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Insects, Mites, and Nematodes

Alfalfa Weevil Management Guidelines and Control Products – (John Obermeyer and Larry Bledsoe) –

- Weevils hatch multiple times in the spring, controls should be delayed for best efficacy
- Use damage and heat unit accumulation information as a guide in making management decisions

In most years, multiple hatches of weevil larvae occur in Indiana, as many as four population peaks may be seen in southern Indiana during the spring. Due to the phenomenon of multiple peaks, the application of controls should be delayed somewhat to reduce the likelihood that multiple applications of an insecticide will be needed. In other words, if an insecticide is applied too early and there are weevils yet to hatch, the insecticide may not be effective enough to control the later hatching larvae.

By utilizing heat unit accumulations data (base 48°F) to determine when sampling should begin and when a management action should be taken, producers can get the greatest economic return. The management guidelines listed below should be used as a guide in determining when alfalfa weevil should be controlled in southern Indiana. Refer to heat unit information in each week's *Pest&Crop* "Weather Update." This heat unit information will help one determine when management steps should be taken.

Alfalfa Weevil Management Guidelines, 2003 Southern Indiana

Heat units	% Tip feeding	Advisory
250		Begin sampling. South facing sandy soils should be monitored earlier.
300	25	Re-evaluate in 7-10 days using the appropriate HU or treat immediately with a residual insecticide if 3 or more larvae are noted per stem and % tip feeding is above 50%.
400	50	Treat immediately with a residual insecticide.
500	75	Treat immediately.
600	75+	If cutting delayed more than 5 days, treat immediately.
750		If harvested or harvesting shortly, return to the field in 4 -5 days after cutting and spray if 1) there is no regrowth and weevil larvae are present OR 2) feeding damage is apparent on 50% of the stubble and weevil larvae are present.

Insecticides For Alfalfa Weevil Larval Control ^{1,2}

Insecticide	Formulation and Amount per Acre	Harvest or Pasture Restriction	Remarks
carbofuran (Furadan) ^{1,2}	1/2 pt. 4F 1 pt. 4F 2 pt. 4F	7 days 14 days 28 days	Use only on pure stands of alfalfa. Use higher rate where residual control is needed. Do not make more than one application per season.
chlorpyrifos (Lorsban) ^{1,2}	1 pt 4E 2 pt. 4E	14 days 21 days	Some yellowing may be observed on young, rapidly growing alfalfa. Alfalfa will outgrow the yellowing and no yield loss should occur.
cyfluthrin (Baythroid 2) ¹	1.6 - 2.8 fl oz. EC	7 days	Use higher rates for heavy populations. Do not use on alfalfa grown for seed.
cyhalothrin (Warrior) ¹	2.56 - 3.84 fl oz. EC	1 day-forage 7 days-hay	Use higher rates for increased residual control. Avoid application when bees are actively foraging. Use only on pure stands of alfalfa.
permethrin (Ambush) ¹ (Pounce) ¹	12.8 oz. 2EC 8 oz. 3.2EC	14 days 14 days	Avoid application when bees are actively feeding. Do not apply more than 12.8 ounces (2EC) or 8 ounces (3.2EC) per acre per cutting. Do Not use in fields with more than 2 larvae per stem and before 500HU (base 48°F) have accumulated.
zeta-cypermethrin (Mustang Max) ¹	2.2 - 4.0 fl oz. EW	3 days	Use higher rates for increased residual control.

¹ Restricted use pesticide.

² Highly toxic to bees.



Western Corn Rootworm Winter Survival - (John Obermeyer and Larry Bledsoe) -

- Beetle egg laying late last summer determines the potential threat to 2003 corn
- Rootworms overwinter as eggs in the soil and are quite durable
- Soil temperature and other variables can affect egg survival
- Tillage does not control rootworms

Three facets of corn rootworm biology will dictate the potential for rootworm damage to corn in 2003: 1) beetle egg laying in 2002, 2) the success of egg overwintering, and 3) larval survival and establishment.

