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Note To Our Readers

***Pest&Crop* Changing to All Electronic Format** – (*John Obermeyer*) –

> *"Change is not made without inconvenience, even from worse to better."*
> Richard Hooker (1554–1600), British theologian

Several years ago we began making the *Pest&Crop* newsletter available on-line at no cost. Our intent was to gradually "wean" our paid subscribers from a printed and mailed copy to an electronic only version. Printing and mailing costs continue to rise and once again we are faced with increasing the subscription fee for printed and mailed copies for 2003. So, in keeping with a "paperless" directive that many departments have incorporated into their publications, we are discontinuing the printed and mailed *Pest&Crop* newsletter after this issue.

We understand that for many of you, the printed and mailed copy was a way to "force" yourself to glean articles during the busy growing season. As well, many of you have saved past year's issues for your own reference library. Hopefully you will now download the *Pest&Crop* immediately after you receive the reminder e-mail with "In This Issue" topics and a direct web link. The *Pest&Crop* can be retrieved as either a HTML version for quick download or PDF for optimum printing. Best of all, it's free! Please bookmark the following address: <http://www.entm.purdue.edu/entomology/ext/ext_newsletters.html>.

To our many faithful subscribers throughout the years…thank you! We hope and trust you will continue to utilize the *Pest&Crop* for pest management and crop production updates throughout the coming year. For those who have already sent in their subscription payment for the 2003 year, your checks have either or will soon be returned. We're sorry for any inconvenience this has caused.

Please e-mail Tammy Luck to receive notification when the first Feburary issue of the 2003 *Pest&Crop* is on-line at: tammy_luck@entm.purdue.edu

Insects, Mites, and Nematodes

Corn Rootworm, What Happened in 2002? – (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) –

- Several 2001 "moderate risk" fields were hit hard in 2002
- Unique weather, planting delays, and growing conditions allowed low numbers of rootworm larvae to severely damage puny roots
- Risk categories for perceived first-year corn rootworm damage are based on both science and best guess
- Insecticide decisions for 2003 should not be based alone on last season's conditions

Producers in many areas of the state are still reeling from low corn yields of 2002. As if extreme late planting followed by droughty conditions wasn't enough, rootworm became a factor in areas that were considered a moderate risk to first-year corn in 2002. So what happened? Most damaged first-year corn fields had several common factors: they were planted in late May or early June, no soil insecticides were applied, soils were compacted, the soil surface was hot and dry, while the subsurface soils were cool and wet, and the few surviving rootworms fed on newly developing nodal roots. In other words, many variables, most beyond our control, created puny, misshapen, and slow growing roots, while normally sub-economic numbers of rootworms became the "last nail in the coffin."

Risk categories to first-year corn rootworm are developed from previous year's soybean sweeps taken while western corn rootworm (WCR) beetles are actively laying eggs, captures of beetles on yellow sticky-traps, and pest manager's observations (please refer to the following article "Corn Rootworm, Management Guidelines for First-Year Corn in 2003" and graphic "Perceived First-Year Corn Rootworm Risk Areas, 2003"). There is an inherent problem with publishing such a map, that is producers take it too literately. The intent is to provide guidelines, not absolutes. It must be noted that we are drawing these conclusions from at best a few fields sampled per county. That leaves a huge margin of error. "High risk" indicates that most soybean fields sampled or observed in that county or area contained high numbers of WCR beetles coupled with the fact that first-year corn rootworm damage frequently occurs in that county. "Moderate risk" means that high to low WCR beetle numbers vary from field to field and that previous first-year rootworm damage has been spotty. "Low risk" areas have consistently low WCR beetle numbers in soybean with few, if any, damaged first-year corn fields reported.

These risk maps have been created for the past several years and have been used responsibly and successfully by pest managers throughout the state. Until 2002, we've heard very few complaints. We continue to encourage pest managers to monitor soybean fields in their area so that more precise WCR management decisions can be made. Our desire is to see financially successful Indiana producers and one way to have this happen is for the proper control option to be used. Remember, pesticides DO NOT increase but only protect yields. If they are needed and there are no other options, then they should be used.

