Pest & Crop

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

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In This Issue

Insects, Mites, and Nematodes

Bean Leaf Beetle Winter Survival and Early Season Damage - (*John Obermeyer and Larry Bledsoe*) -

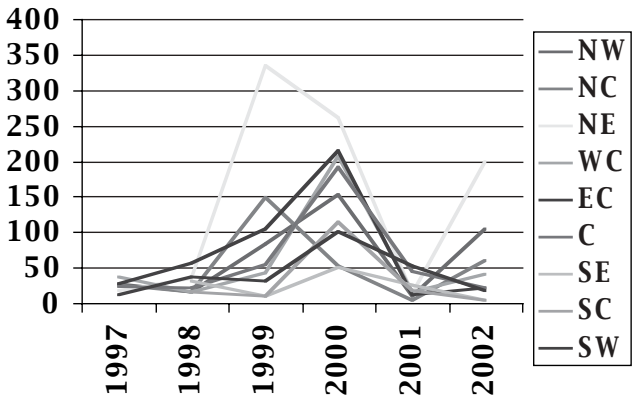
- Bean leaf beetle over winters as an adult
- Beetle numbers are expected lower this spring
- Beetles are vectors of BPMV disease
- BPMV has been a greater threat to yield and seed quality in the western Corn Belt
- Don't attempt to treat for beetles and weeds at the same time
- Planting date is a risk factor for beetle feeding

Bean leaf beetle may feed on soybean cotyledons, foliage, and pods. For an animation depicting the bean leaf beetle biology and damage, go to the web site <http://www.entm.purdue.edu/entomology/ext/fieldcropsipm/flash/blb14.html>. Occasionally, beetle numbers and damage warrant insecticide treatments to protect soybean stands, yield, and/or seed quality. Recently there's been a renewed interest with this pest in the seed industry because of its propensity to vector the bean pod mottle virus (BPMV). Whereas BPMV is a major concern in the western Corn Belt, little of this disease has been seen in Indiana.

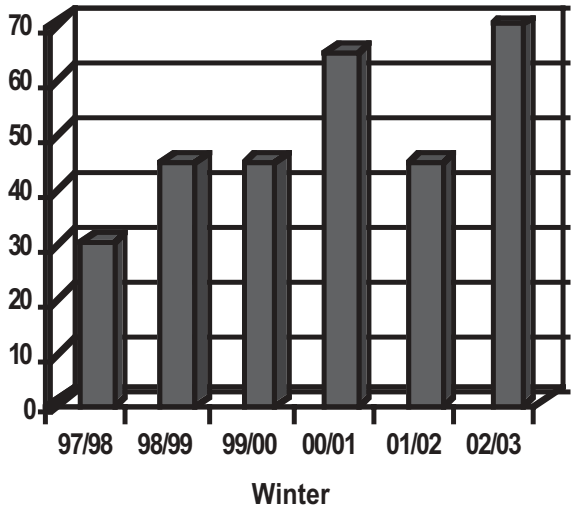
BPMV was first identified in the Midwest in the 1950s, and bean leaf beetle was quickly implicated as a major vector of this disease. It is believed that the virus over winters in wild and cultivated legumes (e.g., clovers). When the over wintering bean leaf beetle "awakens," early in the spring, it begins to seek leguminous plants in which to feed. Should a plant be infected with BPMV, the bean leaf beetle will likely carry it to its next feeding site in its mouthparts. If soybean plants are emerging nearby, the bean leaf beetle may spread the virus to them when they colonize that field. Initial research studies from Nebraska and Iowa show that this early infection is most detrimental to soybean yield and seed quality.

Why BPMV incidence appears to be low and sporadic in Indiana is not understood. Logic tells us to look at the major vector…the bean leaf beetle. Bean leaf beetle numbers have been high in Iowa and Nebraska, and they expect large numbers again this season. Whereas the beetle numbers in Indiana have been relatively lower the last couple seasons, see Graph 1. Winter temperatures have an impact on the survival of several field crop insects (see *Pest&Crop* #1, February 21, 2003). Frankie Lam, Regional IPM Specialist in southwestern Indiana, while at Iowa State University developed a winter survival model for the bean leaf beetle. Graph 2 shows the expected mortality of bean leaf beetle, from temperatures gathered at West Lafayette, Indiana. Should the model be correct, bean leaf beetle numbers are expected to be low this spring.

