Pest & Crop

September 14, 2001 - No. 25

In This Issue

Insects, Mites, and Nematodes

Hessian Fly Infestation Should be Monitored This Fall Even Though Populations Remained Low in Indiana Wheat in 2001 – (*Roger Ratcliffe and Sue Cambron*) -

- Purdue variety INW9811 is resistant to Hessian fly biotype L prevalent in Indiana
- Planting after the fly-free date is a key management strategy for reducing Hessian fly problems
- Highest levels of infestation generally occur in Southwest Indiana

Hessian fly infestation was low in wheat trials sampled in Indiana in 2001, however, precautions should be taken to minimize the establishment of the fly in plantings this fall. The Hessian fly is present in wheat-growing areas throughout Indiana and often survives, although in lower numbers, in wheat stubble or grasses during the summer. However, there is potential for rapid increase of fly populations as a result of weather conditions or cropping practices that favor survival of eggs and young larvae in the fall. This was demonstrated in 1999 and 2000 during seasons of higher rainfall in mid-Atlantic and southeastern states when severe Hessian fly injury occurred in areas where populations had been relatively low for 4-5 years. Insecticidal control of the fly once infestation has occurred is poor, and generally not economically feasible. Management practices that prevent or delay build-up of fly populations, such as planting of resistant varieties and seeding after the fly-free date, provide the most cost effective means of control for wheat growers. Information about both types of management is given below.

As reported in 2000, the soft red winter wheat variety INW9811 with resistance to Hessian fly biotype L is available to Indiana wheat growers. Although many wheat varieties grown in Indiana have the H5 or H6 genes for Hessian fly resistance, INW9811 is the only variety resistant to biotype L, which is predominant in fly populations throughout the state.

INW9811 has demonstrated excellent resistance to field populations of the Hessian fly from Illinois, Indiana, northern Alabama and Arkansas, southern Delaware and Maryland, and eastern North Carolina that have a high frequency of biotype L.

Yield data for 2001 for INW9811 at four Indiana locations, compared to Clark, Ernie, Patterson, and Patton, is shown below.

Variety	Wabash IN	Lafayette IN	Romney IN	Vincennes IN	Indiana Ave.
Clark	72.2	88.3	96.7	93.1	87.0
Ernie	79.8	91.8	94.9	84.5	88.3
INW9811	**81.6**	**87.1**	**107.8**	**100.0**	**92.4**
Patterson	85.4	98.1	110.1	100.8	99.3
Patton	90.8	98.6	112.2	112.7	103.6
Location mean	80.8	93.3	102.7	97.6	95.0

Much of the fall fly population can be avoided by planting after the fly-free date. This is key to avoiding subsequent infestation by the spring brood. Additionally, it has been shown that following the fly-free date will help reduce wheat disease problems and reduce winter kill from excessive growth. To determine the fly-free date for your area of the state, refer to the enclosed map. Crop rotation, where wheat following wheat is avoided, also is one of the key management strategies for reducing Hessian fly problems. The Hessian fly passes the summer in the stubble of the current wheat crop. Plowing the stubble results in the destruction of the pest. Volunteer wheat, the wheat seedlings sprouting in the fall from grain left in the field during threshing, germinates and begins growing just in time for the fall emergence of the Hessian fly. These plants are readily infested resulting in a rapid build-up of the population. The use of resistant varieties, in combination with the above pest management strategies, increases the chance for a fly-free crop.

Specific characteristics and yield potential of varieties presently grown in Indiana can be determined by consulting Purdue Station Bulletin "Performance of Public and Private Small Grains in Indiana - 2000", web access: <http://shawdow.agry.purdue.edu/agronomy/ext/smgrain/variety/sm~var.htm> or talk to your seed dealer.

• • P&C • •

Purdue Wheat Variety Provides Excellent Control of Hessian Fly Populations From the Eastern United States - (*Roger Ratcliffe*) -

The Purdue cultivar 'INW9811' which carries *H13* resistance to biotype 'L', was tested against Hessian fly populations collected in fall-winter of 1999-2000 from central and eastern Maryland, eastern North Carolina and Virginia, central and west central South Carolina, and southwestern Arkansas. The frequency of biotype 'L' in fly populations from Maryland, North Carolina and Virginia ranged from 60 to 96%. There was 16% biotype 'L' in the Arkansas population and none in the South Carolina population. INW9811 was highly resistant to populations from eastern and central Maryland, eastern Virginia, west central South Carolina, and southwestern Arkansas. Molly was highly resistant to all fly populations except that from central South Carolina, to which it demonstrated 70% resistance. These results, and those reported in 1999 for tests with INW9811 against fly populations from Alabama and Georgia, demonstrate the broad range of effectiveness of *H13* resistance against the Hessian fly in the eastern U. S soft winter wheat region.