Rootworm damage to crown nodal roots

A typical compacted root system in 2002

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Corn Rootworm, Management Guidelines for First-Year Corn in 2003 – (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) –

- Rootworm management guidelines for corn following soybean are given by region of Indiana
- Rootworm beetle numbers in 2002 were highest in northwestern and west central counties, a mixed bag in other northern counties, and lowest in the southern half of the state

When one uses a soil insecticide it is important to remember that protection of the primary portion of the root system from economic larval attack is the goal.

Also, one needs to understand that products do not provide 100% control (60-80% control more likely) and occasionally some economic damage may occur depending on the larval population, weather, product performance, planting date, plant development, and time of larval hatch. All of these factors can ultimately impact product performance and must be considered when using a soil insecticide. The important thing for producers to understand is the positive and negative aspects of each product, and determine which one(s) fits best within their farming system. Also, one needs to understand what the warranty for each product really means. Additionally, it makes sense to have untreated check strips in fields to gauge the performance and economics of the products used.

The following guidelines, formulated from 2002 research and observations, should be taken into consideration when making rootworm management decisions for 2003 corn following 2002 soybean.

Northern Indiana (approx. north of Interstate 70):

- A soil insecticide is not needed for rootworm larval control where *no, or very few,* rootworm beetles were observed in 2002 soybean (see discussion below on other soil insect pests).
- Where numbers of western corn rootworm beetles on Pherocon® AM yellow sticky traps in soybean fields in 2002 averaged five (5) or more beetles/trap/day during any trapping week, the application of an insecticide in these fields in 2003 is likely needed. NOTE: In research fields where at least 5 WCR beetles/trap/day in soybean were observed, >95% of the cornfields reached economic root damage the following year.
- In areas where rootworm larvae have caused damage in corn and one *did not monitor* for western rootworm beetles in 2002, a soil insecticide may be needed in 2003 (see the enclosed map "Perceived First-Year Corn Rootworm Risk Areas, 2003")
- Where the average number of larvae in 2003 soil samples is approximately 2 or more per plant by hand sorting or 8 or more per plant by washing, a soil insecticide may be needed before lay-by in 2003. Apply a soil insecticide according to cultivation application instructions on the product label (refer to *Managing Corn Rootworms – 2002*, at <www.entm.purdue.edu/Entomology/ext/targets/e-series/fieldcro.htm>.

Southern Indiana (approx. south of Interstate 70):

Presently we are not observing high numbers of western rootworm beetles in fields other than corn below approximately Interstate 70. Therefore, most 2002 soybean fields going to corn in 2003 will not need to be treated with a soil insecticide for rootworm larval control (see discussion below on other soil insect pests). The exception would be where producers sampled with Pherocon® AM yellow sticky traps and beetle numbers reached or exceeded thresholds given above or where high numbers of western beetles were observed during any time from late July through August 2002.

- The potential for a rootworm problem is minimal or nonexistent if very few beetles were observed in soybean the previous year.
- If a field is being planted to corn following a soybean crop that had a high population of volunteer corn (in excess of approximately 4,000 corn plants per acre) and rootworm beetles were present, treatment may be needed.
- If planting after May 1, applying a reduced rate (75% rate) of some rootworm insecticides may be a cost-saving, yet efficacious, option (see discussion below on other soil insect pests).
- Where the average number of larvae in 2003 soil samples is approximately 2 or more per plant by hand sorting or 8 or more per plant by washing, a soil insecticide may be needed before lay-by in 2003. Apply a soil insecticide according to cultivation application instructions on the product label (refer to *Managing Corn Rootworms – 2002*, at <www.entm.purdue.edu/Entomology/ext/targets/e-series/fieldcro.htm>.

The above discussion is based on assessment of risk of damage from corn rootworm. An insecticide may be needed if other soil insect pests (e.g., grubs, wireworms, etc.) are present in economic numbers. Whenever soil insecticides are used, we encourage producers to leave untreated strips in order to evaluate product performance and the economics of using insecticides.