Graph 1. Bean Leaf Beetle, Soybean Sweeps, Indiana Regions, 1997 - 2002 (number/100 sweeps)



Graph 2. Percent Expected Mortality of Over Wintering Bean Leaf Beetle



Some have suggested that controlling the beetle while applying post-emergent herbicides will "kill two birds with one stone." Given the current situation with the bean leaf beetle and BPMV, we certainly don't recommend prophylactic insecticide applications. More importantly, the timing of bean leaf beetle feeding activity and herbicide application do NOT coincide. The tried and true approach is to use timely field scouting and economic thresholds based on research. For cotyledon- and unifoliolate-stage soybean, refer to the following threshold values:

Crop Value ($/bu)	Control Cost, $/acre				
	6.00	8.00	10.00	12.00	16.00
	Beetles per plant				
5.00	3	4	5	6	8
6.00	3	4	5	5	7

Table modified from the University of Nebraska

Another management option for the bean leaf beetle is planting date. Avoiding an early planting date for soybean grown for seed should avert over wintering beetles flocking to the field. Rather, they will infest the first emerging soybean fields in the area. This is not suggesting "late" planting, because later maturing fields in the fall are prone to second generation beetle damage to the pods. Pod scarring may lead to discolored and shriveled seed from disease organisms other than BPMV. The key seems to be timely planting of soybeans to lower the incidence of bean leaf beetle feeding and BPMV disease!

Close-up of the bean leaf beetle mouthparts

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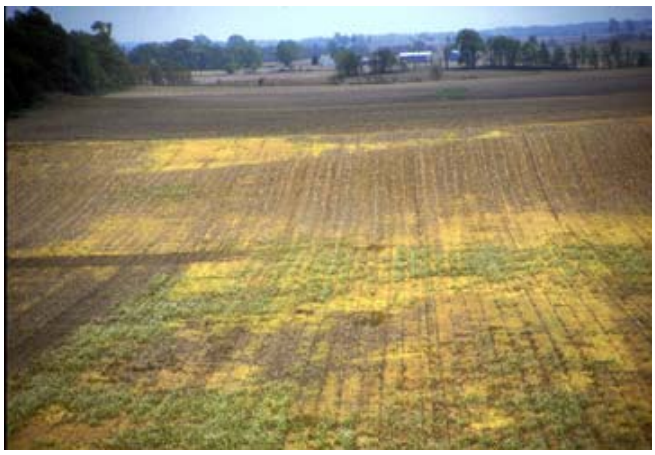
Time to Think Like a Black Cutworm Moth - (*John Obermeyer and Larry Bledsoe*) -

- Black cutworm moth arrival is right on time
- Moths are seeking weedy fields to lay their eggs
- Early herbicide applications can help manage this pest

Look at his week's "Black Cutworm Adult Pheromone Trap Report." You can see that several moths have been trapped by our dutiful cooperators; this is quite normal for this time of year. Sometime in the next week or two we will begin our heat unit accumulations to predict cutting, published in future *Pest&Crop*, "Weather Update." We still await the moth arrivals of later April, which usually account for our crop damage in May and early June.

The important point now is .... will pregnant black cutworm moths arriving in the Hoosier state, find your fields attractive to lay eggs in? Moths are particularly

attracted to winter annuals, such as chickweed and mustards. Fields that are showing plenty of green are at highest risk for cutworm damage. Remember, corn is one of the black cutworms least favorite foods, it just so happens it is the only plant remaining by the time larvae have emerged and weeds have been killed. Research has shown that cutworm larvae starve if weeds are treated with tillage or herbicide 2-3 weeks before corn emergence. Something to be said for controlling weeds in order to manage this insect pest. More later!



