Pest&Crop

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In This Issue

Insects, Mites, and Nematodes
- European Corn Borer Update
- European Corn Borer Survey
- Fall Armyworms
- Sample Now for Potato Leafhopper
- Black Light Trap Catch Report

Plant Diseases
- Wheat Scab Update

Agronomy Tips
- Evaluating Thin Soybean Stands
- Unusual Twisted Whorls in Corn
- Isn't Corn Supposed to be Green?
- Flooding and Ponding Damage to Corn

Weather Update
- Temperature Accumulations

Insects, Mites, and Nematodes

European Corn Borer Update - *(John Obermeyer and Ron Blackwell)* -

- Corn taller than 18" extended leaf height needs to be scouted for corn borer egg masses and borer damage
- "Tall" corn fields may be attracting significant numbers of egg laying moths

A survey on May 30 in southwest Indiana revealed that first generation corn borer damage is very minor in that region (see "European Corn Borer Survey"). Though we have not seen economic infestations yet, pest managers should begin field inspections for this pest immediately. Also, "Bt" corn should not be ignored. A visit to all your fields now may reveal potential problems early.

Typically, corn borers are not able to establish very well on corn less than 18" extended leaf height; this is mainly due to DIMBOA, a plant aglucone, which acts as a "built-in insecticide." Thus, emerging larvae may not survive once they begin to feed. If an impregnated female is not able to find a suitable corn field to lay her eggs, she has hundreds of other hosts (i.e., soybeans, potatoes, grass weeds, broadleaf weeds, flowers, etc.) to choose among.

Corn throughout Indiana that was planted early and is "tall" compared to surrounding corn may be acting as a "trap" crop and should be scouted for egg masses and/or larval damage, "shot-hole" feeding. Refer to Extension Publication, E-17, *European Corn Borer in Field Corn, Sweet Corn, Peppers, and Snap Beans* (Rev. 1/98) for management and control information.

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European Corn Borer Survey - May 30, 2000 (Ron Blackwell)

County (Fields) Sampled	Extended Leaf Height (in.)	% of plants/field w/ damage[1]	Avg. # Egg masses/ plant[2]
Gibson	39.4	0%	0.0
Gibson	53.1	3%	0.0
Gibson	43.2	0%	0.0
Sullivan	20.8	2%	0.0
Sullivan	22.5	0%	0.1
Sullivan	28.3	0%	0.0
Sullivan	30.0	0%	0.0

[1]Percentage calculated from 100 plants inspected per field.
[2]Average from 25 plants inspected per field.

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Fall Armyworms - (*John Obermeyer, Ron Blackwell*) - Fall armyworm larvae were found feeding on corn in southern Indiana on May 30. The larvae found were nearly full grown. Fall armyworms do not overwinter in Indiana and must migrate from southern states each year. Their arrival this year is approximately one month earlier than usual for this pest. This means that we are likely to have one additional generation of fall armyworm compared to normal. The numbers generally increase with each generation, so late summer populations could be quite high.

Fall armyworm moths are attracted to late planted or replanted corn fields. Producers should plan to inspect their corn for larval leaf and whorl damage. Smaller larvae feed on the leaf surface, causing a "window-pane" effect. Whorl feeding by larger larvae appears as ragged-edged holes. Stay tuned for updates in the next few weeks on this potential pest threat.

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Sample Now for Potato Leafhopper - *(John Obermeyer, Larry Bledsoe, and Rich Edwards)* -

- Sample newly seeded or cut alfalfa fields for leafhoppers
- Treatment is preventative rather than curative
- Management guidelines are given

Alfalfa producers should begin sampling their newly seeded alfalfa and regrowth following the first cutting for potato leafhoppers. Surveys in three Tippecanoe County area fields on June 1 revealed that adult leafhoppers are present in very low numbers. Other host plants include potato, garden beans, apple, and redbud trees. Observing leafhoppers or their damage on these plants can also indicate when local populations are increasing.

Potato leafhoppers are small, wedge-shaped, yellowish-green insects that remove plant sap with their piercing-sucking mouth parts. Leafhopper feeding will often cause the wedge-shaped yellow area at the leaf tip, which is referred to as "hopper burn." Widespread feeding damage can cause a field to appear yellow throughout. Leafhopper damage reduces yield and forage quality through a loss of protein. If left uncontrolled for several cuttings, potato leafhoppers can also significantly reduce stands.