Perceived First-Year Corn Rootworm Risk Areas, 2003

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Pre-Applied Insecticide Seed Treatments – (*John Obermeyer, Rich Edwards, and Larry Bledsoe*) -

- Cruiser, the newest approved insecticide for treated corn seed
- These products are not recommended in high-risk rootworm areas
- The short systemic activity of some of these products may protect seed and seedling from other soil insect pests
- Conditions given that may justify the use of these products

There have been many questions about the new pre-applied insecticide seed treatments available for corn. The attractiveness of having a soil insecticide "wrapped" directly on the seed in understandable. Cruiser (just registered) and Prescribe are both from the newer insecticide class, nicotinoids. ProShield contains the same active ingredient as Force granular soil insecticide, the pyrethroid tefluthrin. All of these products must be custom applied to seed with specialized equipment, therefore producers must order them at the time of seed purchase. Prescribe and Gaucho are the same chemistry, Prescribe is applied to the seed at a higher rate to protect seedlings against some rootworm feeding. Cruiser will have two rates, the higher rate is to compete with Prescribe in the corn rootworm market.

At this time, we are not recommending using seed applied insecticides, i.e., Cruiser, Prescribe, and ProShield, for corn rootworm control in high-risk areas (see previous article). This is because of the inconsistencies that have been seen in university trials throughout the Midwest. The labels literally state "protect" or "protection" from rootworm...not control. For producers in areas with low to moderate rootworm pressure, these seed treatments may be beneficial and may also offer protection from other soil insect pests, e.g., wireworms, seedcorn maggots, etc.

Industry/university trials, but mostly producer's testimonials, have given some promising results with Cruiser and Prescribe against wireworms and seedcorn maggot. The systemic activity of these products results in some early suppression/control of corn flea beetle as well, although this insect is not a major pest of yellow dent corn. Certainly the biggest question for producers and researchers is how effective these products are against white grubs. Limited trials have shown a mixed bag of results, as is true with many granular soil insecticides. Most likely there will be some suppression of grubs, but not control. The labels literally read "protect" or "protection" from grubs.

Should one use the pre-applied insecticide seed treatments? Return on investment of seed applied treatments may improve for some pests other than high risk rootworms if:

- field is planted early (before last week of April)
- field is first-year corn and is not in a rootworm high-risk area
- field has a recent history of wireworm damage
- field is no-tilled into dying vegetation
- field is spread with animal manure before planting
- field is higher yielding (180+)

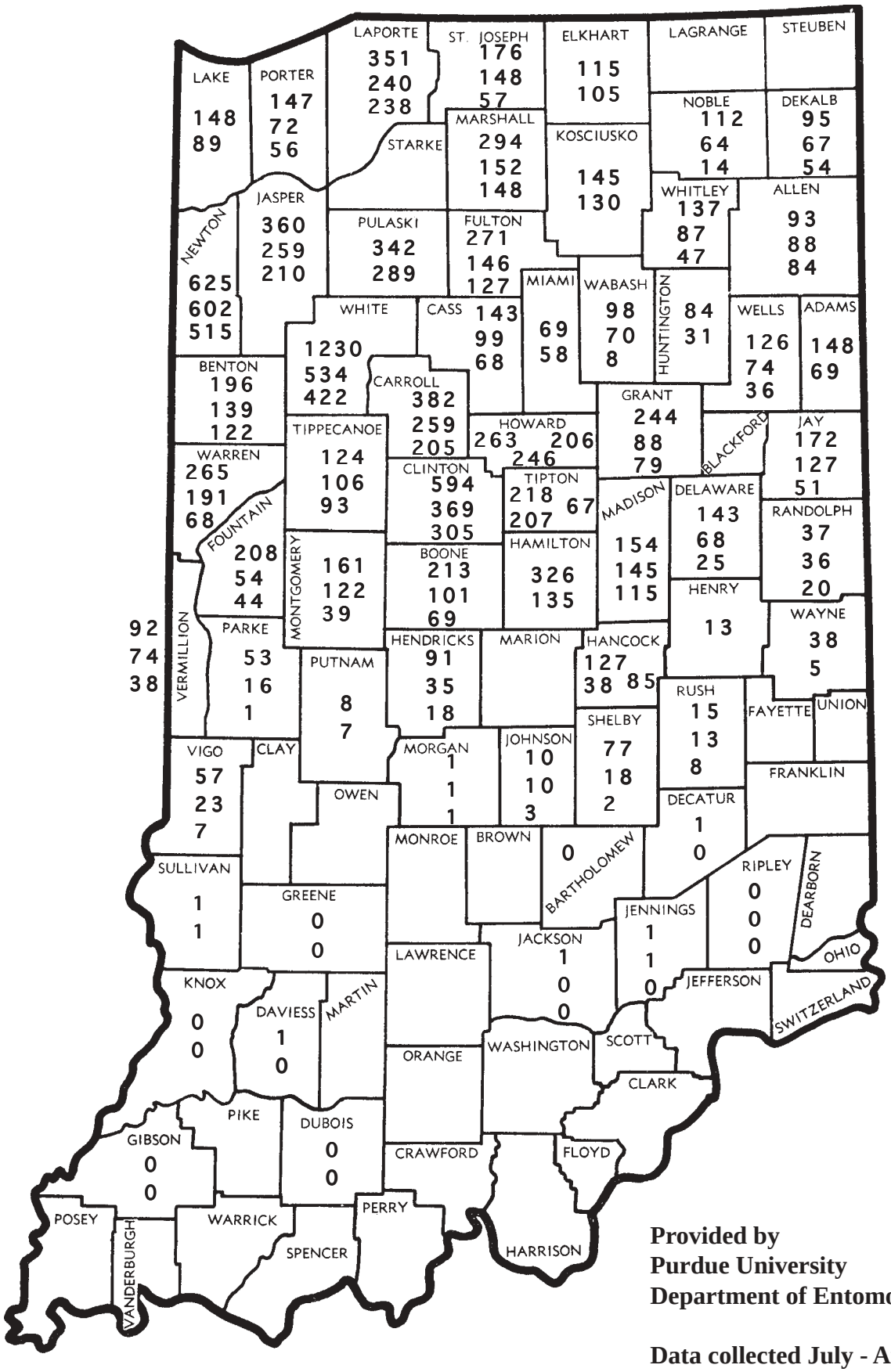
Below are rootworm efficacy trial results for pre-applied insecticide seed treatments from Indiana and Illinois for 2002:

