Pest & Crop

August 16, 2002 - No. 22

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Insects, Mites, and Nematodes

Soybean Growth Stage Critical to Late Season Insect Control Decisions - (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) –

- R5 and R6 soybean are still worth protecting
- Consider thresholds for spider mites and insect defoliators
- R7 soybean will no longer increase in seed size

Spider mites are starting to come on strong in some moisture stressed soybean fields, especially in eastern Indiana. As well, scattered reports of grasshopper damage continue to be received. Many producers seem unwilling to put any more money into this year's crop to protect the yield potential. Many growers are convinced that these fields are beyond hope. However, the stage of development of most of these plants indicates that there is still hope for seed filling. This is especially true for those fields that received recent rains.

Treatment decisions for spider mites or insect defoliators should be based on the crop's growth stage (refer to *Pest&Crop* #19 and 20). Throughout the state, soybean growth is at the point considered by many to be "pretty far along." However, this does not precisely describe stage of soybean development. Incorrectly identifying the growth stage can make the difference between unjustified pesticide applications and a considerable loss in yield.

The following soybean growth stages are determined by looking at one of the four uppermost nodes on the main stem.

R5 - (beginning seed) - The pods are flat because the seeds are very small (1/8'). Leaf tissue is beginning to pump photosynthates into the pod. Insect defoliation of 15-20% should be considered as economic. Remember, this is average defoliation for the whole plant!

R6 - (full seed) - The pods are plump and the seeds are called "green beans" or "butter beans." Defoliation is still of concern because seed fill is now maximizing in all pods. However, not as many photosynthates are required, so insect defoliation of 25% or greater should be considered economic.

R7 - (beginning maturity) - The pods are beginning to yellow. Once a pod begins to lose its green color, no more seed fill will occur. Foliage will also begin to yellow, thus there is no need to protect the plants from spider mites or insect defoliators.

See Ellsworth Christmas' article "Dought Soybeans Still Have a Chance," in the **Agronomy Tips** for further information on the status of this year's soybean crop.

R5 soybean pods

R6 soybean pod

Black Moths Around the Farm - (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) -

Most likely you have seen some black moths flying around farms, homes, and yards. These moths are actually mottled grayish-black and when at rest they have the shape of a stealth fighter jet. These are likely the adult green cloverworm (Noctuidae: *Plathypena scabra*).

The slender green caterpillars feed on soybean foliage, as well as alfalfa, clover, and other leguminous plants. Normally, fungal pathogens, as well as insect parasites and predators, keep green cloverworm populations below economic levels. This year's drier weather likely hampered these natural controls and allowed the cloverworms to increase in number. The result is lots of the black moths flying around lights and residences.

These moths are only a nuisance and will not harm people, houses, or yards. The moths will pass the winter in leaf litter and/or other sheltered areas and next spring will emerge and begin egg laying in fields.

Green cloverworm parasitized by wasp

Green cloverworm moth

Some Reports of Corn Borer Moth Splattered Wind Shields – (*John Obermeyer*) – We've received some reports of significant European corn borer moth flights in northwestern and west central counties of Indiana. This will not be a problem for most corn, as many fields are in the milk to early dough stage of development and not very attractive to moths. It does indicate that late planted and/or late pollinating fields should be monitored for egg laying and larval activity. This is especially important in seed production fields or late market sweet corn.

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Black Light Trap Catch Report
(Ron Blackwell)

County/Cooperator	7/30/02 - 8/5/02							8/6/02 - 8/12/02						
	VC	BCW	ECB	SWCB	CEW	FAW	AW	VC	BCW	ECB	SWCB	CEW	FAW	AW
Clinton/Blackwell	0	0	92	0	0	0	0	0	0	416	0	8	4	10
Dubois/SIPAC	0	3	0	0	2	0	5	1	6	0	0	3	2	1
Jennings/SEPAC	0	0	0	0	0	0	0	0	1	22	0	4	0	0
Knox/SWPAC	4	1	7	0	0	0	7	0	3	7	0	0	0	3
LaPorte/Pinney Ag Center	0	0	37	0	0	0	1	0	0	323	0	0	0	8
Lawrence/Feldun Ag Center	0	2	0	0	0	0	1	0	3	3	0	3	2	3
Randolph/Davis Ag Center	0	0	25	0	0	0	5	0	0	44	0	0	0	7
Vermillion/Hutson	0	0	10	0	0	0	0	1	1	4	0	0	0	1
Whitley/NEPAC	0	2	25	0	0	0	7	0	0	345	0	0	1	0