1) Beetle egg laying in 2002: As already outlined in *Pest & Crop* #1, February 21, 2003, many first-year corn fields in northern Indiana will be at risk from rootworm

damage because of last year's western corn rootworm beetle numbers observed in soybean. This is also true of most corn following corn throughout the state. Simply put, more beetles last year laid eggs, which means greater risk for root damage this year.

2) Egg overwintering and survival: We have received questions this winter concerning the effects of temperature and tillage on overwintering rootworm eggs. After all, the Midwest experienced some low temperatures this winter. Rootworm egg survivability has been researched many times and in different ways in the past. To seek answers one must consider numerous variables such as, soil temperature, duration of temperature, soil moisture, soil type & texture, soil compaction, tillage type, residue cover, snow cover, and depth of egg. Researchers have conducted experiments in order to predict overwintering survival. A recent study was summed up as follows: "... factors such as soil moisture

and temperature, which vary with soil depth and texture, and vary between and within years, make development of simple and highly predictable models of overwinter survival of western corn rootworm eggs difficult." Lab experiments with controlled conditions have studied the effect of temperatures on hatch. A two year study found that temperatures of 23°F and 32°F for 8 weeks resulted in 80% and 17% mortality respectively. Soil temperature data from Purdue's Agronomy Research Center, W. Lafayette during January (coldest period) averaged 30°F (minimums) at 4-inch (bare soil) depth. According to the above research, we shouldn't rely on the winter's cold to significantly decrease rootworm numbers.

Tillage experiments (1940's to present) to control rootworms have yielded a mixed bag of results. The strategy is to move the eggs near the soil surface where they will be exposed to lower soil moisture and temperature; desiccation causes high egg mortality. Knowing the depth of the overwintering egg is critical before tillage is considered as a control method. One study found 60% of the western corn rootworm eggs at a depth of 8-12 inches. Perhaps that is why researchers in one study concluded that "neither fall nor spring plowing can be recommended as a reliable method of controlling corn rootworms."

3) Larval survival and establishment: Here too many factors influence the survival of the newly emerged larva in the spring. Soybean sweeps in 1997 resulted in very high numbers indicating a high risk to first-year corn in 1998. However, heavy rains in late May and early June during egg hatch that season drowned many hatching larvae and damage was reduced. In short, barring environmental extremes such as drought or floods, hatched larva will find and begin feeding on corn roots within a few inches away.

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Calibrate Granular Insecticide Boxes Before Planting - (John Obermeyer, and Larry Bledsoe) -

- Properly calibrate your insecticide boxes as you service and ready your planter this spring,
- Calibrate each unit

Hopefully all producers have their planting equipment fine-tuned and ready for planting this spring. Just as it is important to have your planter units in good working order, your granular insecticide boxes should be cleaned, worn or broken parts replaced, and properly calibrated. The importance of this was recently brought to light while working with several producers on research trials in northwestern Indiana. For the past several years we've calibrated producer's granular applica-

tors before planting and found the settings change, even when using the same planter and product. Occasionally we find serious mechanical failures with boxes, causing significant misapplication.

Remember, each granular unit should be calibrated separately. Use calibration tubes and instructions supplied by the manufacturer or dealer for the insecticide of choice. To calibrate: 1) measuring off a distance of 500 feet along which the planter will travel at planting speed during the calibration process or operate the planter in a stationary position that allows one to simulate traveling 500 feet at planting speed, 2) set each application unit at some beginning setting (planter manual and/or insecticide label may help in this regard), 3) attach an insecticide collection device to each unit, 4) catch and weigh the insecticide that is metered out of each application unit over the prescribed distance, and 5) compare the amount of product caught for each unit with the amount that should be delivered over the prescribed distance (see following table).

Row Rates of Granular Soil Insecticide

Product	Oz. captured/ 500 feet of row
Aztec 2.1G	3.35
Aztec 4.6G (Smartbox)	1.5
Counter CR	3.0
Force 3G	2.0 – 2.5
Fortress 2.5G	3.0 – 4.5
Fortress 5G (Smartbox)	1.5 – 2.25
Lorsban 15G	4.0

When calibrating, don't forget to operate the planter at planting speed. Once you determine the correct setting for each unit, check each unit one more time to make sure that you are getting a fairly consistent reading. Also, record the setting somewhere on the insecticide box (but remember that you will still need to recalibrate next year even if using the same product). We can't stress enough the importance of proper calibration. Happy planting!

