Pest & Crop

July 6, 2001 - No. 16

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Insects, Mites, and Nematodes

Yellow Beans, Rain, and Spider Mites - (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) –

- Spider mites may or may not be the cause of discolored soybean leaves
- Rain indirectly slows or aids in the control of spider mites
- Consider several factors before treating spider mites

Reports of and questions about spider mites in soybean fields have begun to come in from several areas of the state. Most pest managers are well aware of the close association of moisture stressed soybean plants and spider mites. Now that some much needed rains have moved through most of the state (July 3 and 4) will yellow soybean fields and spider mites go away?

A number of factors can cause leaf yellowing. These include soybean cyst nematode, nutrient deficiencies, poor nodulation, herbicide injury, sucking insects, diseases, compaction, etc. Spider mites may be present along with any of these other plant stressers. Spider mites may or may not be causing the problem. In other words, it's the old chicken and egg dilemma. Stressed plants actually provide a better nutritional feast for spider mites thus they thrive and quickly colonize areas or whole fields. The best spider mite control is to eliminate plant stress, and this is sometimes easier said than done.

Spider mites moving in from field edge.

Rain indirectly controls spider mites. Pounding rains can physically knock spider mites off plants where they meet their doom by drowning or becoming food for ground dwelling predators. More importantly, rains increase humidity that slows the spider mite reproduction and favors pathogenic fungi. Several days of relative humidity above 70% may induce an epizootic wiping out the spider mite population. On the other hand, warm temperatures and low humidity returning after rain may only delay the spider mite infestation. Above all else, significant rain helps the soybean crop to grow and provides less of a "protein broth" for the spider mites.

Before considering control, it is very important that spider mites are identified as the source of the problem. Shake some discolored soybean leaves over a white piece of paper. Watch for small dark specks moving about on the paper. Also look for minute webbing on the undersides of the discolored leaves. Once spider mites have been positively identified in the damaged areas of the field, it is essential that the whole field be scouted to determine the range of infestation. Sample in at least five different areas of the field and determine whether the spider mites are present or not by using the "shake" method.

Reduction of crop yield is directly related to duration and intensity of the mite attack. The most severe damage occurs when the infestation starts in the early stages of plant growth and builds throughout the season (extended drought). However, a heavy infestation at seed set (mid-season dry period) can still cause economic damage. Before applying controls, carefully consider that, depending when damage is noted, multiple insecticide applications may be necessary. This is because surviving spider mites are able to repopulate a field faster than natural predators that are often prevalent in infested fields. If leaf discoloration is apparent, spider mites are positively identified as the culprit, and hot, dry conditions are expected to persist, it is recommended that a control be considered.

If a control is warranted, two pesticides are recommended for use. These include dimethoate (Dimethoate 400 and 4 EC) and chlorpyrifos (Lorsban 4E). Proper placement of these pesticides is the key to successful control. Nozzle pressures of 40 psi and 30-40 gallons of water per acre for ground application helps distribute the pesticide throughout the foliage. If using aerial application, the control material should be applied in 3-5 gallons of finished spray per acre. Normally, aerial applications are not as efficacious as ground applications due to limited surface-area coverage. So where possible, use ground application. Also, research has shown that mite controls work best in the early morning or evening hours. This is primarily due to more stable weather conditions, less convection currents and evaporation, resulting in better targeting of the pesticide.

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Corn Lodging, It's That Time of Year - (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) -

- Recent storms have revealed fields with rootworm damage
- Evaluations must be made now, root re-growth will mask damage

Like clockwork, lodging of some cornfields has been reported. This is very typical around the 4th of July. A mix of rapid plant growth, the near completion of rootworm feeding, and rain storms with gusty winds have combined to topple some corn plants. Damage is typically spotty in fields. If damage isn't on the end-rows, which brings attention to the situation, or producers are not out in their fields, producers may have a surprise for them this fall as they attempt to harvest.