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

Weeds

Feeding and Grazing Restrictions for Corn and Soybean Herbicides – (*Glenn Nice, Thomas Bauman, and Tom Jordan*) -

If you do this regularly or have made the decision to use corn or soybean as a forage or to graze it there are some important things to keep in mind. If planed from the beginning, herbicide grazing, forage, and hay restrictions have been part of the planning process. However, if this has been decided after the herbicide applications, the restrictions should be investigated. The table on the next page has been adapted from the Agriliance Crop Protection Guide for 2002.

Table 1. Herbicide grazing and harvest for forage restrictions. Days after application are based from last application (this may be a PRE if a POST is not offered). Harvest aid applications are not included. See specific labels for use directions and further restrictions. Some herbicides listed are labeled only for transgenic crops.

		Days after application	
Herbicide	**Crop**	**Forage**	**Grazing**
A			
Accent	corn	30	30
Accent Gold	corn	85	85
Aim	corn	no restriction*	no restriction*
	soybean	do not	do not
Assure II	soybean	do not	do not
Atrazine	corn	21	21
Axiom	corn	no restriction*	no restriction*
	soybean	do not	do not
B			
Backdraft	soybean	do not	do not
Balance Pro	corn	no restriction*	no restriction*
Banvel	corn	not until mature grain stage	not until mature grain stage
Basagran	corn	12	12
	soybean	30	30
Basis	corn	30	30
Basis Gold	corn	30	30
Beacon	corn	30	30
Bicep II Magnum, Bicep Lite Magnum	corn	30	30
Boundry	soybean	40	40
Buctril / Moxy	corn	45	45
Buctril + Atrazine	corn	45	45
Bullet / Lariat	corn	21	21
Butyrac 200	soybean	60	60
C			
Callisto	corn	no restrictions*	no restriction*
Canopy XL	soybean	do not	no restriction*
Clarity	corn	wait till milk stage	wait till milk stage
Classic	soybean	do not	do not
Cobra	soybean	do not	do not
Command 3 ME / Command Extra	soybean	do not	do not
Celebrity Plus	corn	32 (forage)72 (stover)	32 (forage)72 (stover)
Connect	corn	45	45
Curtail	corn	40	40
D			
Define	corn	no restriction*	no restriction*
Degree	corn	no restriction*	no restriction*
Degree Extra	corn	no restriction*	no restriction*
Distinct	corn	32 (forage)72 (stover)	32 (forage)72 (stover)
Domain	soybean	do not	do not
Dual II Magnum	corn	30	30
	soybean	no restriction*	no restriction*
E			
Exceed	corn	30 (forage)40 (silage)	30
Extreme	soybean	do not	do not

Herbicide	Crop	Days after application: Forage	Days after application: Grazing
F			
FirstRate / Amplify	soybean	14	no restriction*
Fieldmaster	corn	56	56
Flexstar / Reflex	soybean	do not	do not
Frontier / Outlook	corn	40	40
	soybean	do not	do not
Fultime	corn	no restriction*	no restriction*
Fusilade DX	soybean	do not	do not
Fusion	soybean	do not	do not
G			
Gauntlet	soybean	do not	do not
Glyphomax Plus	corn	50	50
	soybean	56	56
Gramoxone Max / Boa	corn	no restriction*	no restriction*
	soybean	wait till R3 stage**	wait till R3 stage**
Guardsman Max / Leadoff	corn	40	40
H			
Harmony GT	soybean	do not	do not
Harness Xtra	corn	no restriction*	no restriction*
Hornet	corn	0	0
L			
Laddok S-12	corn	21	21
Liberty / Liberty ATZ	corn	60	60
Lightning	corn	45	45
Lorox	corn	no restriction*	no restriction*
	soybean	do not	do not
M			
Marksman / Sterling Plus	corn	wait until milk stage	wait until milk stage
Micro-Tech / Partner / Lasso	corn	no restriction*	no restriction*
N			
Northstar	corn	30 (forage)45 (silage)	30
P			
Permit	corn	30	30
Phoenix	soybean	do not	do not
Poast / Poast Plus	corn	45	45
	soybean	do not	do not
Princep / Simazine	corn	do not	do not
Prowl / Pendimax	corn	21	21
	soybean	no restriction*	no restriction*
Pursuit / Pursuit Plus	corn	45	45
	soybean	do not	do not
Python	corn	0	0
	soybean	do not	do not
R			
Ramrod 20G	corn	no restriction*	no restriction*
Raptor	soybean	do not	do not
Readymaster ATZ	corn	56	56

