |
| Farmland | 66 | 59 |
| Perrysville | 65 | 63 |
| Crawfordsville | 61 | 59 |
| Terre Haute | 75 | 62 |
| Vincennes | 71 | 60 |
| Oolitic | 68 | 64 |
| Dubois | 84 | 66 |

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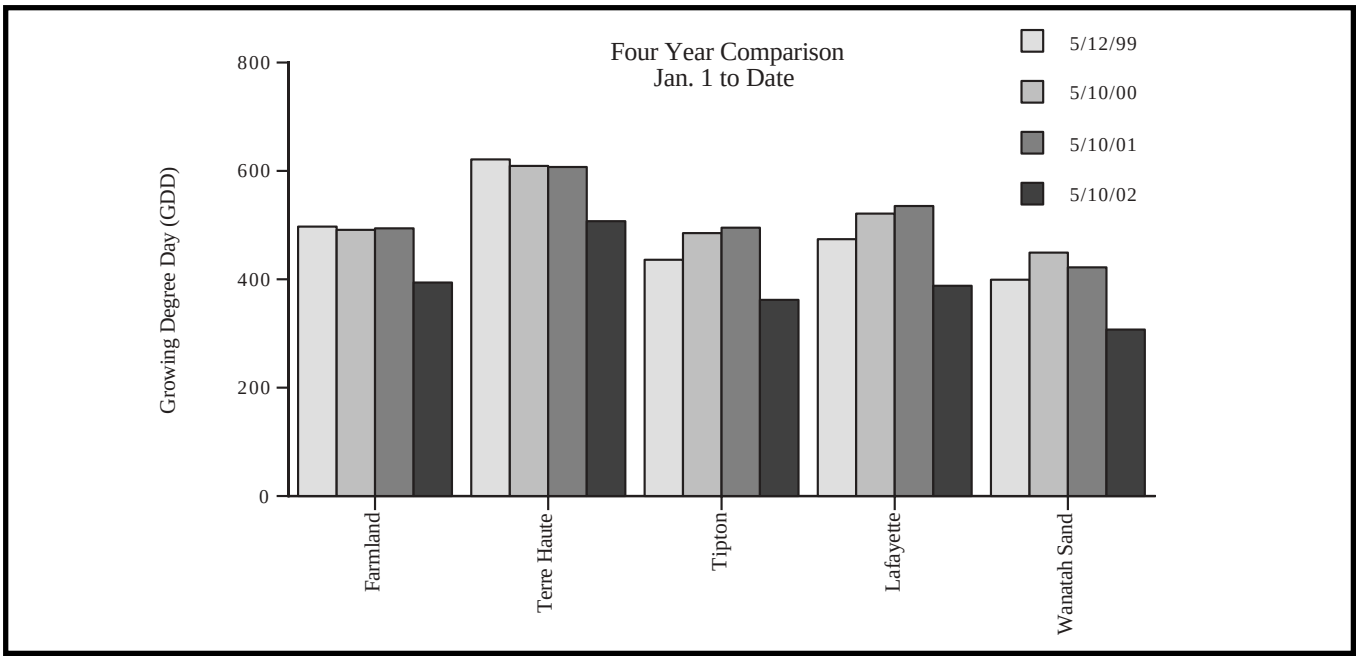
**http://www.entm.purdue.edu/Entomology/ext/targets/newslett.htm**

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