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Insects, Mites, and Nematodes

2003, A Tough Year for the Rootworm – (John Obermeyer and Larry Bledsoe) –

- Cool spring soils extended rootworm egg hatch
- Excessive soil moisture drowned many rootworms
- Rains allowed root regeneration with little impact on yield

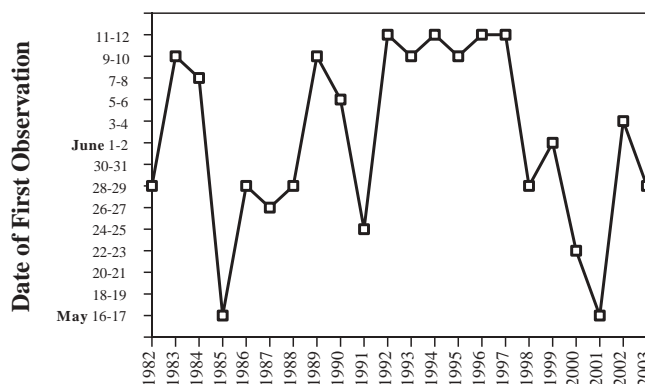
Rain makes grain...certainly not rootworms. A combination of cool and saturated soils this spring did not bode well for rootworm larvae. Therefore, the egg "load" from the high beetle numbers the previous season didn't equate to the amount of root damage expected in this year's corn.

Though initial rootworm egg hatch occurred on schedule, late May, the continual cool soils extended this activity through much of June. Newly hatched larvae are vulnerable to harsh soil conditions, such as high moisture levels and/or low temperatures. When the sky let loose in early July, not only were some fields flooded, but many early instar larvae were drowned.

Correlating early-season root reduction, whether from agronomic or biological factors, to corn yield is next to impossible. Too many variables interact to determine

the plant's ability to regenerate roots without sacrificing ear size. This was the case with rootworm damage in 2003 and the resulting corn yields. Though there were some fields with significant rootworm feeding, especially before the early-July rains, most damaged plants were able to regenerate a substantial root mass and still produce good to excellent yields. "Rain makes grain."

DATES CORN ROOTWORM LARVAE FIRST OBSERVED IN CORN ROOTS, TIPPECANOE COUNTY, INDIANA, 1982-2003



It only goes to reason that high rootworm larvae mortality will result in fewer emerging beetles. Indeed, 2003 western corn rootworm beetle numbers are the lowest we've had for over five years. The good news is that the potential risk of rootworm damage is reduced for next season, the bad news...risk is still present. Refer to the following article on perceived risks for 2004.

• • P&C • •

Perceived Risks to Western Corn Rootworm Damage in First-Year Corn – (John Obermeyer and Larry Bledsoe) –

- Risks of next season's WCR damage is based on beetle numbers and past trends
- Ultimately weather has the biggest impact on rootworm numbers and potential damage
- The following risks are to be used as a guideline, refinement should be done on a local level
- Risk categories defined

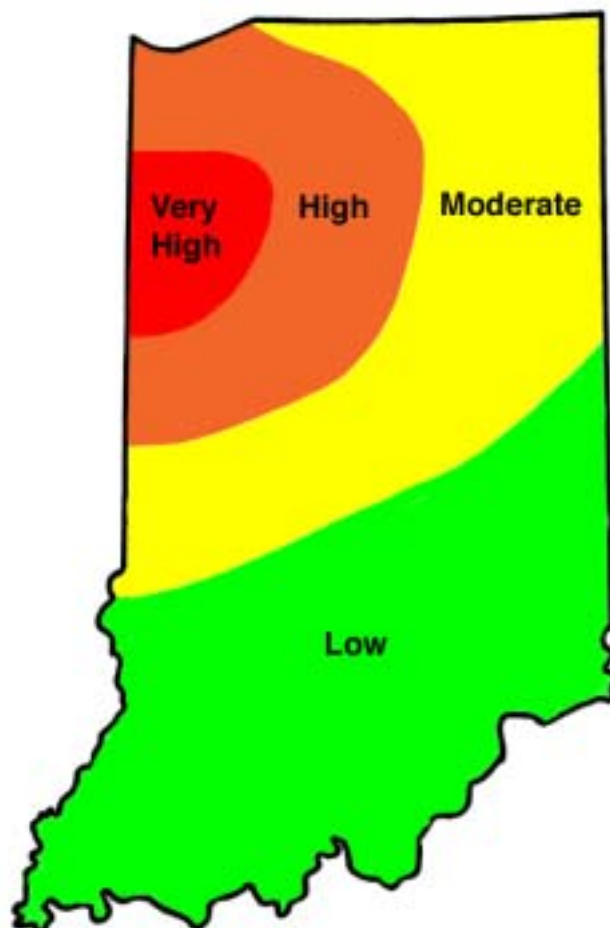
Quoting the great "philosopher" Yogi Berra, "It's tough to make predictions, especially about the future." This is especially true of biological organisms. Our expectations of significant rootworm damage this past season weren't realized. In hindsight we understand that weather extremes played a major role in reducing rootworm numbers. Weather continues to be, and will always be, the major influence on insect numbers and subsequent crop damage. Numerous other biotic and agronomic variables occurring statewide or in localized areas make predictions of corn rootworm problematic.