Herbicide	Crop	Days after application	
		Forage	Grazing
R			
Resource	corn	28	28
	soybean	do not	do not
Roundup Weather Max	corn	50	-
	soybean**	25 after preharvest in conventional soybean 14 after preharvest for Roundup Ready	25 after preharvest in conventional soybean 14 after preharvest for Roundup Ready
S			
Scepter	soybean	do not	do not
Select	soybean	do not	do not
Sencor	corn	60	60
	soybean	40	40
Spirit	corn	30 (forage)40 (silage)	30
Squadron	soybean	do not	do not
Steadfast	corn	30	30
Stellar	soybean	do not	do not
Stinger	corn	40	40
Storm	soybean	do not	do not
Surpass	corn	no restriction*	no restriction*
Synchrony STS	soybean	do not	do not
T			
TopNotch	corn	no restriction*	no restriction*
Touchdown	corn	50	50
	soybean	do not	do not
Tough	corn	68	68
Trust / Treflan	corn	42	42
	soybean	no restriction*	no restriction*
Typhoon	soybean	do not	do not
2,4-D	corn	7	7
U			
Ultra Blazer	soybean	do not	do not
V			
Valor	soybean	do not	do not

No restrictions are addressed on label.
** For burndown applications, any other application, do not feed as forage or graze.

*** Days after POST application could not be found on the label.

Plant Diseases

Soybean Sudden Death Syndrome – (*Gregory Shaner*) –

- SDS has been seen or reported in several areas of northern and central Indiana

Scott Abney, a USDA soybean pathologist at Purdue, reports that sudden death syndrome is present in a few fields and in his research plots in central and northern Indiana. Ron Blackwell, the state survey specialist, saw a field with severe SDS in Pulaksi County. The disease seems to be evident only on the most susceptible varieties at the present time. Because of widespread epidemics of SDS in the years 1998 and 2000, it is likely that soil in many fields planted to soybeans this year is infested with the SDS fungus, *Fusarium solani* f. sp. *glycines*. Even though the fungus may be in a field, SDS may not appear. Early season growing conditions and rainfall during early reproductive stages have a strong influence on the development of SDS. Fields that receive a soaking rain when the beans are flowering or filling pods are more likely to develop SDS.

SDS is usually first recognized when leaf tissue between the major veins turns yellow, then brown. Soon, the leaflets die, shrivel, and often drop off, leaving the petioles (leaf stalks) attached. Inspection of the lower stem and taproot can help to confirm the diagnosis of SDS. Plants with SDS will have a dark cortex, but white pith. Brown stem rot can cause similar foliar symptoms, but the split stem will reveal dark pith, but normal cortex.

Agronomy Tips

FEARMONGER ALERT: Scout Stressed Fields for Root & Stalk Rots - (*Bob Nielsen*) –

- Severe stress during grain fill can predispose corn to stalk rot development
- **Scout stressed areas of fields for possible root or stalk rot development**

The 2002 growing season has been anything but kind to the Indiana corn crop. The delayed planting season put the crop behind the proverbial 8-ball from day one. Various combinations of stresses (including soil compaction, corn rootworm injury to roots, initially wet soils, and eventually dry soils) subsequently affected crop development throughout the summer months. Areas of the state are still in the grip of unusually dry weather that is limiting the photosynthetic ability of the corn plant "factory" during the important grain filling period.