Potato leafhopper damage can be prevented by timely application with an insecticide. Treatment is preventative rather than curative. Thus, to effectively prevent economic losses, treatments must be applied before yellowing occurs, and best results are obtained when treating small alfalfa.

The need to treat for leafhoppers can be determined prior to the appearance of damage if fields are surveyed on a regular basis. The resistant alfalfa varieties should also be scouted in early summer, and periodically thereafter, to verify that leafhoppers are not threatening. To assess leafhopper populations, and the potential for damage, take at least 5 sets of 20 sweeps with a 15" diameter sweep net in representative areas of a field. Carefully examine the contents of the sweep net, count the number of adults and nymphs, and calculate the number of leafhoppers per sweep. Use the general guidelines given below to determine the need for treatment. For additional information see Extension Publication E-36, *Potato Leafhopper on Alfalfa* (Rev. 5/98).

Management Thresholds for Potato Leafhoppers

Stem Height in Inches	Average Number Leafhoppers (Adults & Nymphs) Per Sweep
under 3	0.2
4 - 6	0.5
7 - 12	1.0
greater than 12	1.5

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Black Light Trap Catch Report
(Ron Blackwell)

County/Cooperator	5/16/00 - 5/22/00							5/23/00 - 5/30/00						
	VC	BCW	ECB	GC	CEW	FAW	AW	VC	BCW	ECB	GC	CEW	FAW	AW
Clinton/Blackwell	0	1	8	0	0	0	0	1	0	152	0	0	0	3
Dubois/SIPAC	1	0	3	2	1	0	1	0	0	3	0	0	0	2
Jennings/SEPAC	0	0	4	1	0	0	2	0	0	33	0	0	0	0
LaPorte/Pinney Ag Center	0	0	0	0	0	0	7	0	0	7	0	0	0	5
Lawrence/Feldun Ag Center	0	0	4	0	0	0	1	2	0	13	0	1	0	16
Randolph/Davis Ag Center	0	1	0	1	0	0	0	0	1	48	0	0	0	16
Tippecanoe/P.J. Boeve										16				
Whitley/NEPAC	1	0	28	2	0	0	18							

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

Plant Diseases

Wheat Scab Update – (*Gregory Shaner*) –

- A slight increase in scab incidence occurred over the past week

Although the critical period for infection of wheat by the scab fungus, *Gibberella zeae*, is during pollination, inoculation experiments indicate that some infection can occur as late as the early dough stage of development. In last week's newsletter, I reported that incidence of scab was very low in two experimental sites, one in Tippecanoe County and one in Jennings County. Examination of the plots in Jennings County on May 25 still revealed a low incidence of scab. Less than 0.1% of the heads were blighted. Inspection of the plots in Tippecanoe County on May 30 showed a much higher incidence. Based on 40 counts throughout the plot area, slightly fewer than 3% of the heads were blighted. This is a considerable increase over what was seen a week ago. This wheat was flowering from May 12-15. Normally symptoms of scab start to appear within a week of infection, so it is possible that many of these heads were infected after the flowering period. We have been monitoring the numbers of spores of the scab fungus in the air in this experiment. In addition to some peak spore releases during the flowering period, there was another peak about 10 days ago, on May 20. This may have resulted in some infection when wheat was at the watery ripe stage (Feekes stage 10.5.4). An alternative possibility is that the cool temperatures of the past couple of weeks slowed development of symptoms. In any case, scab symptoms are still developing, but I don't think we will see a major outbreak of the disease.

Now is the best time to scout fields for signs of scab, to determine if any is present. Healthy heads are still green so the blighted heads stand out clearly. If the cause of blighting is scab, a portion or all of the head will be bleached, but the neck and foliage should be green. Under humid conditions, a salmon-pink color may be seen at the base of spikelets. Injury by the wheat stem maggot will also produce a white head, but in this case the neck is also white and the head and neck can be pulled from the plant easily. Take-all root rot will also result in white heads, but the entire plant also dies prematurely.