Corn plants that have tilted or lodged should be dug, not pulled, and then inspected for root feeding scars. Pay particular attention to the nodes of roots just below and above the soil surface. These may have been completely destroyed. There is nothing that can be done to correct this year's damage. However, these fields may have a tremendous beetle population as the adults continue to emerge from the soil. Those who have significant damage and who used full rates of rootworm insecticides should be contacting their dealer or manufacturer's representative to have them evaluate product performance. Remember, products are generally guaranteed to work at recommended rates.

Lodged corn plants

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Black Light Trap Catch Report
(Ron Blackwell)

County/Cooperator	6/19/01 - 6/25/01							6/26/01 - 7/2/01						
	VC	BCW	ECB	GC	CEW	FAW	AW	VC	BCW	ECB	GC	CEW	FAW	AW
Clinton/Blackwell	6	4	0	0	0	0	14	3	2	1	0	0	0	1
Dubois/SIPAC	99	16	0	4	0	0	113	55	9	0	3	0	0	11
Jennings/SEPAC	120	12	1	2	0	0	34	54	4	0	0	0	0	10
LaPorte/Pinney Ag Center	14	3	68	1	0	0	76							
Lawrence/Feldun Ag Center	75	8	0	0	0	0	91	28	2	0	0	0	0	0
Randolph/Davis Ag Center	54	14	26	7	0	0	117	100	29	7	0	0	0	53
Whitley/NEPAC	31	7	78	8	0	0	124							

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

Weeds

Catch the Drift – (*Glenn Nice, Thomas Bauman, Case Medlin*) -

I have not been here long, but one thing I have noticed is drift is not a new thing in Indiana. I don't want to preach, for I am sure we have all heard it many times already, so instead I will explore some of the aspects of drift as a gentile reminder to be careful.

What can affect drift?

Several things can affect drift. Droplet or particle size, air speed and turbulence, temperature, relative humidity, formulation, application pressure, release height, and carrier are some of the variables that can affect drift. Generally, several of these are affecting drift potential at the same time.

Droplet size is a major variable.

The smaller the droplet the farther it can carry in drift. Only 40 to 80% of a fine spray containing approximately 50% of the droplets smaller than 100 to 300 µm (µm = 1/25,400th of an inch) was recovered within 660 ft. Where as, 85 to 98% was recovered with 50% of the droplets smaller than 400 to 600 µm. When there is no air movement (an unlikely occurrence) a 50 µm droplet will fall at a theoretical rate of 15 ft/min. A 200 µm droplet will fall 150 ft/min.

Many of the conditions that effect drift effect droplet size and the percent of small droplets produced. Below is a table of variables that can affect droplet size (Table 1). No matter what the situation, there will always be a certain amount of small particles. The trick is to reduce the percent of these small particles.

Wind is a major variable.

As one would expect wind is one of the larger considerations. Wind direction can be both a tool and a problem. As a simple tool, try to spray when the direction may lead drift away from sensitive plants and residences. As a problem: spraying up wind of sensitive plants and residences. However, we can always wait around for the "winds to change".

As applicators, it is important to do our parts in reducing drift. Herbicides are a useful tool in agriculture and if handled properly and safely they will continue to be tools. Complaints of and improper pesticide use feed the media, thus promoting scrutiny. Use all the technology and techniques available to reduce drift. When possible, notify people like greenhouse operators and homeowners in close proximity when you are going to spray.

Reference: Reducing Pesticide Application Drift-Losses. 1983. Cooperative Extension Service, College of Agriculture the University of Arizona, Tucson, Arizona 85721.