What triggers this fearmonger alert is the fact that corn under such photosynthetic stress during grain fill tends to cannabilize and remobilize a portion of its stalk carbohydrate reserves to satisfy the physiological demands of the developing kernels. The subsequently lower stalk carbohydrate concentrations, plus the fact that root health may be suffering from the season-long stresses plus the current dry soil conditions and the limited carbohydrates available for maintenance of root tissue, increases the susceptibility of the crop to infection by various root and stalk rot organisms.

While I've not heard of any significant discoveries of stalk rot yet in this year's crop, I nonetheless believe folks should spend some time walking fields during the next several weeks and inspecting the condition of the roots and lower stalks to confirm whether the problem is developing. Fields where root or stalk rots are discovered should be scheduled for early harvest relative to other fields with better stalk health in order to minimize the risk of significant mechanical harvest losses due to downed corn.

The inspection techniques are simple. Where plants appear to be healthy, dig up a few plants, shake or wash off the soil from the root ball, and inspect the roots for obvious discoloration or death from root rot diseases. Split the lower stalk and look for obvious discoloration or deterioration of the inner stalk tissue. Where the plant appearance itself suspiciously suggests diseased stalk tissue, squeeze the lower stalk. If it collapses easily, you've got trouble. If you cannot squeeze it easily, you're probably okay for now.

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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Doughty Soybeans Still Have a Chance - (*Ellsworth Christmas*) -

Soybeans are entering an important growth phase. Plants are now filling pods with seeds. Unfortunately, more than two-thirds of the soybean fields aren't getting the moisture necessary to progress normally. It depends on where you're located in the state as to the condition of the crop. The soybeans in east central Indiana are very dry and under tremendous stress. They're still very, very short, the plant canopy has not closed, and with the moisture stresses that we have we're seeing quite a bit of floral — and some pod — abortion in those fields. On the other hand, west central Indiana has received good rainfall during July and the soybeans look very good at this time.

We are in desperate need of 2 to 3 inches of rain within the next week for the soybeans to resume normal growth. Soybeans, like corn, need an inch of rain per week during critical growing phases. It's not too late to turn this crop around. There is still time for the beans to flower and set pods, but we need the rains rather quickly for that to occur. If we do have adequate rain for normal growth to resume, we're going to need the rain to carry through to at least the second week of September. We normally say August, but with the late planting of this year's crop we need rain through the first two weeks of September to give us a reasonable yield.

Yield is determined by the number of pods for a given area, the number of seeds in those pods and the weight of the seed within the pod. Stresses at reproductive stages 3 and 4 can reduce the number of pods. Stresses at reproductive stages 5 and 6 can reduce the number of seeds within the pod, and also can reduce the size of the seed. If any one of those things occurs, it'll have a negative impact on the final yield.

Dry conditions are hurting soybeans in another way. Spider mites are thriving on hot, parched crops. Farmers should monitor their fields for outbreaks. Nutrient deficiency also is a problem, some have reported a lot of fields that tend to be yellowing. Under those conditions look for two things. First of all, look for the possibility of soybean cyst nematode that may be restricting the root system, particularly if the deficiency symptoms appear to be a potassium deficiency. The other element that's causing the yellowing is manganese deficiency. It tends to be more severe on our sandier, well-drained soils. If deficiency symptoms appear, about the only solution is an application of one pound of elemental manganese per acre, as a foliar application.

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Drought-Damaged Corn as Livestock Feed – (*Kern Hendrix, and Keith Johnson, Department of Agronomy*) -

Hot, dry July weather is taking its toll on the corn crop in many areas of Indiana.

Cattle producers may be harvesting drought-stressed corn as silage this year in order to salvage some value and to supplement potentially short winter feed supplies.

Following are some factors producers should consider prior to and during harvesting of drought-stressed corn.

Crop Insurance. Contact the company or a representative so that the crop can be appraised prior to harvest.