For several years, we've assigned risk categories to first-year corn rootworm guided by previous year's soybean sweeps taken while western corn rootworm (WCR) beetles were actively laying eggs and any other factor we considered important. There was an inherent problem with providing an annual risk map delineated by county, that is, producers took it too literally. The intent was to provide estimates of risk, not absolutes. Because we draw these conclusions from at best a few fields sampled per county, there is a large margin of error. Should you desire to see the state map with specific soybean sweep numbers from 2003, refer to the October issue of the *Pest&Crop* or click [HERE](#) (download the state map).

The following "new and improved" perceived risk to first-year corn rootworm map is a compilation of many years of research, surveys, and discussions with Indiana agribusiness personnel. Unless western corn rootworm infestations and subsequent damage to first-year corn are deemed to be shifting, this map will remain as drawn. Other changes are that county boundaries have been removed and a new category, "Very High," has been added. We continue to encourage pest managers to monitor soybean fields in

their *specific* area so that more precise risks can be assigned and appropriate management strategies implemented.

Perceived First-Year Corn Rootworm Risk Areas



"Very High" indicates that consistently high numbers of WCR beetles have been found in soybean fields. First-year WCR damage is likely and may be severe in parts of or whole fields.

"High" risk indicates that most soybean fields sampled or observed in that area contained high numbers of WCR beetles coupled with the fact that first-year corn rootworm damage frequently occurs.

"Moderate" risk means that WCR beetle numbers vary from field to field and that significant first-year rootworm damage is expected to be spotty.

"Low" risk areas have consistently low WCR beetle numbers in soybean with few, if any, damaged first-year corn fields expected.

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Rootworm Soil Insecticides: Choices, Considerations, and Efficacy Results - (John Obermeyer and Larry Bledsoe) –

- Four delivery methods for rootworm insecticide exist, none provide perfect control
- Brief discussion of each delivery method and product rootworm efficacy compared

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

Listed below, by application method, are the current registered soil products and their efficacy in

protecting roots in 2003 Indiana and Illinois university rootworm trials. All data, except the transgenic trial, are from the same tests. Separation by application technology was made so that like-products could more easily be compared. There is no consideration of other insect pests, e.g., wireworms, white grubs, cutworms, in these evaluations.

Insecticide-coated seed: There have been many questions about the newer pre-applied insecticide seed treatments available for corn. The attractiveness of having a soil insecticide “wrapped” directly on the seed is understandable. Cruiser (1.4 rate) and Poncho 1250 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. Using seed applied insecticides for corn rootworm control in high-risk areas (see previous article) may be a gamble. This is because of the inconsistencies that have been seen in university trials throughout the Midwest (Poncho 1250 may be the exception, see following discussion under *Bt Corn Rootworm*). 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.