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Black Cutworm Adult Pheromone Trap Report
 Week 1 = 3/27/03 - 4/2/03 Week 2 = 4/3/03 - 4/9/03
 (Ron Blackwell)

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

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

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Southwestern Corn Borer Spring Surveys - (Ric Bessin, Doug Johnson, Clint Hardy, Mike Smith, and Rod Grusey, University of Kentucky)

Southwestern corn borer spends the winter as larvae in galleries at the base of corn stalks. Stubble in cornfields can be checked during early spring for damaged plants and surviving borers. This can provide an indication of what the first generation may be like for 2003. A survey of southwestern corn borer damage and larval survival was conducted in Caldwell, Daviess, Hardin and Henderson counties on March 13 and 14. These counties were selected because of the past infestation history. The purpose was to estimate the extent of SWCB damage, as evidenced by basal stalk girdling. In addition, we wanted to estimate the survival of the overwintering larvae in the crowns of these damaged plants. In each county, three to five non-Bt corn fields were evaluated. Within each field, 10 to 12 groups of 10 plants were examined for girdling. An additional minimum of 50 girdled plants were examined for the presence of live SWCB larvae.

2003 SWCB Spring Survey Results		
	Damaged plants	Live SWCB recovered
Daviess Co.		
Farm #1	66/100	0/50
Farm #2	41/100	0/50
Henderson Co.		
Farm #1	27/100	2/60
Farm #2	28/100	6/50
Farm #3	17/100	8/52
Farm #4	21/100	1/50
Farm #5	25/100	2/60
Caldwell Co.		
Farm #1	31/100	0/60
Farm #2	36/100	1/65
Farm #3	8/100	2/50
Farm #4	17/100	2/50
Farm #5	17/100	1/50
Hardin Co.		
Farm #1	26/100	7/73
Farm #2	12/100	4/71

This is the fifth year that we have conducted such a survey. In comparison to the previous winters, we had moderate levels of girdled plants, but the lowest survival of overwintering larvae because of the long cold winter. Moderate levels of girdled stalks were to be expected, because wet soils delayed planting in 2002. Delayed harvest allows SWCB time to migrate to the bottom of the stalk and girdle the plant. Late planted corn is also more attractive for late-season egg laying.

Observed levels of survival in the girdled crowns was welcome news. Of the girdled crowns sampled this spring, a large proportion had evidence of bird activity with the larva having been removed. Relatively few crowns had dead larva remaining in the overwintering chamber. The survival was the lowest observed in the last five years. While the survival of the larvae was less than last year and because there were so many larvae, the number of live SWCB larvae per stalk is almost twice of what we estimated last year, but the numbers are still very low. This survey indicates that there are relatively few SWCB moths to begin the season as compared with the past years.

Year	Girdled stalks (%)	Survival/girdled stalk (%)	Overall Survival/stalk (%)
2003	26.57	4.25	1.13
2002	11.78	5.31	0.63
2001	40.58	9.66	3.92
2000	20.73	26.85	5.57
1999	35.89	10.14	3.64

Keep in mind that overwintering survival is just one of the variables that will, in part, determine the potential for SWCB problems in 2003. Historically, the date of planting of individual fields has been a key variable contributing to the potential for late season SWCB damage. Although early season numbers seem to be very low, favorable conditions, may allow SWCB numbers to rebound by the second and third generations. Typically, fields planted after May 10 have an increased potential for this type of damage. Last year we had very low numbers of SWCB, but delayed planted made much of the crop more vulnerable to second and third generation borers.

What we can conclude:

- Thanks to the cold winter, we found low survival levels of SWCB larvae in each of the counties surveyed.
- Birds seem to feed heavily on SWCB larvae during the winter.
- Winter conditions were not sufficient to eliminate SWCB larvae.
- We expect low first generation SWCB pressure for those areas surveyed.
- Date of planting is still important. Corn planted after May 10 could be at risk to late season SWCB activity.