• • P&C • •

Black Light Trap Catch Report
(Ron Blackwell)

County/Cooperator	8/21/01 - 8/27/01							8/28/01 - 9/4/01						
	VC	BCW	ECB	GC	CEW	FAW	AW	VC	BCW	ECB	GC	CEW	FAW	AW
Clinton/Blackwell	16	0	148	140	16	0	4	12	18	47	92	18	2	0
Dubois/SIPAC	2	45	20	191	159	0	12	2	40	38	76	40	2	8
Jennings/SEPAC	3	0	24	165	20	0	2	3	1	42	37	9	0	0
LaPorte/Pinney Ag Center	6	4	103	15	9	0	0	8	2	168	36	24	0	3
Lawrence/Feldun Ag Center	2	10	20	44	67	1	4	5	21	19	37	28	3	3
Randolph/Davis Ag Center	15	15	70	145	4	2	9	4	4	81	81	10	3	6
Whitley/NEPAC	10	19	157	129	10	1	6	10	4	70	91	6	10	5

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

Weeds

The Use of a Fall Applied Herbicides – (*Glenn Nice, Tom Bauman, and Case Medlin*) -

- Why worry about it
- Advantages and disadvantages
- One year results of a study

If you are growing corn or soybean, herbicides may not be top on your list of things to think about at the moment. Nor are winter annuals such as chickweeds (*Stellaria* sp., *Cerastium* sp.), Purple deadnettle (*Lamium purpureum*), or henbit (*Lamium amplexicaule*) on your mind. However, using herbicides during the fall months have been on the rise.

Why worry about it?

One reason is that winter annuals are doing well in the state of Indiana. Reasons for this may be mild winters, reduced use of soil-residual herbicides, reductions of fall tillage, or a combination of these factors. Although not generally a problem during the production season, but they can slow the warming of the soils in the spring and compete for resources early in the growing season. In some case they may harbor certain pests as nematodes, seedcorn maggots, and cutworms. A burndown application is often used in the spring, but sometimes this can be inconvenient and can not be applied in a timely manner. The use of a fall application of a residual herbicide could be considered.

What would some of the advantages be to applying in the fall?

Weed control is generally more effective when the plant is actively growing. Winter annuals start their life cycle in the fall, after harvest, and by the time a burndown may be applied in the spring growth may have already stopped, decreasing efficacy. An application of a residual may aid in planting in a timely manner, spreading the workload out.

What would some of the disadvantages be to applying in the fall?

With a fall applied program, you may lock yourself into one particular crop. Rotation restrictions can range from none up to 48 months depending on the crop and herbicide used. For example, only soybean can be applied when following applications of Canopy XL, Classic, FirstRate, or Squadron. Applying herbicides in the fall may increase potential of off site movement through the soil of some products. Also, if your soil is prone to erosion, a bare soil surface from the control of winter annuals may not be a direction you wish to go.

A study was conducted in the state of Indiana looking at fall applied herbicides in the control of common chickweed and purple deadnettle. Applications were put out late October and early November. The table below was taken from an upcoming Extension Publication. Please keep in mind that the table below is based on a single year's research and may give different results depending on the environmental conditions of any given year.

Table 1. Weed control data from fall applications of currently labeled corn and soybean products. Tolerance of corn and soybean to spring treatments may differ.