Agronomy Tips

Evaluating Thin Soybean Stands – (*Ellsworth P. Christmas***) -**

- Slow emerging soybeans and thin stands
- Determining stand count in solid seeded soybeans
- Replant decisions

A number of individuals have expressed concerns regarding the slow emergence of soybeans planted in April. Soil temperatures were very cold during the entire month of April, only reaching 60 degrees on the last day of April. These cold soils resulted in very slow emergence with one of my plantings at the Diagnostic Training Center requiring three weeks to emerge. The health of the plants in those fields that I have examined appears to be good with little evidence of rotting of the germinating seed, however, I have also received some reports of root rot diseases thinning soybean stands. A number of the plants that I have examined appear to have had some difficulty emerging as is evidenced by enlarged hypocotyls. These enlarged hypocotyls may be the result of the extended time that the plants have been in the soil or in some cases are the result deep planting, compaction, or soil crusting.

Where crusting, compaction, or deep planting has been a problem and stands are thin, an evaluation of the condition of the plants not yet emerged should be made as soon as possible. This can be accomplished by digging in the field to determine if a significant number of plants have been damaged trying to emerge. Broken hypocotyls will be the most common problem encountered. If it appears that the maximum number of plants have emerged that are going to emerge, then the plant population of the emerged stand needs to be determined. The best method to use with solid seeded or drilled soybeans is the hula-hoop method. This involves the use of a perfectly round circle made of wire or other material including a child's hula-hoop. Determine the fractional part of an acre within the circle by dividing the area of an acre (43,560 sq.ft.) by the radius of the circle (in inches) squared divided by 144. This example is for a circle or hula-hoop having a diameter of 36 inches: 43,560/(((18X18)X3.14)/144) or 6,165. You are now ready to make your stand count by tossing the hula-hoop and counting the number of plants within the hula-hoop. Now multiply number of plants counted within the circle by 6,165 to obtain the number of plants per acre. These counts should be made at several locations within the field to obtain an average for the field or to identify areas within the field that have a particularly poor stand.

Once the actual stand has been determined, you are then ready to decide if the field should be replanted. In

addition to the actual stand, other factors need to be determined including the date of the replant, uniformity of the stand, and any weeds that might be present. A 50% solid stand or 80,000 plants per acre will result in a yield reduction of a full season variety of approximately 4-5%, while a total replant on May 30 will result in a 6% yield reduction assuming that a perfect stand is obtained. In addition to the yield penalties related to reduced stands and delayed planting, the additional costs associated with a replant need to be included. In most years a solid seeded stand of 60,000 plants per acre will give a yield equal to that of a perfect stand replanted on June 10. Both the 60,000 plants from a mid May planting and the June 10 replant will result in a yield reduction of approximately 10 percent. Therefore, in most cases reduced stands of mid May planted soybeans will give an equal or higher yield than a replant and will provide a higher return since the costs of the replant have been avoided. By the time you read this newsletter, the bottom line will be that a uniform stand of 80,000 plants per acre will give an equal to higher yield and a greater profit than a replant.

In some cases, areas within a field may be very thin (less than 60,000 plants per acre) and should be replanted. In these areas, I would suggest that a variety one-half of a maturity group earlier than the one originally planted be used so that these areas and the balance of the field mature at about the same time.

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Isn't Corn Supposed to be Green? - (*Bob Nielsen*) -

- Many causes of discoloration. Some are important, some not

Pick your colors..... Yellow, Purple, Red, and even White. These are the colors that some corn growers are seeing as they walk their corn fields this spring. Given the growing season to date, multi-colored corn is not unexpected. Here's why.

As Mother Nature often reminds us, corn grows and develops best with sunny days and warm temperatures. Indiana has simply not had many days like that so far in the 2000 growing season. Couple that with the fact that a sizeable percentage of Indiana's corn crop was planted on the early side back in early to mid-April when temperatures were even cooler and it is no wonder that many fields are an ugly yellow-green rather than the darker green that we would prefer to see. Warm, sunny days will correct this.

Purpling results from the accumulation of a purple pigment called **anthocyanin**. Whether or not a corn plant produces anthocyanin is determined by the hybrid's genetics. Some hybrids contain more 'purpling' genes than others.

Purple corn is caused by one of two factors. The first factor is simply a genetic response to cool nights following bright, sunny days. Warmer weather will cause the purpling to slowly disappear. The second factor is restricted root development, coupled with an abundance of plant sugars produced by photosynthesis that triggers the purpling.

If the cause of the root restriction is temporary (e.g., cool temperatures), then the purpling should disappear as the plants develop further and yield losses should be minimal, if any. If the cause of the root restriction continues to affect plant growth for some time (e.g., soil compaction, grub feeding), then the purpling may continue for some time and some yield loss may result if the plants become stunted. Remember that the effects of early season damage to the seed or root system can be magnified when corn is already developing slowly due to cool, cloudy weather.