LDP Program. If participating in the LDP (Loan Deficiency Payment) program, producers should contact their Farm Service Agency Office regarding field(s) to be harvested for silage so that yield estimates can be determined.

Check Pesticide Labels. Before using any stressed corn for feed, be sure to note the harvest restrictions for any herbicides and insecticides. Check the pesticide label or consult your chemical supplier for details. This is especially critical with an early silage harvest.

Harvesting as Whole Plant Silage. Feeding value of drought-stressed corn is influenced by several factors, but in general is higher than expected. Most studies indicate feed value of drought-stressed corn to be 80 to 100% that of normal silage. Purdue studies conducted with stressed corn indicated little or no difference in feedlot gain or in milk production when beef and dairy cattle were fed normal or stressed corn silage. As a rule, drought-stressed corn will have slightly more fiber resulting in less energy, but one to two percentage units more protein than normal silage.

One of the most important factors influencing feeding value, is moisture content at harvest. Ideally, the crop should contain 60-70% moisture at harvest. For up-right silos, to avoid seepage, harvest at 60-65%, whereas for bunker silos, harvesting at 65-70% moisture will result in better packing and storage qualities.

The tendency will be to harvest too soon, resulting in silage with excess moisture, poor fermentation and reduced feed value. Stalks of plants with many or most leaves turning brown will contain considerable moisture. Also, stalks with small ears and little or no grain content will be higher in moisture. Normal harvest indicators such as kernel milk line and black layer may not apply in stressed corn.

A quick way to determine if the plant contains too much moisture is to hand-squeeze a representative sample collected from the forage chopper. If water drips from the squeezed sample, the corn is too wet for ideal fermentation. Moisture content may also be determined using a microwave: <http://www.agry.purdue.edu/ext/forages/publications/ID-172.htm>.

What About Nitrate Content? Stressed corn can have elevated nitrate levels. However, samples collected from previous drought years indicated nitrates were not a problem in most cases. For example in 1988, based on 70 fresh corn samples, only 18% contained toxic levels of nitrate. In contrast, 71% of the sorghum-sudan grass samples contained toxic levels of nitrate.

Quantitative laboratory analyses for nitrate can be performed at the Purdue University Animal Disease Diagnostic Laboratory (ADDL). Cost is $15.00 per sample plus $7.00 accession fee per individual each time samples are submitted. A one-quart size sample of chopped forage is adequate. Samples should be submitted in paper bags or cardboard boxes, not in sealed glass or plastic containers. Names and addresses of other laboratories to obtain nitrate tests can be found at <http://www.ansc.purdue.edu/beef/Hendrix/ForageNitrate.html>.

Also, during the fermentation process, 40 to 60 percent of nitrates will be eliminated. Keep in mind, however, that various nitrogen oxide gases produced during the fermentation process are highly toxic to humans and livestock. For the first three to four weeks after ensiling, do not enter a silo without first running the blower for 15 to 30 minutes.

Harvesting for Green Chop. In cases where pasture and stored feed supplies are getting short, producers may wish to consider green-chopping corn for feed. There are two major concerns with this practice. One is the potential for nitrate toxicity and second is the potential to founder animals. To avoid these problems: (1) raise the cutter bar to 12 inches or so the first few days of chopping, (2) gradually introduce animals to green chop, (3) use other feeds that are low in nitrate as part of the ration, (4) feed green chop in small quantities throughout the day rather than large quantities once per day, (5) don't allow green-chop forage to set on a wagon overnight, (6) feed two to three pounds of grain with high nitrate feeds, (7) nitrate levels tend to increase for two to three days following rain, thus take extra precautions during this time period, (8) as plants mature, nitrate levels decline, also animals become acclimated, thus chances for toxicity decrease with time.

Selling or Buying Drought-Damaged Corn. Normally, whole plant corn silage (65%) moisture per ton is valued at 9-10 times the price of a bushel of corn, including harvest and storage costs (i.e. $2.50/bu = $22.50 to $25.00/ton of silage). Standing corn should be discounted $5.00 to $7.00/ton to account for harvesting costs. Discounts due to lower feed value should range from 0 to no more than $4.00 per ton.