Weedy winter annuals in the spring

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Alfalfa Weevil Larval Survey
4/15/03
(Ron Blackwell)

County (Fields) Sampled	Stem Ht. (in.)	% Tip Feeding
Lawrence 1	11.5	4%
Lawrence 2	11.2	4%
Lawrence 3	9.8	20%
Lawrence 4	12.1	12%
Orange 1	11.8	12%
Orange 2	12.0	0%

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Black Cutworm Adult Pheromone Trap Report
Week 1 = 4/3/03 - 4/9/03 Week 2 = 4/10/03 - 4/16/03
(Ron Blackwell)

County	Cooperator	BCW Trapped		County	Cooperator	BCW Trapped	
		Wk 1	Wk 2			Wk 1	Wk 2
Adams	Roe/Price Ag Services	0	1	Lake	Kliene (2)	0	5
Allen	Gynn/South Wind Farms	0	0	Marshall	Barry/Marshall Co. Co-op	0	2
Bartholomew	Ludwig/Growers Service	1	1	Parke	Rule/Midland Co-op	4	7
Clay	Smith/Growers Co-op (Bzl)	1	0	Porter	Mueller/Agriliance	1	1
Clay	Smith/Growers Co-op (CC)	0	3	Putnam	Nicholson Consulting	1	1
Clinton	Blackwell/Purdue	8	24*	Randolph	Jackson/Davis-Purdue Ag Center (S)	0	0
Elkhart	Kauffman/Crop Tech (1)	0	0	Randolph	Jackson/Davis-Purdue Ag Center (N)	2	3
Elkhart	Kauffman/Crop Tech (2)	0	2	Sullivan	Smith/Growers Co-op (Farmersburg)	0	1
Fayette	Schelle/Falmouth Farm Supply	0	1	Sullivan	Smith/Growers Co-op (E)	1	2
Fountain	Mroczkiewicz/Syngenta	0	0	Sullivan	Smith/Growers Co-op (NwLb)	9	1
Fountain	Hutson/Purdue	0	0	Tippecanoe	Obermeyer/Purdue	1	1
Gibson	Hirsch Farms	11*	0	Tipton	Johnson/Pioneer	5	2
Hendricks	Whicker/Midland Co-op	0	0	Vermillion	Hutson/Vermillion Co. Extension	0	0
Henry	Schelle/Falmouth Farm Supply	1	0	Vigo	Smith/Growers Co-op	0	0
Knox	Smith/Growers Co-op (Oaktown)	0	1	White	Reynolds/ConAgra Popcorn 1K	1	5
Knox	Smith/Growers Co-op (Whtlnd 1)	1	1	White	Reynolds/ConAgra Popcorn 2P	0	2
Knox	Smith/Growers Co-op (Whtlnd 2)	0	3	Whitley	Walker/NEPAC	0	2
Lake	Kliene (1)	0	1				

* = Intensive Capture.... An intensive capture occurs when 9 or more moths are caught over a 2-night period.

Catch the Drift? – Hopefully Not! – (*Glenn Nice, Thomas Bauman, and Bill Johnson*) -

As we enter the busy spray season, we felt it was important to review a few issues concerning spray drift. Spray drift is becoming an important issue in many communities in both the rural and urban settings. There are a number of extension publications on spray drift and recent ones by the University of Wisconsin titled *Managing Pesticide Drift in Wisconsin: Field Sprayers (X1000)* and University of Missouri Extension titled *Controlling Drift of Crop Protection Materials* (guidesheet G1886) address in more detail many of the specific issues responsible for minimizing pesticide drift.

Remember, drift increases as...

...spray droplet size decreases because smaller droplets fall more slowly and are more easily moved by wind;

When there is no air movement 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 list 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 key is to reduce the percentage of these small particles.

...wind speed increases because droplets are carried farther before they can be deposited;

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."

...nozzle height from target surface increases because droplets take longer to reach the target surface;

...temperature rises and relative humidity falls because water in spray droplets evaporates, making droplets smaller.

Table 1. Factors affecting droplet size

Factor	Effect	Suggestion
Application pressure	Increasing pressure increases the percentage of fine droplets.	Set spray boom pressure to the lower range specified by specific nozzle types. Utilize nozzles which can be operated at 30 psi or less.
Nozzle type	The nozzle and orifice type can influence droplet size.	Use nozzles that produce larger droplet size or can be operated at lower pressure.
Temperatue and relative humidity	High temperatures and low relative humidity will result in evaporation of water, decreasing droplet size.	Wait until later in the day when temperatures are lower or use a drift reduction agent spray additive.
Herbicide formulation and spray additives	Herbicide formulations and spray additives such as drift reduction agents can change the physical characteristics of the carrier or alter its viscosity.	Use low volatility formulations when possible. Examples of these would be low volatile esters and amine formulations of 2,4-D. Drift reduction agents are designed to increase spray viscosity and droplet size.