Insecticide Coated Seed Root-Rating Performance¹, 2003

Location	Best ² Rating	Cruiser 1.4	Poncho 1250	ProShield	Check
Lafayette, IN	1.90	4.00	2.25	3.65	5.30
Wanatah, IN	1.60	2.70	2.10	3.00	4.85
Columbia City, IN	1.75	2.45	2.00	3.20	3.15
DeKalb, IL	2.10	3.50	3.50		4.20
Monmouth, IL	2.40	4.20	3.45		4.95
Urbana, IL	1.90	2.70	2.90		4.60

¹Root rating: 1 = none to little damage, 6 = severe root pruning, 3.5 or greater - plants likely predisposed to a significant yield loss

²The “Best Rating” is the least amount of rootworm damage for any soil insecticide in the plot

Liquid soil insecticides: Producers have had the option of the liquid insecticides Capture and Regent for several years. At first, the niche market for these products and their unique application equipment were for producers without granular soil insecticide applicators on their planters, and who were beginning to notice rootworm damage in first-year corn. We became concerned when companies aggressively targeted the rootworm market in high-risk areas of the state. Producers soon found that the performance of these products under high rootworm pressure was

inconsistent, some with disastrous results. The recent release of the new John Deere 1790 planter with the FMC “LiquidReady” system as the only insecticide application equipment option certainly has gotten our attention. We would encourage producers in the very high-risk, first-year rootworm areas contemplating using the currently available liquid insecticides to evaluate their recent experiences with rootworm. The new transgenic corn for rootworm (see discussion below) might be a better fit in high-risk areas.

Liquid Soil Insecticide Root-Rating Performance¹, 2003

Location	Best ² Rating	Capture	Regent	Check
Lafayette, IN	1.90	2.75	3.75	5.30
Wanatah, IN	1.60	3.10	2.55	4.85
Columbia City, IN	1.75	2.20	2.30	3.15
DeKalb, IL	2.10	2.70		4.20
Monmouth, IL	2.40	3.20		4.95
Urbana, IL	1.90	2.55		4.60

¹Root rating: 1 = none to little damage, 6 = severe root pruning, 3.5 or greater - plants likely predisposed to a significant yield loss

²The "Best Rating" is the least amount of rootworm damage for any soil insecticide in the plot

Granular soil insecticides: Granular insecticides have long been considered the standard from which other soil products are compared. They've been criticized for being bulky, dusty, and time consuming albeit considered the most consistent in performance. Though formulations and product names have changed over the last several years, chemical class has remained the

same...organophosphates and synthetic pyrethroids. EPA has hinted several times in the past that granular soil insecticides, especially the organophosphates, will be phased out. Recent formula registrations and product re-registrations doesn't reflect that. Insect resistance or enhanced biodegradation has not been an issue with the current registered products.

Granular Soil Insecticide Root-Rating Performance^{1,2}, 2003

Location	Best ³ Rating	Aztec 2.1	CounterCR	Empower	Force	Fortress 2.5	Lorsban	Check
Lafayette, IN	1.90	2.45	2.35	3.95	2.40	1.90	2.90	5.30
Wanatah, IN	1.60	2.70	2.00	4.30	2.55	2.70	2.45	4.85
Columbia City, IN	1.75	2.15	1.95	2.30	2.20	2.00	2.70	3.15
DeKalb, IL	2.10	2.15	2.45		2.20	2.20	2.65	4.20
Monmouth, IL	2.40	2.70	2.20	4.15	2.70	2.40	2.56	4.95
Urbana, IL	1.90	2.10	1.90	2.75	2.20	2.00	2.10	4.60

¹Root rating: 1 = none to little damage, 6 = severe root pruning, 3.5 or greater - plants likely predisposed to a significant yield loss

²All products applied in T-band except for Fortress 2.5G which was placed in-furrow

³The "Best Rating" is the least amount of rootworm damage for any soil insecticide in the plot

Bt Corn Rootworm: EPA approved YieldGard-RW late last winter and the "stacked" event for both rootworm and corn borer (YieldGard Plus) has just been labeled. This combination should remove the confusion many producers have in separating the two different genetic events targeting specific pests. It will be imperative that producers follow refuge guidelines (20% within or adjoining field). Trials the last several years with this technology have shown that a new "benchmark" in rootworm control has been reached. Though there is some rootworm feeding, root ratings have always been as good if not better than the best performing granular insecticide. All YieldGard seed

will be "wrapped" with either Cruiser (low rate) or Gaucho for protection from other soil insect pests, e.g., wireworms, seedcorn maggots, etc. YieldGard-RW and YieldGard Plus will be very attractive to producers in high-risk areas to first-year corn rootworm damage and those with the new John Deere 1790 planter. The 20% non-Bt refuge will need chemical protection from rootworm, and discussions with producers vary on how they intend to treat this acreage. Poncho 1250 seems to be the popular choice. Purdue's rootworm trials over the last several years support this as the most efficacious product over the other seed treatments and liquids.