White corn historically was often blamed on the herbicide clomazone (e.g., Command), but can also be caused injury by the herbicide isoxaflutole (e.g., Balance) and by spray drift of glyphosate (e.g., Roundup). Single white plants in a field are usually genetic mutants.

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/chatchew.htm. For other information about corn, take a look at the Corn Growers' Guidebook on the World Wide Web at http://www.kingcorn.org/

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Unusual Twisted Whorls in Corn - (*Bob Nielsen*) –

- Unusual twisted growth of whorls noted in some fields
- Likely caused by sudden return to good growing conditions
- Yield effects are minimal, if any

Whilst walking corn fields recently (like every good corn grower should be doing regularly early in the season, I might add!), I noticed something that I had not seen just a few days ago. Scattered plants throughout the field were exhibiting unusual twisted growth. The whorls of the affected plants were tightly twisted, often bent over severely, and not unfurling on a timely basis.

One's natural instincts would blame the twisted growth on herbicide injury, especially those characterized by the cell growth inhibitor mode of action. Where such herbicides are applied pre-plant or pre-emergence, shoot uptake of the herbicide by the emerging seedling can result in twisted growth. But, in some cases, the cause is something entirely different.

The problem can be related to periods of slow corn growth (typically, cool growing conditions) followed by a sharp transition to periods of rapid corn growth (typically, warm weather plus ample moisture). Such a transition occurred not too long ago.

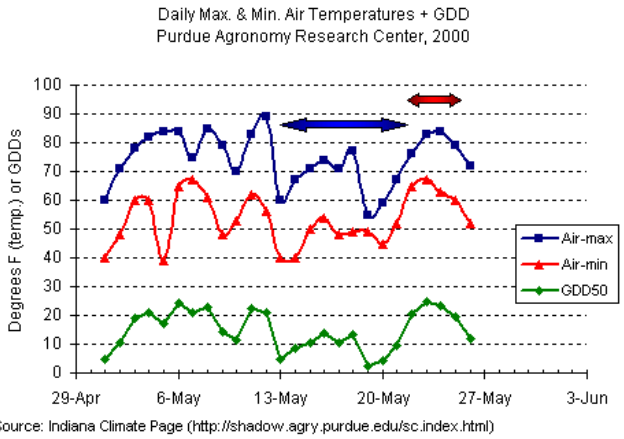
Daily maximum temperatures were less than 80°F during the ten-day period 13-22 May with five of the ten days' daily maximum only in the 60's and 50's. During one 24-hour period, the daily maximum was only 55°F and the daily minimum was 45°F. Seven of the ten days' low temperatures were in the 40's or lower. This cool period was followed by a rapid warmup to daily maximums in the low to mid-80's, coupled with a very strong westerly wind on the warmest day. The combination of slow and fast growing conditions was also exemplified by the range of daily GDD accumulations during the past two weeks.

Certain hybrids react to such a change in growing conditions by basically going 'bonkers'. The upper whorls of the plants don't unfurl properly. Younger leaves deeper in the whorl continue to grow rapidly, but are unable to emerge from the unfurled upper leaves. The now tightly twisted whorl then bends and kinks from the pressure exerted from the younger leaves' continued growth. The growth stage where I've observed this phenomenon in past years was around four to six visible leaf collars (about knee-high).

At the peak of the problem, the appearance of these plants is indeed unsettling and one would think that the whorls would never unroll properly. Given another week, though, the majority of the affected plants do unroll and continue to grow normally. Yield effects from the period of twisted growth will be minimal, if any.

If you didn't notice the twisted growth to begin with, you may notice the appearance of 'yellow tops' across the field after the whorls unroll. The younger leaves that had been trapped inside the twisted upper leaves emerge fairly yellow due to the fact that they had been shaded for quite some time.

In addition to being fairly yellow, the leaves will exhibit a crinkly surface caused by their restricted expansion inside the twisted whorl. Another day or two will green these up and the problem will no longer be visible.



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Flooding and Ponding Damage to Corn - (*Peter Thomison, Ohio State University - With minor edits by Bob Nielsen*) -

(Originally published in OSU's C.O.R.N. newsletter, 30 May)

- Ponding of corn fields can injure corn
- Extent of injury depends on growth stage, duration of ponding and soil temperatures

The recent thunderstorms and heavy downpours that hit parts of Ohio and Indiana during the past week resulted in localized flooding in some corn fields, and

ponding in others. The following are some tips to consider when evaluating possible injury from ponding and flooding.