Early Season Weed Control in Corn – (*Bill Johnson, Glenn Nice, and Tom Bauman*) -

Corn planting is underway and will continue in many portions of the state during the next week if the weather allows. Residual herbicide activity is very important in corn production due to the prevalence of weed species that emerge later in the growing season. If lack of or excess rainfall raises concern over the performance of soil-applied herbicides, you will need to scout corn fields within 1 to 2 weeks after planting to determine if weeds are escaping soil-applied treatments. Atrazine and atrazine premixes (Bicep II Magnum, Cinch ATZ, Harness Extra, Degree Extra, Fultime, Keystone, Guardsman, Guardsman Max, Leadoff, and Lariat) are used on a widespread basis. Most herbicide labels for these herbicides state that 0.5 to 1 inch of rain is needed within 1 to 2 weeks after emergence for proper activation and efficacy on target weeds. If the herbicide is not activated (moved into soil solution), it cannot be taken up by weeds.

If weeds emerge with the crop and do not die shortly thereafter, additional methods of weed control will be needed. Rotary hoeing will break up the soil crust, dislodge small weeds and reactivate soil-applied herbicides if an activating rainfall was lacking. This inexpensive, mechanical technique is probably underutilized in corn production in most areas.

In addition to mechanical techniques, there are several herbicides that can be used as early postemergence treatments in corn to control small, emerged weeds, provide some residual activity, and extend the window of residual control in the crop (see Table 1). This information should also be useful if untimely rain prevented spraying after planting, and the crop has emerged. Adjuvants will be needed with most of these products to maximize activity on emerged weeds. Consult WS-16 Weed Control Guidelines for Indiana <http://www.btny.purdue.edu/Pubs/WS/WS-16/> and the manufacturer's label for appropriate rates and adjuvants to use with these products.