Moisture content will greatly influence pricing. For example, let us assume a value of $24.50 per ton of 65% moisture has been established. Each ton at 65% moisture contains (2000 x .35) = 700 lbs of dry matter. Value per cwt of dry matter = $24.50 ÷ 7 = $3.50. If, however, moisture content is 70%, then each ton contains only 600 lbs of dry matter. To have comparable value, this silage should be priced at $21.00 (6 x $3.50) per ton. On the other hand, if moisture content was 60%, then a comparable price would be (2000 x .40 = 800; 8 x $3.50 = $28.00 per ton).

Yield per acre will vary greatly with moisture content and with grain yield. At 65% moisture, normal yields would be one ton for each seven to eight bushels of grain. However, with stressed corn, and grain yields in the 50 to 75 bushel per acre range, assume one ton of silage for each five bushels of grain. If stalks are mostly barren, an estimate is one ton per foot of stalk, excluding the tassel.

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Forage Nitrate Testing and Making Feeding Recommendations Based on the Results – (*Kern S. Hendrix, Department of Animal Sciences*) -

Several areas of Indiana have experienced lack of adequate rainfall in the early-mid summer growing season this year.

The normal process for conversion of nitrate (NO_3) into plant proteins can be slowed when plants are subjected to stress such as lack of moisture. As a result, excess nitrate can accumulate. Forages such as corn, sorghum, and sudangrass are most likely to accumulate nitrate followed by oats and other small grain crops, followed by grasses. Legumes are less likely to accumulate nitrate. In all cases, the lower stem of plants is where the greatest nitrate levels are found. Forage feeding method influences the degree of risk from nitrate toxicity. Feeding greenchop forage is the highest risk followed by grazing, followed by hay. Silage feeding is the least risk, as significant amounts of nitrates are lost or converted to other compounds during the ensiling process.

If there is concern about the possibility of elevated nitrate levels in forage crops, cattle producers may wish to have a nitrate analysis done.

Fresh, dry or ensiled samples may be submitted for assay. Submit one to two quarts of chopped forage in unsealed paper or plastic bag(s). Listed below are names and addresses of laboratories that perform nitrate assays on forages. Cost will be in the range of $10.00 to $15.00 per sample. Turnaround time is within a few days in most cases. For shipping, it is recommended to use a carrier that provides next-day delivery service.

Laboratories may report results differently. It is important that results be evaluated on a dry matter rather than as-fed basis. Methods in which nitrate levels are commonly expressed and recommendations for feeding are shown in the table "Cattle Feeding Guidelines for Forages Containing Varying Levels of Nitrate".

Animal Disease Diagnostic Laboratory, 1175 ADDL, Purdue University, West Lafayette, IN 47907-1175, Phone: 765-494-7440 FAX: 765-494-9181

A&L Great Lakes Laboratories, 3505 Conestoga Drive, Ft. Wayne, IN 46808-4413, Phone: 260-483-4759

Sure-Tech Laboratories, 2435 Kentucky Avenue, Bldg. 9, Indianapolis, IN 46221, Phone: 317-243-1502 FAX: 317-243-1509

Cattle Feeding Guidelines for Forages Containing Varying Levels of Nitrate[1]

Method of Reporting Nitrate Level			Recommendations For Feeding
Nitrate (NO_3)	NitrateNitrogen (NO_3-N)	PotassiumNitrate (KNO_3)	
Percent of Forage Dry Matter			
0.0 - 0.44	0.0 - .10	0.0 - 0.73	Safe to feed in all situations.
0.44 - 0.66	0.10 - 0.15	0.73 - 1.10	Safe for non-pregnant animals. Limit to 50% of diet dry matter for pregnant animals.
0.66 - 0.88	0.15 - 0.20	1.10 - 1.47	Limit to 50% of diet dry matter.
0.88 - 1.54	0.20 - 0.35	1.47 - 2.57	Limit to 35-40% of diet dry matter. Avoid feeding to pregnant animals.
1.54 - 1.76	0.35 - 0.40	2.57 - 2.93	Limit to 25% of diet dry matter. Avoid feeding to pregnant animals.
over 1.76	over 0.40	over 2.93	**DO NOT FEED**

To convert from parts per million (ppm) to percent, move the decimal point four places to the left (i.e., 8800 ppm = 0.88%).