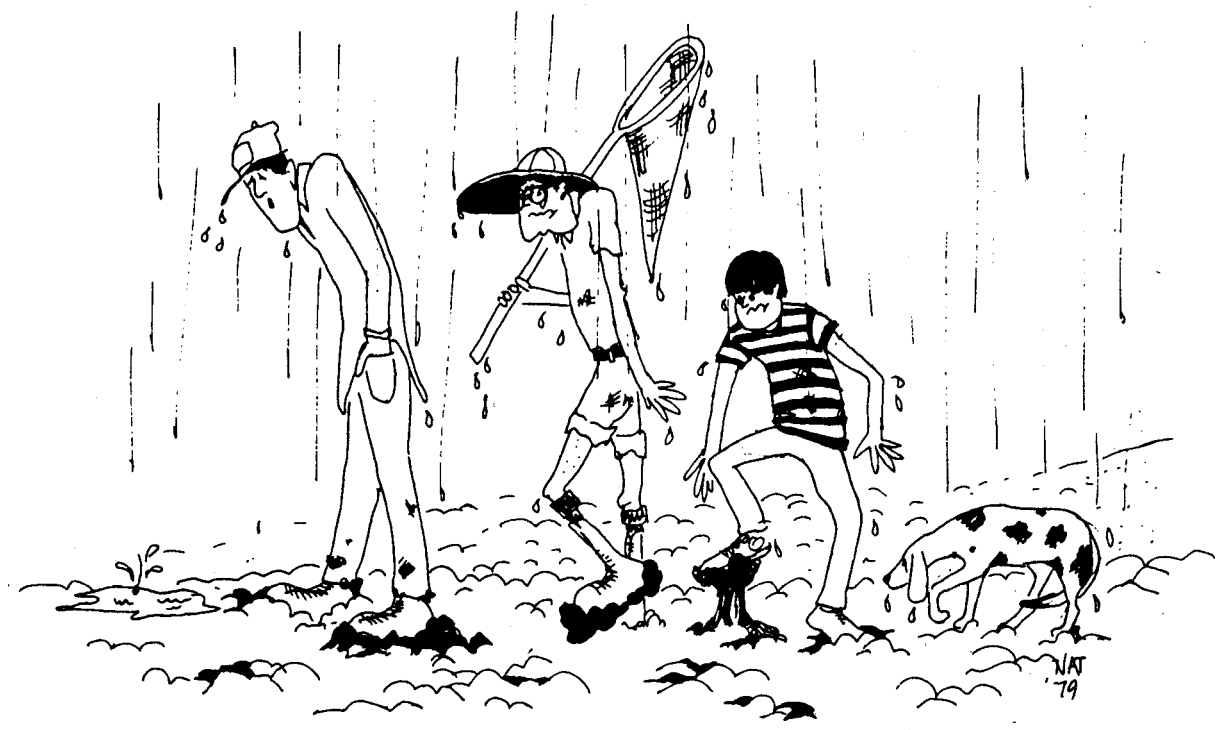
The extent to which flooding injures corn is determined by several factors including: (1) plant stage of development when flooding occurs, (2) duration of flooding and (3) air/soil temperatures. Prior to the 6-leaf stage (measured by visible leaf collars) or when the growing point is near or below the soil surface, corn can survive only 2 to 4 days of flooded conditions. The oxygen supply in the soil is depleted after about 48 hours in a flooded soil. Without oxygen, the plant cannot perform critical life sustaining functions; e.g., nutrient and water uptake is impaired, root growth is inhibited, etc. If temperatures are warm during flooding (greater than 77°F) plants may not survive 24-hours. Cooler temperatures prolong survival. Once the growing point is above the water level the likelihood for survival improves greatly. Corn in southern Ohio and Indiana that had not yet reached the 6-leaf stage, had great potential for flooding and ponding injury.

Even if flooding doesn't kill plants outright, it may have a long term negative impact on crop performance. Excess moisture during the early vegetative stages retards corn root development. As a result, plants may be subject to greater injury during a dry summer because root systems are not sufficiently developed to access available subsoil water. Flooding and ponding can also result in losses of nitrogen through denitrification and leaching.