Root-Rating Performance[1], 2002

Location	Best[2] Rating	Cruiser	Prescribe	ProShield	Check
Lafayette, IN	1.60		2.35	2.40	4.20
Lafayette, IN (2)	1.60	2.25	2.15	2.40	2.10
Farmland, IN	1.25		1.95	2.45	3.85
Columbia City, IN	1.55		2.95	2.50	4.80
DeKalb, IL	2.60	3.65	3.50	4.00	4.65
Monmouth, IL	2.05	3.75	2.85	2.94	3.94
Urbana, IL	1.85	2.20	2.60	3.10	3.95

[1]Root rating: 1 = none to little damage, 6 = severe root pruning, 3.5 or greater - economic damage likely
[2]The "Best Rating" is the least amount of rootworm damage for any soil insecticide in the plot.

2002 Western Corn Rootworm Sweep Net Survey in Soybean (Number/100 Sweeps)



Provided by
Purdue University
Department of Entomology

Data collected July - August, 2002

Weeds

Weed Science News for November – (*Bill Johnson, Glenn Nice, and Tom Bauman*) -

Fall applied herbicides. Fall applied herbicides for winter annual weed control should be applied late October and November when soil temperatures reach 50°F or less. We are little past the optimum timing for best activity. Efficacy of glyphosate (Roundup/Touchdown/Glyphomax, etc.) and 2,4-D products will be best when daytime air temperatures are above 50°F. Efficacy of contact products such as Gramoxone, Authority/Spartan, and Sencor tends to not drop off as quickly when air temperatures are less than 50°F and should be considered if you are still considering whether or not to apply herbicides this fall.

Fields that are logical candidates for fall applied herbicides include those with poor drainage and heavy winter annual weed populations. If the winter annual weed pressure is heavy enough to slow the drying process in the spring and tillage is utilized to dry and warm the soil, the use of fall applied herbicides may be able to reduce spring tillage and subsequently soil erosion. However, keep in mind that removal of winter annual ground cover will allow the soil to warm more quickly and summer annual weeds will emerge earlier as the soil warms.

We have received a few reports of fall applied atrazine use in Indiana. Atrazine is not labeled to be applied more than 45 days before planting corn or grain sorghum in Indiana. Atrazine is labeled for fall applied use in Kansas as an extension of the eco-fallow label for that state. However, atrazine applied in the fall in Indiana is off label and subject to reprimands and possible fines by the Office of Indiana State Chemist. However, the use of simazine (Princep) is labeled for use before corn in the fall. This may be a good replacement for those who desire to use atrazine.