Product	Rate	Unit	Common chickweed	Purple deadnettle	Labeled for Application before[1] Corn	Soybean
			--------- % Control ---------			
Roundup Ultra Max	1.21	pt/A	83	95	X	X
Ammonium Sulfate	17	lb/100 gallons				
Roundup Ultra Max	1.21	pt/A	96	90	X	X
2,4-D Ester	1	pt/A				
Ammonium Sulfate	17	lb/100 gallons				
Canopy XL	4.5	oz/A	92	95		X
Express	0.15	oz/A				
2,4-D Ester	1	pt/A				
Crop Oil Conc.	1	% v/v				
Squadron	3	pt/A	89	95		X
2,4-D Ester	1	pt/A				
Crop Oil Conc.	1	% v/v				

Table 1 Continued on Page 4

Table 1 (Continued). Weed control data from fall applications of currently labeled corn and soybean products. Tolerance of corn and soybean to spring treatments may differ.

Product	Rate	Unit	Common chickweed	Purple deadnettle	Labeled for Application before[1] Corn	Soybean
			-------- % Control --------			
Backdraft	3	pt/A	91	75		X
2,4-D Ester	1	pt/A				
Ammonium Sulfate	17	lb/100 gallons				
Nonionic surfactant	0.25	% v/v				
Python WDG	1	oz/A	91	95	X	X
Sencor 75DG	4	oz/A				
2,4-D Ester	1	pt/A				
Crop Oil Conc.	1	% v/v				
Sencor 75DG	8	oz/A	86	95	X	X
2,4-D Ester	1	pt/A				
Crop Oil Conc.	1	% v/v				
Gramoxone Extra	1.5	pt/A	93	100	X	X
2,4-D Ester	1	pt/A				
Sencor 75DG	4	oz/A				
Nonionic surfactant	0.25	% v/v				
Command 3ME	2	pt/A	98	83		X
2,4-D Ester	1	pt/A				
Crop Oil Conc.	1	% v/v				
Sterling	16	fl oz/A	62	90	X	
Crop Oil Conc.	1	% v/v				
Sencor 75DG	6	oz/A	91	90	X	X
Sterling	8	fl oz/A				
Crop Oil Conc.	1	% v/v				
Valor	2	oz/A	75	95		X
Crop Oil Conc.	1	% v/v				
Valor	2	oz/A	91	100		X
Classic	2	oz/A				
Crop Oil Conc.	1	% v/v				
Valor	2	oz/A	84	100		X
FirstRate	0.6	oz/A				
Crop Oil Conc.	1	% v/v				
Basis	0.5	oz/A	99	Data not available	X	X
2,4-D Ester	1	pt/A				
Crop Oil Conc.	1	% v/v				
Basis	0.33	oz/A	100	Data not available	X	
Princep 4L	1	qt/A				
Crop Oil Conc.	1	% v/v				
Express	0.33	oz/A	100	Data not available	X	
Princep 4L	1	qt/A				
Crop Oil Conc.	1	% v/v				
Basis	0.5	oz/A	100	Data not available	X	
Princep 4L	1	qt/A				
Crop Oil Conc.	1	% v/v				
Simazine 90DF	1.1	lb/A	100	Data not available	X	
Crop Oil Conc.	1	qt/A				

[1]Some of the herbicides listed can carry over in certain environmental conditions. Rotation restrictions 4 months or less before corn or soybean are marked with an "X". Please read the labels before use.

Agronomy Tips

'Beer Can' Ear Syndrome – 2001 - (*Bob Nielsen*) -

- Severely stunted ears found in some fields
- Cause unknown, but chilling injury suspected

Saturday football games in Ross-Ade Stadium, tailgate parties and beer cans; ah, yes, the familiar signs that classes are in session at Purdue again. Interestingly enough, a few corn fields out in the state seem to be supporting the cause by their exhibition of a peculiar oddity known as 'beer can' ears. Also called 'pop can' ears or simply stunted ears, this phenomenon was identified in several fields and hybrids in Wells and Grant counties this past week.

Although the plants and ear shoots (husk leaves) appear normal, the cobs of 'beer can' ears are remarkably short and the tip inch or so is barren. Interestingly, kernel row numbers at the butt end of these ears appear to be normal or at least acceptable. Part way up the ear, however, kernel row number goes from normal to nothing. Compared to an acceptable 35 to 40 kernels per row, these ears only contain about half that in terms of ovules per row and often only 12 to 16 actual kernels per row due to silk balling that occurred when the final silks could not elongate successfully through the remainder of the normal length husk leaves. More severe ear stunting also occurs, leaving one with what looks like a corny hand grenade.