Table 1. Factors Affecting Droplet Size

Factor	Effect	Suggestion
Application pressure	increasing pressure increases the percent of fine droplets.	Try operating at the lowest pressure necessary to maintian maximum efficiency. For grown herbicide application a general pressure of 30 lb/in^2 has been suggestsed. Utilize different nozzles when possible to increase GPA, not pressure.
Nozzle type	The nozzle and orifice type can influence droplet size.	Use nozzles that produce a larger droplet size, however in the case of contact herbicides where coverage is critical this becomes a give and take situation.
Temperature	Air temperature influences air stability, inversions, evaporation rates, and relative humidity.	Applying in moderate temperatures may reduce evaporation of droplet if a water carrier is used.
Relative humidity	This affects the rate at which water evaporates, the lower the relative humidity, the smaller the droplet will be.	Relative humidity is not as strong an influence as temperature. The higher the temperature, the lower the relative humidity. Apply in moderate temperatures.
Formulation and adjuvants	The formulation and adjuvants will change the physical characteristics of the carrier or alter its viscosity. Drift potential by average particle (droplet) size in μm are as follows:Granules (400-5000), invert emulsions (500-5000), normal emulsions (NE) with drift reducing adjuvant (700-1500), NE (150-600), NE with spreading adjuvant (150-400), oil based (150-400), Ultra low volume (125-200), dust (10-50).	Most adjuvants may lower evaporation, better adhesion to plants, and produce a more uniform spray covverage. However, they may also reduce droplet size. Adjuvants that decrase drift generally change the viscotiy of the carrier thus increaseing droplet size.

After Thought – (*Glenn Nice*) -

In the article "The Mighty Marestail" (*P&C #15*) I neglected to mention flumetsulam (Python) at 0.64 oz ai/A PRE or cloransulam (Firstrate) at 0.5 oz ai/A as a burndown. Also, cloransulam at 0.25 lb ai/A POST can be used in the suppression of marestail. Rates can increase under certain soil conditions, so please always read the label before application.

Plant Diseases

Gray Leaf Spot and Common Rust of Corn - (*Gregory Shaner*) –

- Gray leaf spot and common rust have made their appearance

I saw symptoms and signs of both gray leaf spot and common rust in a seed production field south of Indianapolis on June 28. I have also seen a few gray leaf spot lesions on hybrid corn at the Purdue Agronomy Research Center near Lafayette, and have received a report of both these diseases in high amylose corn near Franklin. In the seed corn field, gray leaf spot was more abundant than rust. Most plants had several young lesions, mainly on leaves 4 through 8. The largest lesions were less than 0.5 inch long, indicating that they were not yet fully developed. Corn was at the V14 stage of growth. When I visited this field again on July 3, some lesions had expanded to almost an inch long and there were more lesions than a week earlier.

The gray leaf spot fungus, *Cercospora zeae-maydis*, survives the winter on corn residue. Even though the seed corn field where I saw the disease was clean-tilled, there was evidently sufficient inoculum in the area to cause a general infection of most plants. Once lesions form on lower leaves, they serve as a source of infection for upper leaves. Under warm, humid conditions the fungus produces spores on these lesions, which can be dispersed by wind or rain splash to upper leaves.

It has been several years since we have had a major outbreak of gray leaf spot in Indiana, and it is premature to say whether we will have one this year. But, the disease has appeared earlier than normal, and if we continue to have hot, humid weather the disease will likely continue to develop. It is likely that gray leaf spot is developing in many corn fields in Indiana.

During the first half of the 1990s some very susceptible corn hybrids were widely grown. Corn breeders have been working to improve resistance to gray leaf spot. If the disease does continue to develop growers should monitor their crops regularly for the amount of disease. Then they can compare what actually develops with the resistance rating of the hybrid, to get an idea of how much protection a given degree of resistance provides.

Typically, gray leaf spot will develop in a gradient, with more disease on the lower (older) leaves at any given time. If lesions appear on the ear leaf or above within 2 weeks after silking, gray leaf spot will likely cause reduction in yield and grain quality.

Common rust, caused by *Puccinia sorghi*, was widespread in Indiana last year, and some hybrids had more of this disease than is typically seen. Last year, rust was well established by mid June. The rust I saw in the seed corn field was still very light – only a pustule or two on some plants. As with gray leaf spot, growers should be on the lookout for rust. It is more likely to be a problem in seed corn fields, specialty hybrids, and sweet corn, than in yellow dent hybrid corn.