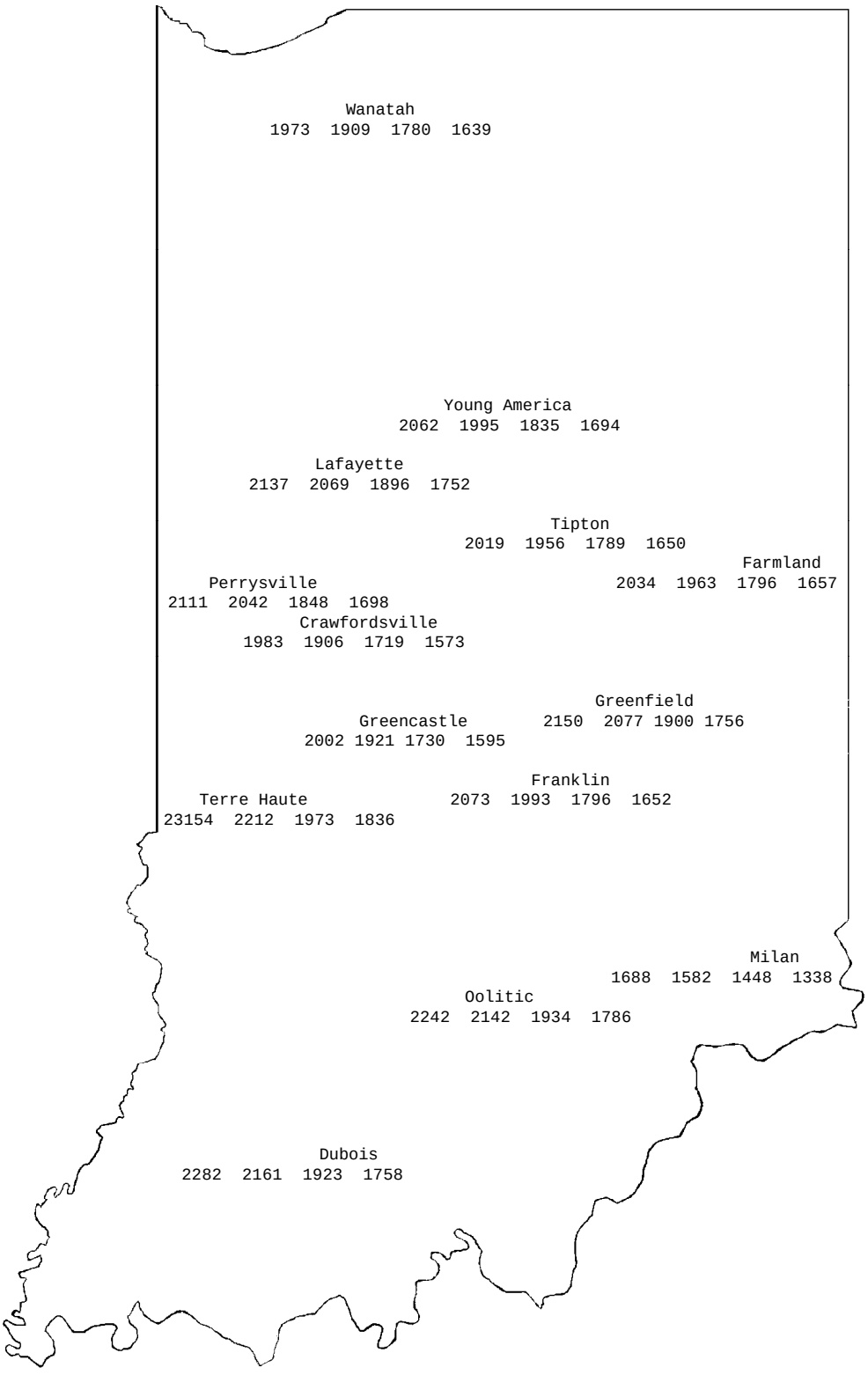
[1] Source: Sniffen, C.J. and L.E. Chase. 1981. Nitrates in Dairy Rations, Department of Animal Science, Cornell University.

