Pest & Crop

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Insects, Mites, and Nematodes

Japanese Beetles Emerging - (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) –

- Grub feeding is mostly over, now it's the beetle's turn
- Watch for activity on soybean, and later on corn silks

Larry Caplan, Vanderburgh County Extension Educator, has reported sightings of Japanese beetles around the greater Evansville area as of June 12. Within two weeks, most areas in the state should be seeing this notorious pest. The good news is that the grub stage of this species has, or soon will, stop feeding to pupate and later emerge as an adult.

This year's adults are the result of eggs that were laid by female beetles last summer. After these eggs hatched in 2001, the grubs immediately began to feed on roots and decaying organic matter in the soil. They continued feeding until cold temperatures prompted them to move deeper in the soil profile to overwinter. Early this spring, the surviving grubs returned to near the soil surface to feed. Spring root feeding by the grubs can result in serious damage to early-planted crops, especially corn. With this year's delayed planting, we've not had near the calls concerning grubs feeding on roots as in years past.

Japanese beetles will feed on more than 350 different species of plants, but are especially fond of roses, grapes, smartweed, soybeans, corn silks, flowers of all kinds, and overripe fruit. Beetle damage to cultivated crops is often minimal and defoliation (leaf removal) on soybean looks much worse than it is. The beetles often congregate in several areas of a soybean field, feeding on and mating in the upper canopy. The beetles' iridescent, metallic color catches the attention of those doing "windshield" field inspections. Closer inspections will often reveal that weeds such as smartweed have made fields even more attractive to the beetles. Look for more on this pest in future issues of *Pest&Crop*.

Japanese beetles feeding on soybeans

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Rootworm Sampling - (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) -

- Seedling corn can be damaged by rootworms
- High-risk fields can be evaluated for rootworms
- Treatment guidelines are given

Rootworm larvae have been hatching and seeking corn roots for well over a week. First, the larvae are very small and live mostly within the roots. As they increase in size, so does their appetite. They will feed both within and outside of the roots, causing tunneling and pruning. Though we often associate this damage with corn that is waist high or more, this can occur at all stages of growth. For 2002, it is possible that seedling corn will be damaged, and possibly killed, by rootworm larvae. It would be wise to sample roots of plants in high-risk fields, especially where insecticide efficacy is in question.

Using a shovel to sample for rootworms, lift out the root mass and surrounding soil and place on a dark surface (black plastic garbage bags work well). Carefully break up the clods and sort through the soil. Look for 1/4 to 1/2-inch long, slender, creamy-white larvae with a brownish-black heads and tails. Once the soil has been separated from the root mass, inspect it for root scarring and pruning. You may find the rootworms under the leaf collars that are in close proximity to nodal roots, tear these leaves away to check. Also, you may even observe the rootworms' hind-ends sticking out of roots. Repeat this process with several plants representing different areas of a field. An average of two or more larvae per plant represents a rootworm population that signals the need for a cultivation application.

Insecticides applied after planting must be directed toward the base of plants. It is also important to cultivate the soil near the plants to incorporate the insecticide. Throwing soil up around plants will also promote the establishment of brace roots. A good brace root system will help prevent plant lodging and reduce losses due to rootworm feeding. If a no-till field has an economic population of larvae, placing the insecticide on top of the ground will normally not be effective. The only exceptions might be if the soil insecticide is watered in through irrigation or rainfall (ideally a Ω inch or more). Two liquid soil insecticides, Furadan 4F and Lorsban 4E, are labeled for post-directed applications. If one decides to mix the insecticide with a liquid nitrogen source for a carrier, compatibility checks should be made.

Additional information about rootworms can be found in extension publication *Managing Corn Rootworm – 2002* (Rev. 1/02), available from county extension offices or on the web at <http://www.entm.purdue.edu/entomology/ext/targets/e-series/EseriesPDF/E-49.pdf>.

Tools used for rootworm sampling

Root inspection

Corn rootworm larvae

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Potato Leafhopper Management in Alfalfa - (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) -

- Sample newly cut alfalfa fields for leafhoppers
- If yellowing has already occurred, it is too late to prevent damage this cutting
- Management guidelines are given

Potato leafhoppers are small, wedge-shaped, yellowish-green insects that remove plant sap with their piercing-sucking mouthparts. Leafhopper feeding will often cause the characteristic 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.