If flooding in corn lasts less than 48 hours, crop injury should be limited. To confirm plant survival, check the color of the growing point. It should be white to cream colored, while a darkening and/or softening usually precedes plant death. Also look for new leaf growth 3 to 5 days after water drains from the field. Sometimes the growing point is killed by bacterial infections during and after flooding, but plant growth continues in the form of non-productive tillers (suckers).

Additional disease problems that become greater risks due to flooding and cool temperatures are corn smut and crazy top. The fungus that causes crazy top depends on saturated soil conditions to infect corn seedlings. There is limited hybrid resistance to these diseases and predicting damage is difficult until later in the growing season.

Bug Scout



Who said we should scout this field before that little ol' cloud got here?

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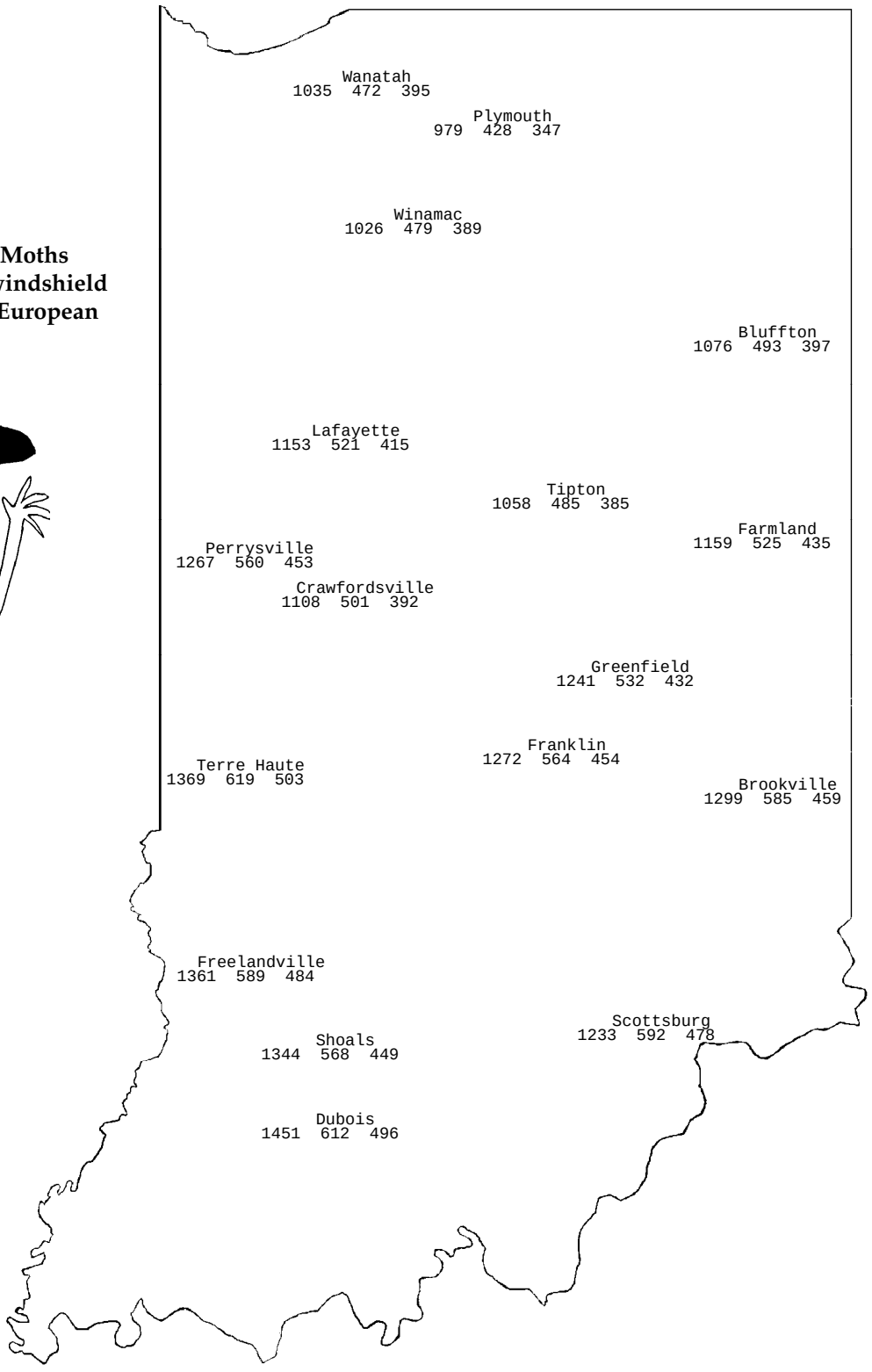
Weather Update