A tassel branch-like appendage sometimes exists at the tip of the cob, while other ears exhibit an apparent remnant ear initial similar to that visible by dissection of ear shoots at about leaf stage V9 (nine visible leaf collars). The latter symptom suggests that development of the ear initial was interrupted or arrested between the time ear initiation occurred (about V5) and kernel row number was finalized (about V12). The half-length size of the cobs suggests that ear development was stopped in the neighborhood of leaf stages V8 to V9.

Because ear development was apparently arrested or stopped so completely and suddenly (normal row numbers, then nothing), the cause of the problem would appear to be a single triggering event, not a lingering stress like nutrient deficiency. One possible cause could be the application of certain post-emergence herbicides (growth regulators or ALS-type), but none were applied to the fields I visited last week.

Another possible cause of such a dramatic cessation of ear development could be chilling injury. Indeed, research reported from France (Bechoux et al., 2000; Lejeune and Bernier, 1996) documents the potential for chilling injury at the time of ear and tassel initiation (about V5) to prevent ear initiation altogether and reduce tassel branch and spikelet formation. Perhaps chilling injury to the developing ear a few leaf stages down the road could similarly abort continued ear development.

The nearest weather reporting station to the field I visited in Wells County was at Bluffton. Using the reported daily maximum and minimum temperatures (<http://shadow.agry.purdue.edu/sc.index.html>), I calculated the daily growing degree days (GDDs) and their accumulation from the reported day of planting (May 8) of this field. Based on earlier research of one of my graduate students that documented the relationship between corn leaf stage development and GDD accumulation (Wuethrich, 1997), I then estimated the leaf stage progression of the corn for that field.

Interestingly, there was a single night of cold temperatures down into the high 40's at about the time the crop should have been at the V8 to V9 stages of development. That leaf stage range is similar to what the length of the cobs suggests was the time of arrested development. Coincidence? Perhaps.

The 'beer can' ear phenomenon has been reported in other years in Indiana. The first rash of reports in dent corn occurred in 1992, that year often lovingly referred to as our 'ice age' summer because of the season-long unusually cool temperatures. The problem was last reported in 1996 in parts of northern Indiana and Ohio, most frequently in fields planted during the last two weeks of May. Several nights of temperatures in the mid- to high 40's were reported that summer during the time when these late-planted fields were also estimated to be at leaf stages V8 to V9.

The fact that this phenomenon does not occur frequently in Indiana probably relegates it to the curiosity shelf along with dumbbell ears, pinched ears, two-headed ears and other corny oddities. However, the possibility that chilling injury may be a contributing factor to its occurrence is interesting from the viewpoint that far less research has been conducted on the injurious effects of cold temperatures on corn reproduction than on those effects due to heat stress or drought.

Related References:

Bechoux, N., G. Bernier, and P. Lejeune. 2000. Environmental effects on the early stages of tassel morphogenesis in maize (Zea mays L.). Plant, Cell & Environment. 23(1):91-98.

Lejeune, P. and G. Bernier. 1996. Effect of environment on the early steps of ear initiation in maize (Zea mays L.). Plant, Cell & Environment. 19:217-224.

Nielsen, R.L. (Bob). 1996. Beer-Can Ear Syndrome in Corn. Purdue Pest & Crop Newsletter. 30 Aug. 1996. Also on the Web at <www.kingcorn.org/news/articles.96/p&c9645.htm>.

Nielsen, R.L. (Bob). 1996. Another Example of Beer-Can Ears in Corn. Published at the Chat 'n Chew Café on the Web at <www.kingcorn.org/news/articles.96/rn9601.htm>.

Wuethrich, Kirby. 1997. Vegetative and Reproductive Phenology of Fourteen Hybrids of Dent Corn (Zea mays L.). M.S. Thesis. Purdue Univ., W. Lafayette, IN.

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/>.

• • P&C • •

Segregated Marketing of Grain from Glyphosate Tolerant Corn – (*Bill Wiebold, University of Missouri-Columbia*) -

(Bob Nielsen's note: This article comes from Missouri Extension Corn Specialist Bill Wiebold, but Indiana farmers should also take heed of this reminder about the harvest of certain transgenic corn hybrids this fall.)