Spraying alfalfa with an insecticide is preventative, not curative. Thus, to effectively prevent economic losses, treatments must be applied before yellowing occurs. Usually the best results are obtained when treating recently cut alfalfa, so be sure to sample the alfalfa regrowth.

The need to treat for leafhoppers can be determined prior to the appearance of damage if fields are surveyed on a regular basis. 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 guidelines given below to determine the need for treatment. For insecticides see Extension Publication E-220, *Alfalfa Insect Control Recommendations* – 2002 (Rev. 4/02) which can be viewed at: <http://www.entm.purdue.edu/entomology/ext/targets/e-series/EseriesPDF/E-220.pdf>.

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

Potato leafhopper adult

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Black Light Trap Catch Report
(Ron Blackwell)

County/Cooperator	5/29/02 - 6/3/02							6/4/02 - 6/10/02						
	VC	BCW	ECB	SWCB	CEW	FAW	AW	VC	BCW	ECB	SWCB	CEW	FAW	AW
Clinton/Blackwell	0	0	67	0	0	0	1	0	0	221	0	0	0	1
Dubois/SIPAC	0	1	5	1	0	0	2	0	1	6	1	0	0	1
Jennings/SEPAC	0	0	52	0	0	0	0	0	0	63	0	0	0	1
Knox/SWPAC	1	0	17	15	0	1	1	1	8	11	7	0	0	4
LaPorte/Pinney Ag Center	1	1	3	0	0	0	16	0	0	151	0	0	0	3
Lawrence/Feldun Ag Center	0	0	6	0	0	0	6	1	0	1	0	0	0	2
Randolph/Davis Ag Center	0	0	169	0	0	0	2	0	0	219	0	0	0	8
Vermillion/Hutson	0	0	108	0	0	0	0	0	0	64	0	0	0	0
Whitley/NEPAC	0	0	31	0	0	0	12	0	0	240	0	0	0	5

BCW = Black Cutworm ECB = European Corn Borer SWCB = Southwestern Corn Borer CEW = Corn Earworm
AW = Armyworm FAW = Fall Armyworm VC = Variegated Cutworm

Agronomy Tips

Wet Soil Conditions – Delayed Soybean Planting – (*Ellsworth P. Christmas*) -

- Continued rains equate to delayed soybean planting
- The date is approaching to consider changing to an earlier maturity group of soybean

The Indiana Crop & Weather Report for the week ending June 9, 2002 indicates that more than one-fourth of the acreage intended for soybeans has yet to be planted, about 18 days behind normal. Rain fall reported across Indiana this past week has been more intense across southern Indiana with most reporting stations having one to two inches for the week with some areas receiving one-half to more than an inch since Sunday. In general, total rainfall across the southern one-half of Indiana is running from about 5 to more than 10 inches above normal for the year to date. Soybean planting obviously has been delayed, with only 52% of the acreage being planted in southern Indiana.

Delayed planting has less effect on the yield of soybeans than on corn. Unlike corn, which requires a certain number of growing degree days to mature, soybeans are sensitive to day length and as the day length shortens later in the growing season, maturity speeds up. As a general rule of thumb, for each three days planting is delayed, harvest is delayed one day. Below is a comparison of the yield reduction experienced by corn and soybeans as planting is delayed.

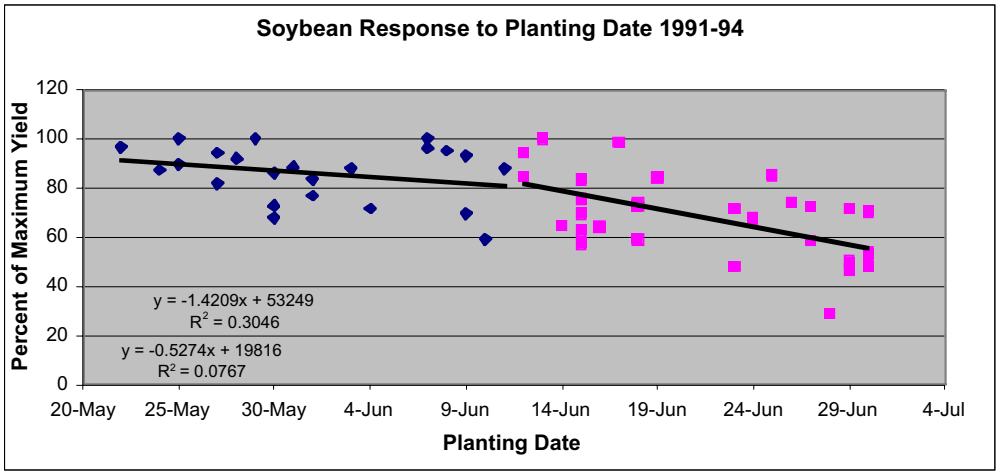
	May 21	May 26	May 31	June 5	June 10	June 30
Corn	5%	8%	13%	19%	25%	
Soybeans	0	2%	4%	7%	10%	38%