Early gray leaf spot lesions

Common rust pustules

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Sudden Death Syndrome – (*Gregory Shaner*) –

- Sudden death syndrome is showing up earlier than usual

A soybean plant submitted to the Plant and Pest Diagnostic Laboratory from southern Indiana showed classic symptoms of sudden death syndrome. Upper leaves displayed interveinal necrosis. Some leaflets had dropped off, leaving only the leaf stalk (petiole) attached to the stem. The cortex of the lower stem showed a distinct brown discoloration. Normally, we do not see sudden death syndrome for another week or two, when pods are starting to develop on lower nodes. These plants were only at the R2 (V8) stage of growth.

A soil-borne fungus, *Fusarium solani* f. sp. *glycines*, causes sudden death syndrome. The fungus is widely distributed in Indiana fields. Its abundance in a particular field depends on cropping history and the previous occurrence of the disease in that field. There is no reason to expect sudden death syndrome to show up earlier in southern Indiana than elsewhere in the state, so given that it has been found, growers and crop scouts should be on the lookout for symptoms anywhere in the state. Fields planted early are at greater risk (the field in southern Indiana where the disease was confirmed was planted in late April).

Heavy rains anytime from full flowering to early pod development are critical for development of sudden death syndrome. A period of soil saturation during this time may allow fungus in the upper layers of soil (to a depth of about 1.5 inches) to infect the taproot directly. This leads to the characteristic foliar symptoms of the disease. Many areas of the state have experienced heavy rains recently.

There are no remedial measures that can be taken at this stage if sudden death syndrome is detected in a field. However, documenting the pattern and severity of the disease in a field will provide useful information for future crop management decisions. Most varieties adapted for production in Indiana are susceptible to sudden death syndrome, but a few have a degree of resistance.

Interveinal necrosis from soybean death syndrome

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Virus Complex Showing Up - *(Paul Vincelli, University of Kentucky, Kentucky Pest News, No. 923)* -

Symptoms of the corn virus complex were very apparent in fields in many areas of the state last week. Two viruses are known to overwinter in johnsongrass rhizomes: maize dwarf mosaic virus (MDMV) and maize chlorotic dwarf virus (MCDV). MDMV is spread by certain aphids, and MCDV is spread by leafhoppers.

In field corn, these two viruses usually occur together and commonly are most severe within a short distance (10-20 feet) of clumps of rhizome johnsongrass. Symptoms can be more widely dispersed in sweet corn. Plants infected with MDMV mosaic patterns of random streaks of light green and dark green areas; as weather gets hot, the mosaic fades to a general yellowing in the whorl. Symptoms of infection by MCDV are as follows: stunting of corn plants, especially internode shortening; yellowing of leaves in the whorl; reddening of leaf margins and tips; and a subtle clearing of the tertiary (finest) veins in leaf blades (this is best visible by holding an infected leaf and a healthy leaf side-by-side up to the sky). Suspect cases should be tested by laboratory techniques for confirmation.

The risk of yield loss from the virus complex depends on the amount and location of rhizome johnsongrass. Fields that are heavily infested (20%+ of the field with rhizome johnsongrass) often have high disease pressure. Conversely, fields that have been cleaned of rhizomes through the use of herbicides often have low risk. However, recognize that the virus complex can occur in a field that is free of rhizome johnsongrass, since the border can also be a source of inoculum. Small plantings with rhizome-infested borders generally have a greater risk than larger plantings. Also, a long, skinny field with rhizome-infested borders has a greater risk than a square field.

Later planted fields are at higher risk, because the crop is at a comparatively earlier stage when plants become infected. Another factor that may influence the risk of the disease is delaying application of postemergence herbicides for johnsongrass control. Producers may delay herbicide applications for numerous reasons, including delays from weather, having too much acreage to cover quickly or a desire to wait for as much weed seedling emergence as possible before application. No matter what the reason, it seems likely that postponing herbicide applications that kill the rhizome johnsongrass provides more opportunity for insect vectors to disseminate the viruses to uninfected plants.