For an excellent summary of the activity of various fall applied herbicides on specific weeds, see this article by Mark Loux, Tony Dobbels, and Jeff Stachler at Ohio State University in the Ohio Crop Observation and Recommendation Network <http://corn.osu.edu/archive/2002/oct/02-36.html>.

Glyphosate tolerance in weeds. A number of sites experienced difficulty in controlling marestail (horseweed) and giant ragweed with glyphosate this past year. Glyphosate-resistant marestail has been documented in Delaware, Tennessee, and Kentucky. There is some evidence that suggests that we also have a few sites in southern and southeast IN. At this time we are cooperating with the Weed Science personnel at Ohio State to investigate the tolerance of a few marestail populations to glyphosate and ALS inhibitors. We will write a follow-up article on this topic when the results of the study are conclusive.

Glyphosate tolerance among various biotypes of giant ragweed has not been investigated as thoroughly as marestail to date. It appears that in a number of cases, the presence of stalk tunneling insects may have impaired herbicide activity. There were also reports of control failures when stalk boring insects were not present. Giant ragweed appears to emerge over a relatively long period and some of the control failures could also be related to subsequent emergence. We will be monitoring this situation closely and interested in collecting seed from sites that have experience failures.

Plant Diseases

2002 Indiana Ear Rot and Mycotoxin Survey – (*Charles P. Woloshuk*) –

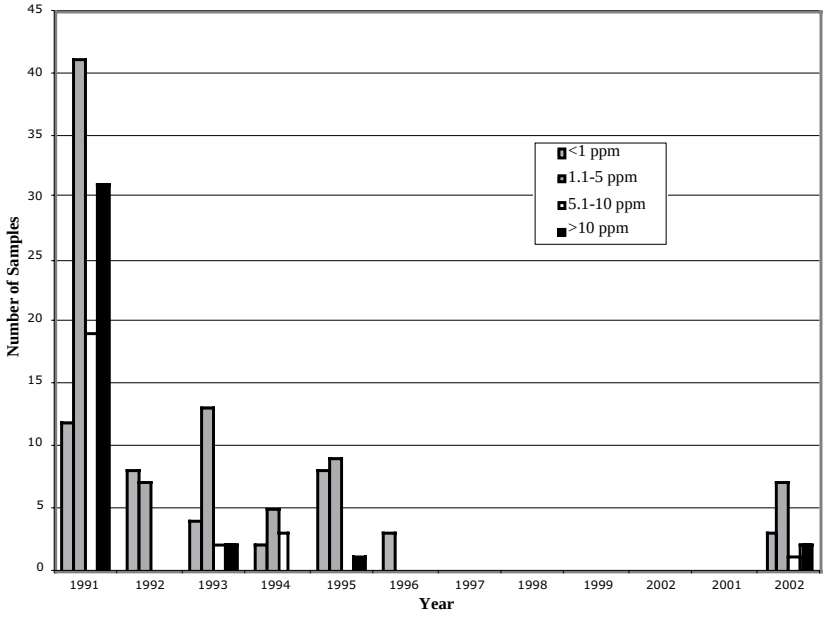
- Poor quality of Indiana corn will mean problems for long term storage
- Fumonisins have returned after a 5 year decline

Beginning in 1989, we have surveyed Indiana cornfields to determine the extent of pre-harvest ear rots and mycotoxins. Each year, the Indiana Agricultural Statistics Service (IASS) selects the fields to be sampled and two sites within each field are sampled during the fall prior to harvest. The samples from each site consists of the primary ears from five consecutive plants in a single row. The ears with the husks intact are placed in cloth bags and mailed to Purdue University. Upon arrival, the husks are removed and the ears examined for ear rot symptoms. Each year, I examine samples from about 160 fields. Data are recorded for the percentage of kernels with symptoms of the following diseases: *Fusarium* ear/kernel rot, *Gibberella* ear rot, *Aspergillus* ear rot, *Diplodia* ear rot, and ear rots caused by *Alternaria*, *Nigrospora*, *Penicillium* and *Trichoderma*. Samples with 10 percent or more rotted kernels are tested for mycotoxins (aflatoxin, ochratoxin, zearalenone, deoxynivalenol and fumonisin) by the Animal Disease Diagnostic Laboratory at Purdue.