As yield levels of soybeans have increased over the past ten years or so, the percentage yield loss has increased slightly. For example, data from a recent study, given in the graph below, indicates that the reductions in yield for May 20 and June 10 are about 0.5% per day. Yield losses for the period from June 11 to June 30 are about 1.4 bushels per day for each day of delay after June 10.

We are approaching the date where planting has been delayed enough to consider changing maturity groups. It is advisable to stay with a full-season variety of soybeans for your particular area until about June 15 in the northern one-fourth of Indiana, June 20 for the central one half of Indiana and June 25 in southern Indiana one-fourth of the state. Full season soybeans will almost always give a higher yield than shorter season varieties for a given geographic area even when planting is modestly delayed.

Once June 15 has been reached in northern, June 20 in central and June 25 in southern Indiana, producers should move from a full season variety of soybeans to a mid season variety for their respective area. This will equate to a change of one-half maturity group assuming that a full season variety is being grown. Additionally, seeding rates should be increased by 15 to 20 percent to promote shading and taller plants to increase podding height and nodes per acre.

A commonly used rule of thumb for a cutoff date to stop planting soybeans is 90 days prior to the first 32 degree frost for a given area within the state. Using a 25% probability, or one in four years of a 32 degree or lower temperature, the magical date for the Bluffton area in northeastern Indiana is June 30, while in the Lafayette area it is July 5. Soybean planting should cease in most of the southern half of Indiana by July 10 except for the southwest corner where planting can occur up to July 15.



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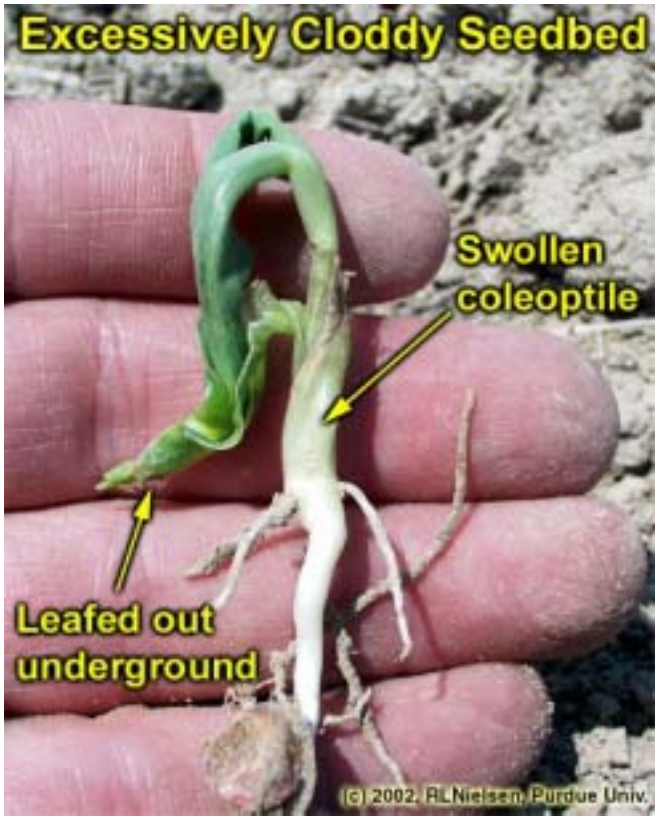
Episode II: Attack of the Clods - (*Bob Nielsen*) -

Cloddy soil conditions are a natural outcome of working ground that is "on the wet side." Heaven knows that Indiana has had its fair share of wet fields during the 2002 planting season that have cloned an impressive number of cloddy seedbeds.