Temperature Accumulations from Jan. 1 to May 31, 2000

MAP KEY
Location
HU41 GDD(5) GDD(35)

HU41 = heat units at a 41°F base from Jan. 1, stalk borer egg hatch at approx. 600, larval movement from grasses to corn at approx. 1,400
GDD(5) = Growing Degree Days from April 15 (5% of Indiana's corn planted), for corn growth and development
GDD(35) = Growing Degree Days from April 30 (35% of Indiana's corn planted), for corn growth and development



Bug Scout says "Moths splattering the windshield at night may be European Corn Borers!"

4" Bare Soil Temperatures 5/31/2000

Location	Max.	Min.
Wtfd Mills	66	64
Wanatah	70	62
Columbia City	66	63
Winamac	70	62
Kentland	70	61
Bluffton	66	61
W Laf Agro	68	59
Tipton	69	53
Farmland	67	58
Perrysville	73	64
Crawfordsville	70	64
Liberty	72	58
Trafalgar	75	62
Terre Haute	74	64
Oolitic	74	696
Dubois	90	65

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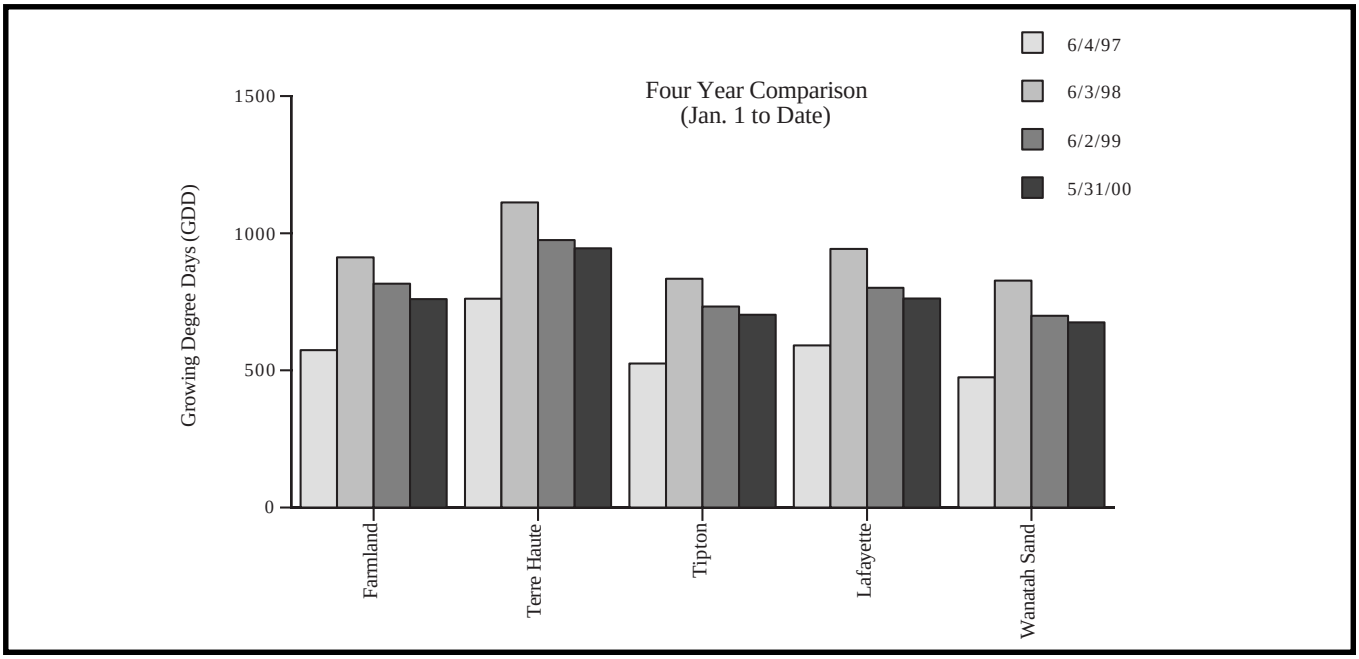

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