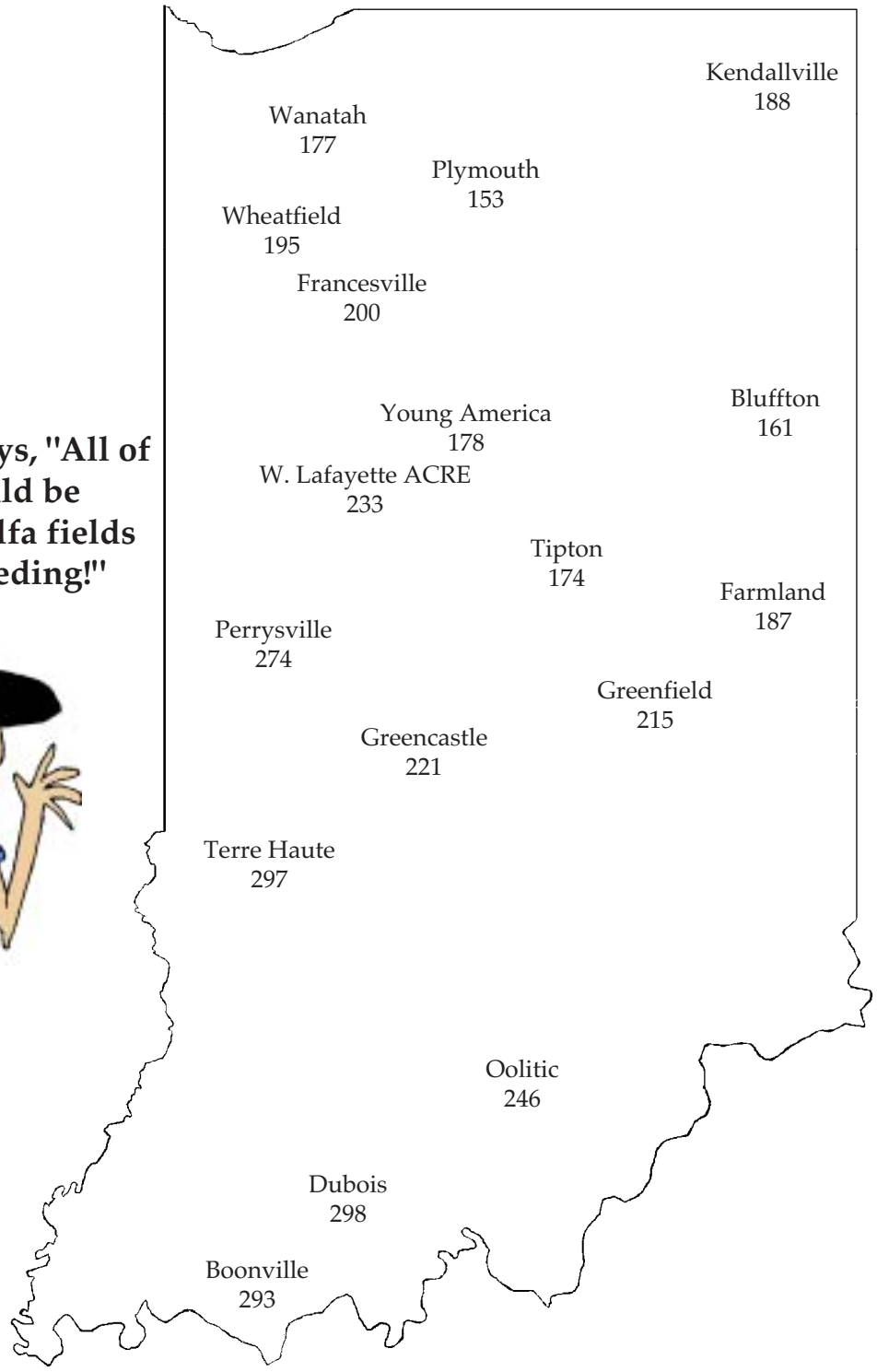
Herbicide	Weeds Controlled	Max. Weed Size According to Label	Max. Corn Size for Broadcast Applications
Atrazine	Grass and broadleaf	1.5 inch grass, 4 inch broadleaf	12 inches
Clarity/Distinct	Broadleaf	Established weeds	5-leaf or 8 inches for **Clarity**. **For Distinct**:: corn must be at least 4 inches tall. Use up to 6 oz./A for 4 to 10 inch corn and *no more* than 4 oz./A for 10 to 24 inch corn.
Bicep, Bicep II, Bicep Lite (includes Magnum formulations and Dupont's Cinch products)	Grass and broadleaf	2-leaf	5 inches
Bullet/Lariat	Grass and broadleaf	2-leaf	5 inches
Dual	Grass and small seeded broadleaf weeds	Will not control emerged weeds alone (requires a tankmix partner)	40 inches
Outlook	Grass and small seeded broadleaf weeds	Will not control emerged weeds alone (requires a tankmix partner)	36 inches
Field Master (if corn has emerged apply to Roundup Ready corn only)	Grass and broadleaf	6 inches	Prior to crop emergence
Guardsman Max	Grass and broadleaf	1.5 inches	8 inches
Harness, Degree, Surpass, Topnotch	Grass	Will not control emerged weeds alone (requires a tankmix partner)	11 inches
Harness Xtra/Degree Xtra, Fultime, Keystone	Grass and broadleaf	2-leaf	11 inches
Hornet	Broadleaf	Less than 8 inches	20 inches or V6
MicroTech	Grass and small seeded broadleaf weeds	Will not control emerged weeds alone (requires a tankmix partner)	5 inches
Lightning (Clearfield corn only)	Grass and broadleaf	4-inch grass and broadleaf	20 inches or V6
Marksman	Grass and broadleaf	1.5 inch grass	5-leaf
Prowl	Grass and small seeded broadleaf weeds	Will not control emerged weeds alone (requires a tankmix partner)	Dependent on tankmix partner
Python	Broadleaf	Less than 8 inches	20 inches or V6
ReadyMaster	Grass and broadleaf	6 inches	12 inches
Shotgun	Broadleaf	Established weed seedlings	4-leaf or 8 inches

Weather Update

MAP KEY
Location HU48

Temperature Accumulations from Jan. 1 to April 16, 2003

HU48 = heat units at a 48°F base from Jan. 1, for alfalfa weevil development (begin scouting at 200)



Bug Scout says, "All of Indiana should be scouting alfalfa fields for weevil feeding!"

4" Bare Soil Temperatures 4/17/03

Location	Max.	Min.
Wanatah	67	52
Columbia City	63	47
Winamac	64	49
Bluffton	53	51
W Laf Agro	72	57
Tipton	62	55
Farmland	65	48
Perrysville	59	55
Crawfordsville	64	56
Liberty	66	52
Terre Haute	67	58
Oolitic	65	53
Dubois	72	58

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.

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