One of the consequences of cloddy seedbeds is poor seed-to-soil contact that results in unsuccessful or uneven germination of the planted kernels. Another consequence is the physical restriction that clods impose on the emerging coleoptile that often results in the leaves emerging from the coleoptile underground before the coleoptile has reached the soil surface. A third consequence, and one that is often overlooked, is the potential limitation imposed by the dry clod environment on the elongation and successful establishment of the initial sets of nodal roots.

Interestingly, the existence of massive numbers of clods does not always result in poor or uneven germination. This is particularly true if the clod seedbed environment remains moist enough to allow for water imbibition and germination of the seed or if timely rainfall occurs following planting that "melts" the clods and improves seed-to-soil contact.

The ability of the clods to physically restrict the emergence of the coleoptile depends on their size and weight plus the degree to which the clods have "cemented" together with subsequent rains. Technically, the clods do not "cause" the seedling to leaf out underground. Rather the effect is indirect as a result of the restriction of the coleoptile emergence. The developing leaves inside the coleoptile rupture through the coleoptile relatively "on schedule." It's just that if the coleoptile emergence through the soil surface has been delayed, the "normal" leafing out occurs below ground rather than above ground. Ditto for the effects of a severely crusted soil surface on corn emergence. A technicality to be sure, but this knowledge may someday win you a trivia contest.



The mid-summer heat and strong drying winds of the first few days of June rapidly dried out the clod seedbed environment in some fields planted in late May at a point in time when the first sets of nodal roots were beginning to elongate. Such fields that did not receive subsequent rainfall from the storms that went through the state on June 4-6 are at risk of developing what is often termed "floppy" corn syndrome.

This rootless condition develops whenever the initial few sets of nodal roots begin their development in a severely dry environment. In some fields, this severely dry environment is represented by the existence of several inches of dry clods at the surface.

During their initial elongation from the stalk nodes, nodal roots are susceptible to desiccation of their root tips under very dry conditions. If the young root tip dries out, that root's growing point dies and the entire young nodal root stops development. Failure of successive sets of nodal roots to develop eventually leads to a rootless condition that either results in seedling death or the survival of plants to a point where they simply "flop over" for lack of support and then die.

When clods are the cause of the dry rooting environment, there is little one can do to ameliorate the situation. Row cultivation will simply toss the clods around, knocking over or burying plants in the process. The only respite for a clod-caused "floppy" corn problem is the occurrence of a good soaking rain to "melt" the clods down and provide a better root development environment.

"May the Force be with you……"

Related References:

Nielsen, Bob. 2001. Be Alert for Floppy Corn [Online]. Purdue Univ. Coop. Extension Service. <http://www.kingcorn.org/news/articles.01/Floppy_Corn-0509.html> (Verified 6/6/02).

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Some Corn Afflicted With TMDS Syndrome - (*Bob Nielsen*) -

A few of the regular patrons of the Main Street Café, at the corner of 1st and Walnut streets, have begun to filter back for their morning coffee and rolls following a couple of weeks of non-stop planting of corn and soybean. As the adrenaline rush slowly fades away, some have been checking out the condition of the few fields that were planted back in late April and early May as well as those that have recently emerged from the late May planting frenzy.

Several individuals are reporting that some of the corn crop is now suffering from a malady referred to as TMDS Syndrome, otherwise known as **T**oo **M**uch **D**ang **S**tress. Severe cases of TMDS merit the substitution of stronger expletives for "dang," but the net result is the same: Corn that is unevenly stunted, putrid light green, yellow, white, and/or striped with interveinal chlorosis; or extensive areas of fields with severe stand loss.

The TMDS Syndrome is most pronounced on sandy knobs or knolls in fields across the northern third of the state where most of the early-planted corn exists this year. Other versions of TMDS occur elsewhere in the state in the lower swales of fields or simply in areas of fields that are slightly lower elevation than the surrounding areas.

The common causal link to all cases of TMDS is the occurrence of multiple stresses and their timing with the developmental stage of the crop. As with good comedy, timing is everything, especially when it comes to the effects of severe early season stress on corn.

Two of my recent articles discussed the importance of early root development in corn and the consequence of stress occurring before stand establishment is complete; i.e., before the nodal roots are well established (see links below). This has been one of those years where multiple stresses have occurred in a time period in which corn has, by and large, not yet been well established. Consequently, the effects have been very dramatic in some fields.