Use hybrids selected for tolerance to the corn virus complex for fields with significant risk of the disease. Most seed companies have at least some hybrids with moderate to good tolerance to the disease. In addition, control rhizome johnsongrass to reduce the source of overwintering inoculum.

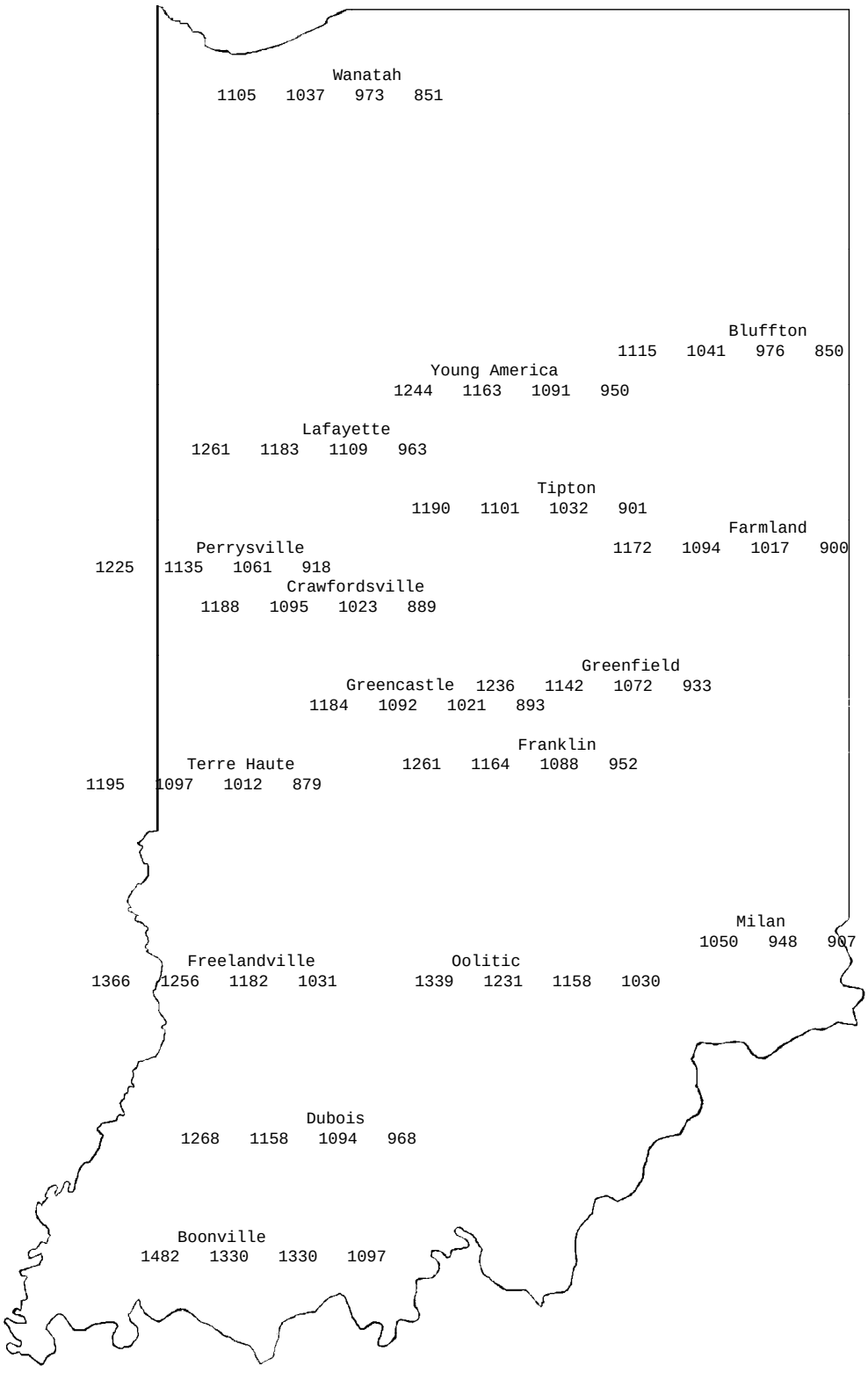
Corn infected with MDMV.