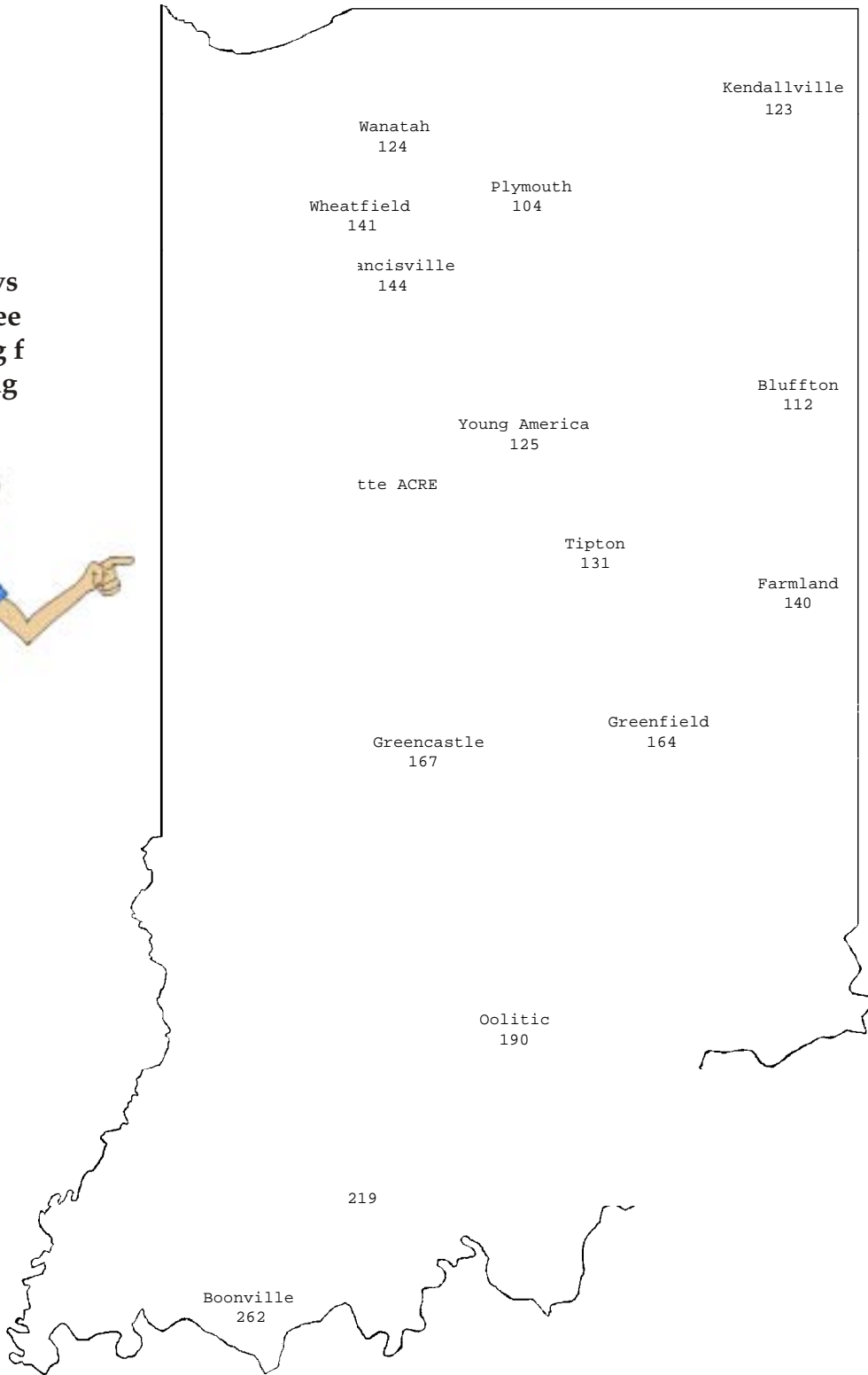
Weather Update

MAP KEY
Location HU48

Temperature Accumulations from Jan. 1 to April 9, 2003

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

**Bug Scout says
below here need
diate scouting f
weevil feeding**



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