Corn harvest in Missouri has begun and it is important to remind producers that grain from hybrids selected to tolerate glyphosate must be segregated from other corn grain. These hybrids, usually called Roundup Ready, produce grain that has not been approved for import into most European countries. This grain should be marketed only to merchandisers that have agreed to accept such grain.

When release of varieties without full import/use approval happens grain that results from these varieties must not enter specific market channels. It is illegal for grain to be sold to unapproved markets, even if the marketing is unintentional. Small amounts of unapproved grain can contaminate whole grain lots and these grain lots may be destroyed or turned back at the market. Seed companies that release varieties not approved for all markets attempt to control the flow of grain into specific approved channels, thus the word channeling.

Growers that purchase hybrids that are not fully approved take on much of the responsibility of making sure that the resulting grain is sold only to approved markets. Often, producers are asked to sign an agreement in which they promise to follow marketing recommendations made by the seed company. Producers should review these forms and coordinate harvest and delivery plans with their grain merchant.

Tracking and identifying grain resulting from unapproved varieties can be difficult for cross-pollinated crops such as corn. Pollen from biotech varieties carries genes that can produce unapproved grain and that pollen can move great distances. Regardless of the difficulty, it is important that producers do what it takes to ensure the integrity of the U.S. corn supply and our relationships with foreign buyers. Failure to do so will put this specific technology in jeopardy and may impact the development of other, much-needed hybrids.

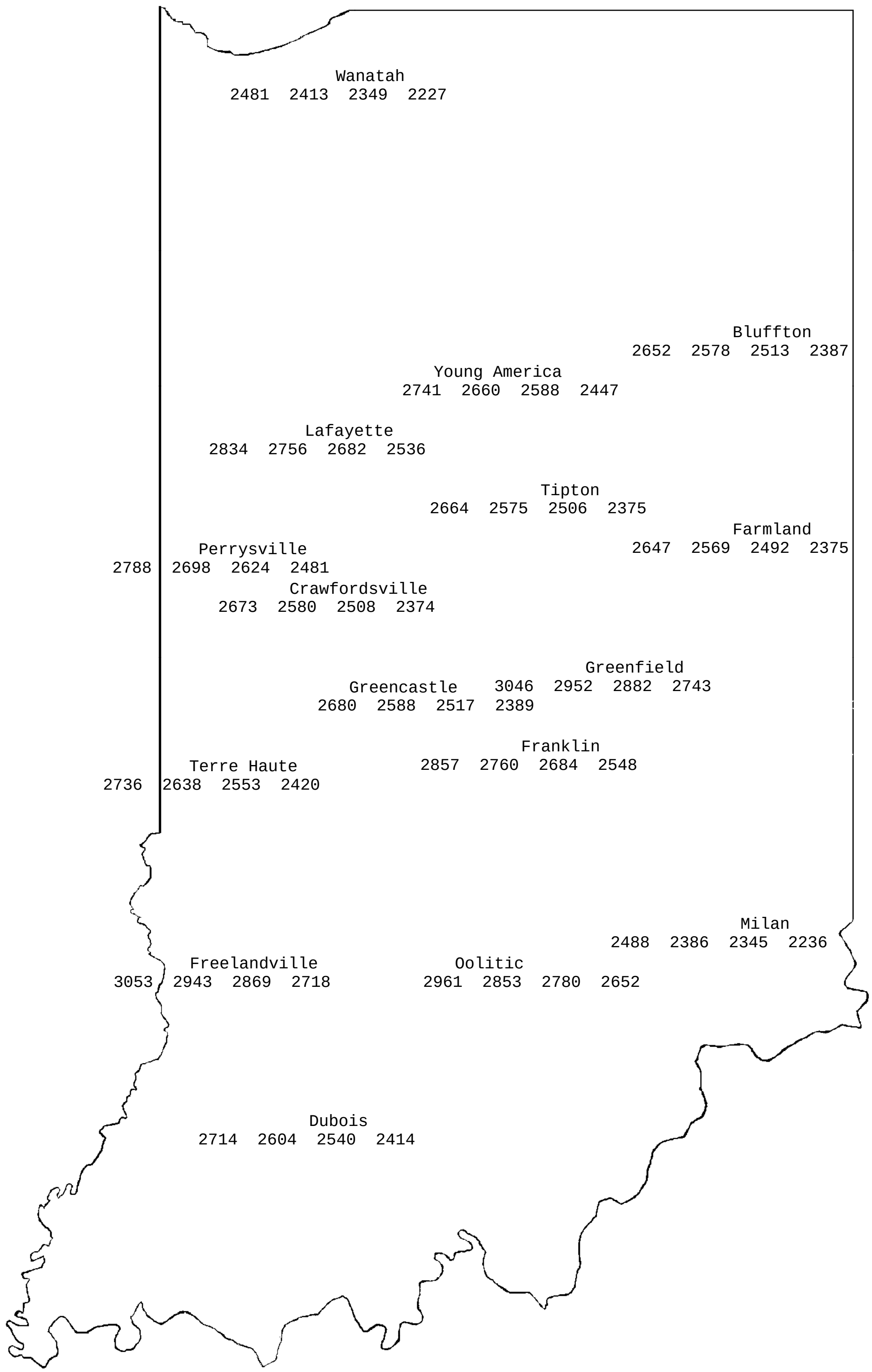
(Note: This article was taken from the Integrated Pest & Crop Management Newsletter, University of Missouri-Columbia, Vol. 11, No. 22, Article 1 of 7, September 14, 2001.)