Weather Update

Temperature Accumulations from Jan. 1 to July 4, 2001

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

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 7/4/01

Location	Max.	Min.
Wtfd Mills	75	68
Wanatah	75	70
Columbia City	70	65
W Laf Agro	72	69
Tipton	70	67
Farmland	68	65
Perrysville	71	68
Crawfordsville	71	69
Trafalgar	78	70
Liberty	65	63
Oolitic	73	71

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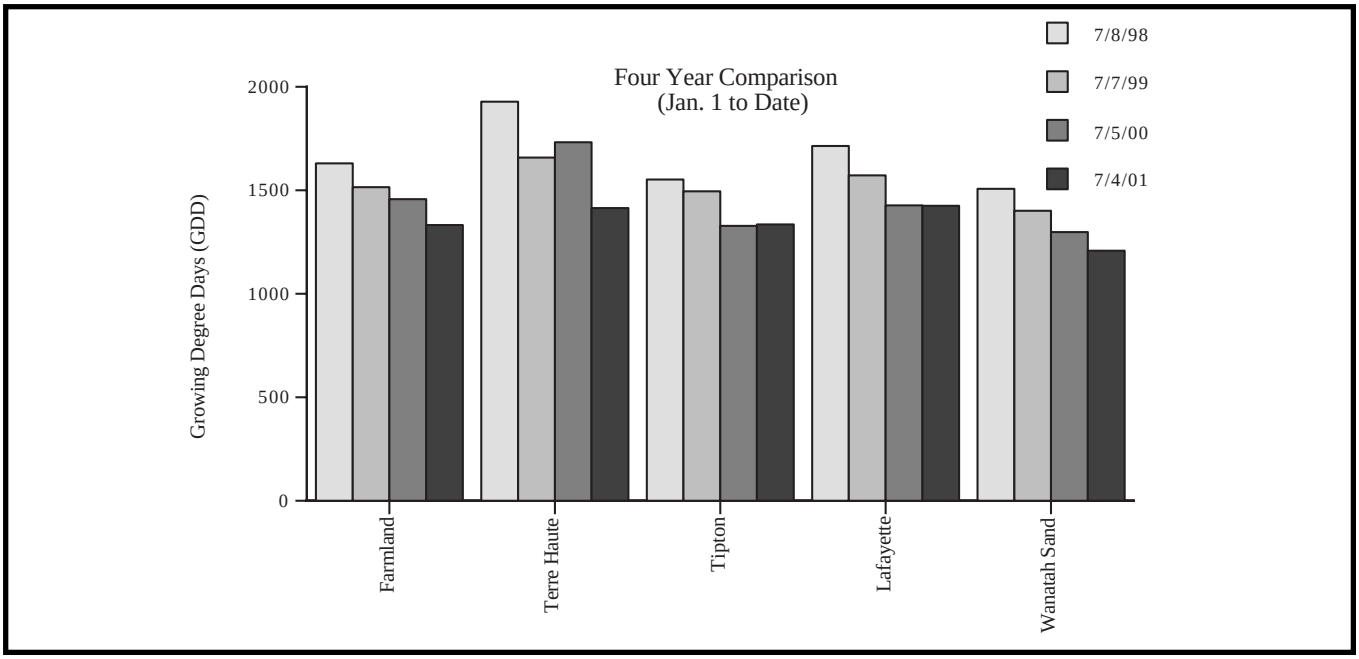

The ***Pest Management and Crop Production Newsletter*** is produced by the Departments of Agronomy, Botany and Plant Pathology, and Entomology at Purdue University. The Newsletter is published monthly February, March, October, and November. Weekly publication begins the first week of April and continues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