The 2002 survey is nearly complete, and I have examined 1530 ears from 306 samples. The quality of the ears is the poorest that I have seen in years. Many of the samples contained small ears with fewer than 300 kernels per ear. There were also many barren ears. Nearly a third of the ears examined had some insect damage, ranging from a few kernels to nearly all the kernels. Striking was the amount channeling damage to the crowns of kernels. In many cases, no mold growth was visible on the exposed endosperm tissue. When mold was present it was always a grayish-green *Penicillium* species. Some good news is that I have seen very little *Diplodia* ear rot. To date, the ADDL has analyzed 29 samples for mycotoxins. Fifteen of the samples had no mycotoxins. No samples contained aflatoxins or ochratoxins. One sample that had an ear with severe (50%) *Gibberella* ear rot contained 40 ppm deoxynivalenol and 1 ppm zearalenone. Thirteen of the samples contained fumonisins, 9 of which had 1.6 ppm total fumonisins (FB_1 + FB_2) or less. Of the remaining four samples, we measured 21 ppm, 12 ppm, 4.2 ppm, and 5.2 ppm of total fumonisins. The ears in these last four samples were very small with major insect damage and *Fusarium* kernel/ear rot.

In addition to the data obtained from the survey, I have received several calls from several producers and grain handlers concerning mycotoxins in the corn. There were a few reports of loads containing aflatoxin, but Indiana appears to have avoided the aflatoxin problems that have occurred in states to the west. The major concern in Indiana will be from fumonisins. We have seen a decline in fumonisin contamination since 1991, the year we started monitoring the mycotoxin, until this year. The incidence and severity of the disease has been low over the past 5 years with no fumonisins detected in the samples we analyzed (see table). The reason for the increase in fumonsins levels this year is due to the heat, drought, and insect damage that have stressed the corn crop. These conditions are ideal for the growth of the *Fusarium* mold that produces fumonisins. Fumonisins are a group of mycotoxins that cause equine leukoencephalomalacia in horses, donkeys, and mules, and pulmonary edema in swine. There is evidence that links fumonisin to cancer and to fetal neural tube defects in humans. The U.S. Food and Drug Administration (FDA) has set guidance levels for fumonisins in food at 2 to 4 ppm, depending on the food product. For animal feed the FDA has set levels at 1 ppm total fumonisin in the total rations of horses and rabbits. The level is 10 ppm for swine, 30 ppm for ruminants, and 50 ppm for poultry in the total rations. Our data suggest that individual fields in Indiana may have high levels of fumonisin. We recommend that horse owners limit the amount of corn in their feed or have the feed tested for fumonisin. Removing fumonisins for contaminated corn is not really possible, but cleaning, especially after drying and before delivery and/or storage, should remove damaged kernels and fines, which contain most of the mycotoxin. This will also help to minimize discounts and improve storability of the corn.

Proper storage of this year's corn is crucial. Drying the grain to 15% moisture will stop further growth of the molds that produce aflatoxin, zearalenone, deoxynivalenol, and fumonisin. However, the widespread insect damage will result in a lot of broken kernels and fines in the stored grain. Storage molds, such as *Aspergillus glaucus*, which can grow at 14 to 15% moisture, will find it easy to invade the kernels and cause further spoilage damage. The grain should be dried to below 14% and cooled to below 50°F as soon after harvest as possible, and then to 30°F for winter storage. Storage time should be limited to the cold weather season and no corn with a lot of damage should be held into next summer.



Recertification Program Now Online – (*Cheri Janssen*) -

- You know about "three recertification programs in five years; two programs in one year for credit"
- And now add "one of the three programs can be an online program"

Private applicators with Internet access can now receive credit for a recertification program at their convenience. The first online program is "Aquatic Plant Management." After paying the $10 fee (credit cards only) the private applicator receives a log-in name and password. They then have 90 days of unlimited access to complete the 9 modules that make up the program. A self-evaluation quiz follows each module and must be completed before moving on to the next module. After completing the last module, the user triggers a message that will credit the program to their private applicator record. Programs will be credited only upon completion (not registration).