Weather Update

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

Temperature Accumulations from Jan. 1 to August 14, 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 8/14/02

Location	Max.	Min.
Wanatah	91	75
Columbia City	86	71
Winamac	81	72
W Laf Agro	85	77
Tipton	81	77
Farmland	86	771
Crawfordsville	81	80
Terre Haute	79	77
Vincennes	78	73
Oolitic	78	75
Dubois	83	74

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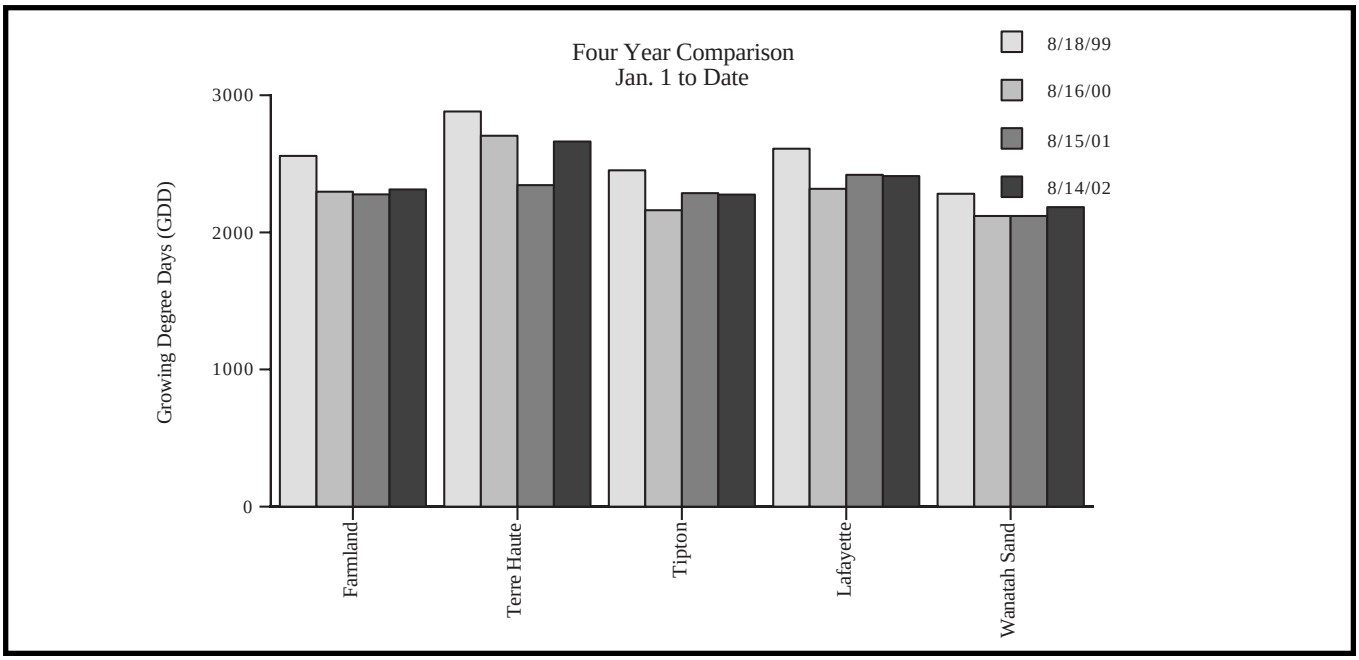
Department of Entomology
Purdue University
1158 Smith Hall
West Lafayette, IN 47907-1158

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



The ***Pest Management and Crop Production Newsletter*** is produced by the Departments of Agronomy, Botany and Plant Pathology, and Entomology at Purdue University. The Newsletter is published monthly February, March, October, and November. Weekly publication begins the first week of April and continues through mid-September. If there are questions or problems, contact the Extension Entomology Office at (765) 494-8761.