The various stresses to choose from this year include the following. Pick and choose from the list to customize your own list of yield limiting factors thus far in 2002. Combine these stresses with hybrids with less than excellent hybrid vigor, rates of starter fertilizer rates less than optimum, or dangerously low soil pH and the results will be more severe.

1. Excessive rainfall that caused excessive leaching of soil nitrate N, magnesium, and other mobile nutrients below the root zone of young corn plants; especially in sandier coarser textured soils (i.e., those sandy knobs).

2. Excessive rainfall that caused lengthy periods of ponding or saturated soil conditions that quickly results in root death of young corn seedlings.

3. Excessive rainfall that caused severe soil surface crusting that restricted seedling emergence and resulted in leafing out underground.

4. Excessive rainfall leading to significant soil erosion that washed away parts of fields and mudded over other parts of fields.

5. Four to five weeks of cool and wet soil conditions following planting in late April that eventually resulted in significant outbreaks of seedling blight once the seed-applied fungicide "gave up the ghost."

6. Four to five weeks of cool and wet soil conditions following planting in late April that favored the development and activity of certain corn nematodes on some of the sandier soils in northern Indiana.

7. The combination of four to five weeks of cool and wet soil conditions following planting in late April followed by a very rapid transition to mid-summer type temperatures and strong drying winds.

8. Several frost and freeze events that resulted in stand loss or above-ground leaf damage followed by one or more weeks of continued cooler than optimum temperatures that stifled the recovery of the damaged crop.

9. Frequent and lengthy periods of cool, cloudy weather that greatly reduced the rates of photosynthesis.

10. Sidewall and other soil compaction that restricted the initial development of the seminal and nodal root system.

11. Cloddy seedbeds that hindered both germination and early root development of the corn crop.

What management steps can corn growers take in response to these stresses? Unfortunately, most of the damage has already been done. A return to decent corn growing weather (mid-80's and sunshine) will likely do wonders towards improving the appearance of the crop, especially once the root system develops more extensively and is better able to explore the soil environment for nutrients.

With regards to the excessive leaching of nitrogen, magnesium, and other nutrients, there are few certain options. The uncertainty lies with the difficulty in knowing how far the nutrients have leached. If not deeply, then the crop may still access them once its root system develops more extensively. Consequently, "rescue" applications of nitrogen or magnesium fertilizers may indeed cause a rapid greening of the crop, but may not result in increased yields.

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

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More on "Late" Applications of Nitrogen to Corn – (*Peter Thomison, Ohio State University*) -

Persistent rains this year may force many growers to sidedress their nitrogen (N) in corn this year much later than what is considered normal. Other growers may be supplementing their earlier N applications to replace N lost from denitrification and leaching. The following are some suggestions from extension soil fertility specialists at Ohio State and Purdue University from past years that address various questions concerning N applications to corn after planting.

HOW LATE CAN N BE APPLIED? Corn utilizes large quantities of N during the grand growth stage. From the 8 leaf stage through tasseling N uptake is 4 to 8 pounds per day. For most corn hybrids N uptake is complete shortly after pollination. So, most of the N should be applied prior to the 10-leaf stage, with any supplemental applications complete by or shortly after tasseling. Under conditions of severe N deficiency, some response would be expected to low rates of N (30 to 60 pounds) as late as three weeks after pollination.

WHAT IS THE BEST N SOURCE TO USE? Ammonia or N solutions knifed in, or ammonium nitrate over the top are preferred in most situations, especially high residue fields. Granular urea can also be applied over the top in clean tilled situations. Both granular urea and ammonium nitrate broadcast in standing corn will cause some foliar burn when granules fall into the whorl. While it may appear unsightly, little yield decrease normally occurs if the fertilizer is applied prior to the 10-leaf stage.

HOW MUCH N SHOULD BE APPLIED? If the corn has gotten too tall to sidedress by this point (late June and early July), it has probably not been severely stressed and yield potential is still good. An example would be rotation corn after beans which had some starter or 28% applied with herbicides with good green color. Supple-

mental N rates at this point should probably be in the 0.5 to 0.7 pounds N per bushel of expected yield.

CAN I BROADCAST UREA AND 28-0-0 SOLUTIONS "OVER THE TOP"? Using broadcast applications of urea and 28% N solution to sidedress N will cause some burn to foliar tissue of corn plants. Damage results when urea granules or 28% UAN solution get inside the leaf whorl of corn plants.