To find out more about the online recertification program go to Programs on the PARP website <www.btny.purdue.edu/PPP/PARP/>. To register for the online program, call **1-888-EXT-INFO (398-4636).**

Carry It With You

Bring your private applicator permit card when you attend recertification programs. The new private applicator permit cards are plastic, designed for you to carry it with you. Using your PA number when you register at a program instead of your social security number helps protect the personal information linked to your social security number. Your PA number is your unique identification in the private applicator database and is needed to assure appropriate program credit. We want to make sure the right Joe Smith receives credit for the program.

Your pesticide dealer will also need to see your PA permit when you purchase pesticides.

You can easily get a replacement card if yours becomes lost or unreadable by calling Pat McGinnis, OISC, **765/494-6271.**

So carry it with you, it's a good idea.

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Spread the Word – ID Required - (*Cheri Janssen*) -

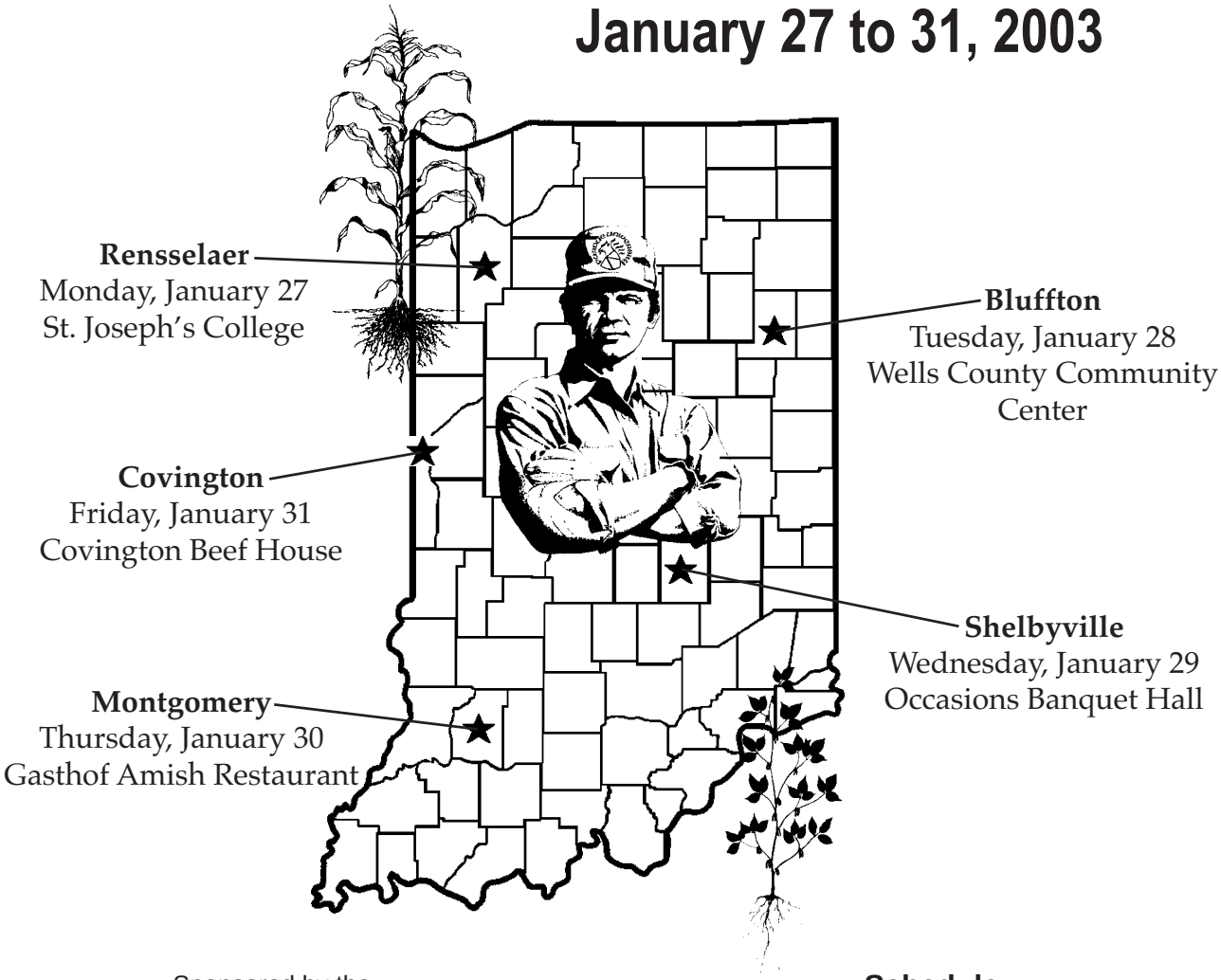
A government issued photo ID is required at all pesticide exam sites – at Purdue University campus, at regional sites for private applicators, and at remote exam-by-computer sites. A photo-exempt ID from the Bureau of Motor Vehicles will be accepted if religious beliefs do not allow personal photographs.