Weather Update

MAP KEY
Location GDD(3) GDD(11) GDD(40) GDD(90)

Temperature Accumulations from Jan. 1 to September 12, 2001

GDD(3) = Growing Degree Days from April 14 (3% of Indiana's corn planted), for corn growth and development
GDD(11) = Growing Degree Days from April 22 (11% of Indiana's corn planted), for corn growth and development
GDD(40) = Growing Degree Days from April 28 (40% of Indiana's corn planted), for corn growth and development
GDD(90) = Growing Degree Days from May 6 (90% of Indiana's corn planted), for corn growth and development

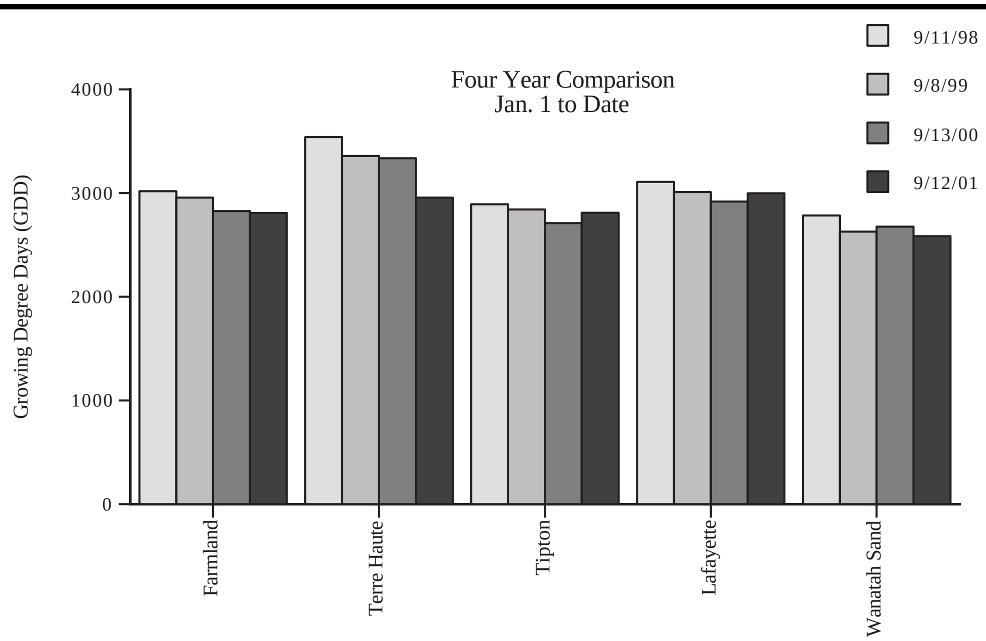


4" Bare Soil Temperatures 9/12/01

Location	Max.	Min.
Wtfd Mills	72	66
Wanatah	82	64
W Laf Agro	81	62
Tipton	67	63
Perrysville	78	71
Crawfordsville	75	68
Liberty	78	63
Terre Haute	77	70
Vincennes	76	63
Oolitic	74	69
Dubois	82	60

Pest&Crop
Extension Entomology Office
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.