The severity of injury is determined by the plant's stage of growth, the amount of N used and form of N. If the plant growing point is at or below the soil surface (or when plant has six collared leaves or less), the extent of foliar injury caused by burn will usually be negligible if the N rate is kept below 50 lb/acre. Even with higher N rates at later vegetative growth stages the injury from leaf burn is normally not so severe that it outweighs the potential benefits received from the N addition. The degree of this plant burning is less with urea granules than with other N products.

Dribbling 28% solution with drop nozzles as a narrow band on the soil surface is an alternative approach that can help reduce foliar burning. Dribbling 28% is also a more efficient use of N than broadcast surface application because it helps reduce N volatilization.

CAN I APPLY N TO EVERY OTHER ROW? Research in Indiana, Illinois and Iowa has all shown that farmers can knife ammonia or N solutions in every other row middle (60 vs. 30 inch spacing) with no reduction in yield. The only caution is that extra attention must be paid, especially in wet conditions that no knives plug with soil. A plugged knife in 60 inch spacing gives 4 rows with no N and will seriously reduce yields.

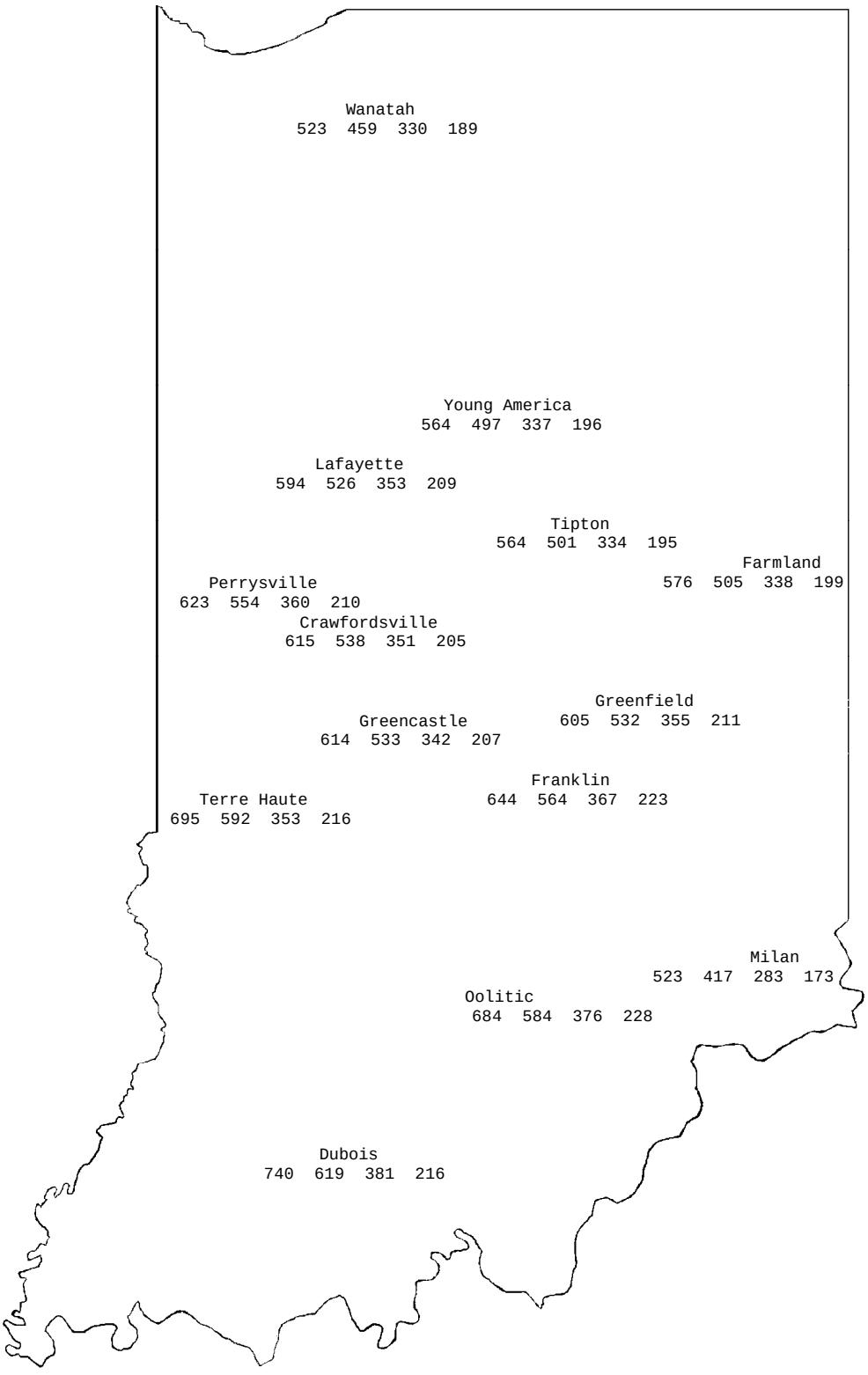
C.O.R.N. Newsletter, 6/11/02

Weather Update

MAP KEY
Location GDD(2) GDD(10) GDD(43) GDD (75)

Temperature Accumulations from Jan. 1 to June 12, 2002

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
GDD(43) = Growing Degree Days from May 26 (43% of Indiana's corn planted), for corn growth and development
GDD(75) = Growing Degree Days from June 2 (75% of Indiana's corn planted), for corn growth and development



4" Bare Soil Temperatures 6/12/02

Location	Max.	Min.
Wanatah	81	72
Columbia City	78	67
Winamac	79	70
W Laf Agro	76	70
Tipton	74	72
Farmland	76	66
Perrysville	74	73
Crawfordsville	69	66
Terre Haute	85	73
Vincennes	78	67
Oolitic	77	73

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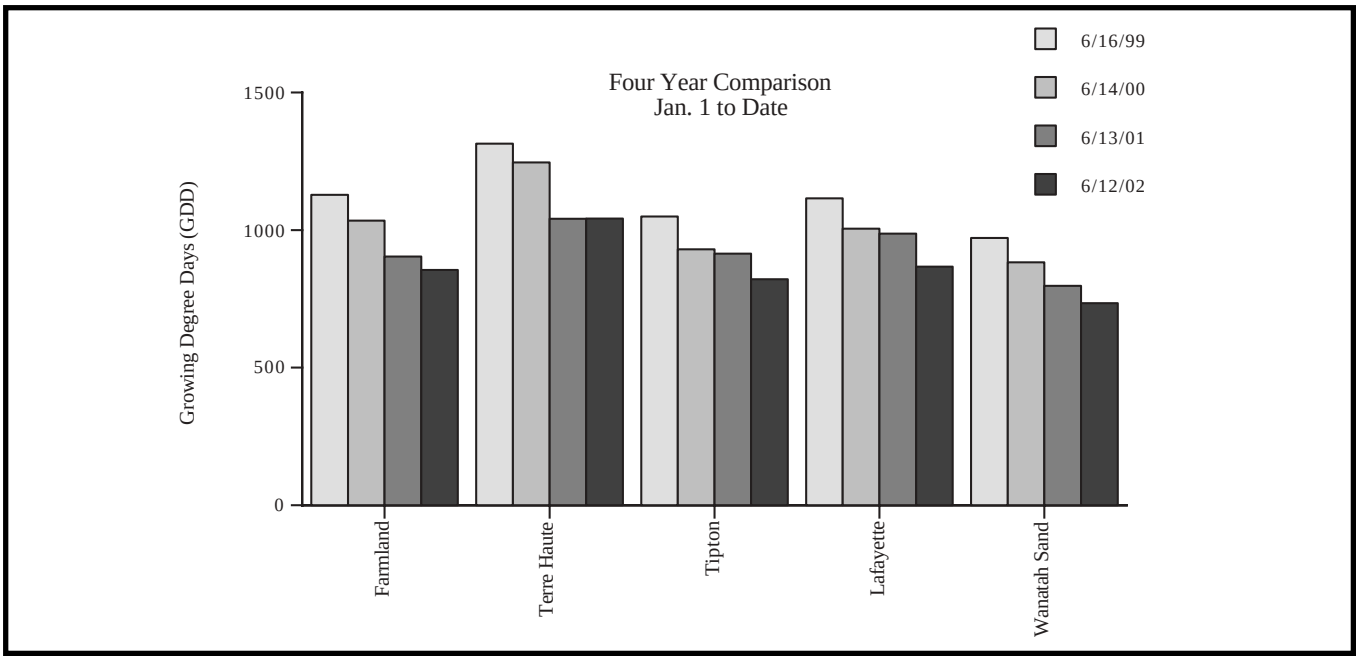

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