People needing a private applicator permit for the first time or to reinstate an expired permit will need to take the exam. You may know family members, employees, or neighbors that need a private applicator permit (or commercial license) and will need to take the pesticide exam. Let them know of the ID requirement or direct them to the Purdue Pesticide Programs at **765/496-7499**.

Mark Your Calendar for the

2003 Crop Management Workshops

January 27 to 31, 2003



Rensselaer
Monday, January 27
St. Joseph's College

Bluffton
Tuesday, January 28
Wells County Community Center

Covington
Friday, January 31
Covington Beef House

Shelbyville
Wednesday, January 29
Occasions Banquet Hall

Montgomery
Thursday, January 30
Gasthof Amish Restaurant

Sponsored by the
Purdue Pest Management Program

in cooperation with the Departments of
Botany and Plant Pathology
and Entomology

Additional Information

John Obermeyer
765-494-4563

Schedule

(all locations, EXCEPT Rensesslaer, are Eastern Standard Time)

8:30 - 9:00	Registration
9:00 - 12:15	Morning Presentations
12:15 - 1:00	Lunch Provided
1:00 - 4:15	Afternoon Presentations
4:15	CCH/CEU Forms

Topics

(for each location)

Disease, Insect, and Weed Control Strategies
State and Federal Pesticide Regulations
Making Sense of GPS Soil Test Data
Soybean Cyst Nematode Management

Registration Information Forthcoming...

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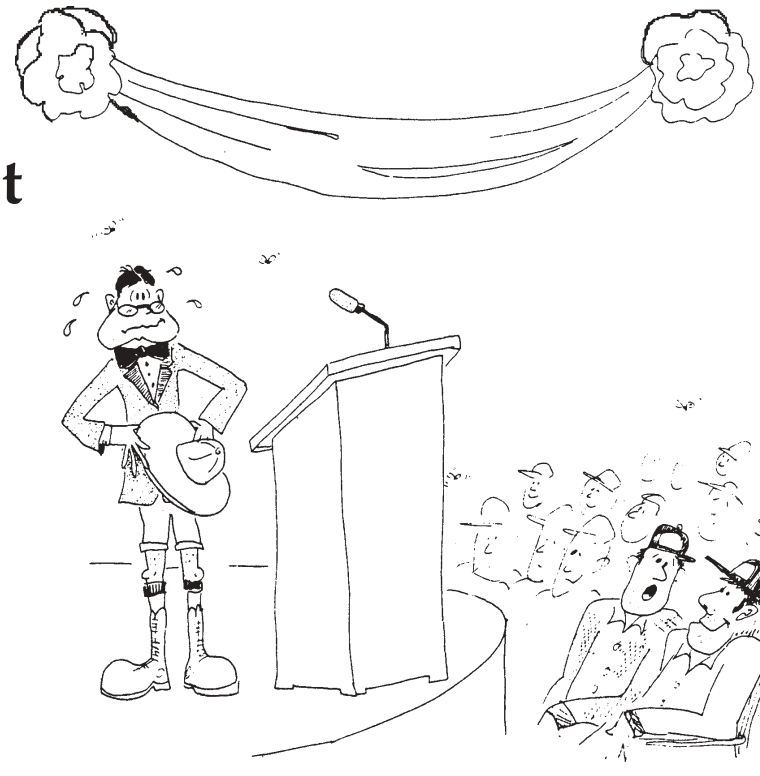
Bug Scout



Ol' Bug Scout cleans up pretty good for the Crop Management Workshops!

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The Pest&Crop staff would like to wish you a happy and safe holiday season!

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