Transgenic BT-CRW Root-Rating Performance ¹ , 2003				
Location	Best ² Rating	YieldGard CRW	Force	Check
Lafayette, IN	1.05	1.05	2.20	3.90
Lafayette, IN-2	1.95	1.95	2.55	5.60
Wanatah, IN	1.20	1.20	2.15	4.80
Wanatah, IN-2	1.30	1.30	2.75	4.50
Columbia City, IN	1.50	1.50	2.35	3.15
Columbia City, IN-2	1.30	1.30	2.00	4.50
DeKalb, IL	1.45	1.45	2.20	4.06
Monmouth, IL	2.05	2.05	2.70	5.75
Urbana, IL	1.35	1.35	2.20	5.45

¹Root rating: 1 = none to little damage, 6 = severe root pruning, 3.5 or greater - plants likely predisposed to a significant yield loss
²The "Best Rating" is the least amount of rootworm damage for any treatment in the plot

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Pre-Applied Insecticide Seed Treatments for Secondary Insects – (John Obermeyer and Larry Bledsoe)

- Predicting soil insect infestations is a very inexact science
- The brief systemic activity of some of these products may protect seed and seedling from some soil insect pests
- Conditions that may justify the use of these products
- If a soil insecticide for rootworm is being used at planting, seed-applied insecticides are not necessary

Few industry or university replicated trials correlate secondary soil insects to stand and yield losses. Many experiments have been tried but often fail because the insects don't show up or damage to yield correlation was poor. However, we know these losses occur, we just can't predict when and where. Producer testimonials tout promising results with Cruiser, Gaucho, and Poncho 250 so much that some seed companies are pre-treating a majority of their hybrids. Will producers recoup this additional \$4-6/acre (depending on seed drop) expense?

These pre-applied seed treatments are from the new insecticide chemistry, nicotinoids that have systemic activity during the early life of the corn seedling. Data exist that show some seed/seedling protection from seedcorn maggot, wireworms, and cutworms. Certainly the biggest question for producers and researchers is how effective these products are against white grubs, considered a primary pest by some. Scant data 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 of these products literally read "protect" or "protection" from grubs.

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

- field is planted early (before last week of April)
- field has a recent history of wireworm damage
- field is no-tilled into dying vegetation (e.g., spring weeds)
- field is spread with animal manure before planting
- field is higher yielding (170+)

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Soybean Aphid, We're Still Sorting It Out - (John Obermeyer and Larry Bledsoe) –

Thanks to those who have sent plot and yield information concerning soybean aphid. If you haven't done so already, please send ASAP (obe@purdue.edu). The variability in soybean yields where treatments were applied has been fascinating. We're still analyzing data from our research trials, certainly this information will be shared with you at upcoming winter meetings.

University researchers throughout the north central states will soon be meeting and sharing data and observations from the 2003 season. There is hope that a preliminary treatment threshold can be refined from this effort. Please be patient as we develop future management strategies for this pest.

Weeds

Winter Weed Control – (Bill Johnson and Glenn Nice)

We have started putting out our fall applied herbicide treatments this week and just wanted to provide a few application tips to those who are also in the process of making fall herbicide applications.

- 1) Scout fields and determine whether you need an application. Not all fields need an application, however, if you pull back the residue, especially in corn fields, you are likely to find infestations of winter weeds. Winter weeds could be particularly prevalent in corn stubble this year because we had excessive amounts of rain earlier in the season and late-season summer weed escapes in corn were widespread because herbicides were diluted by excess rain.
- 2) We have known cases of glyphosate-resistant marestail in 5 counties in SE Indiana and our sampling this fall has revealed a substantial number of fields with marestail in them late in the year that either were not controlled by postemergence herbicides or emerged after postemergence herbicides were applied. It would be wise to treat fields with marestail, particularly in SE Indiana with 2,4-D as part of the herbicide program.
- 3) The best time to apply herbicides in the fall is on days when the morning low is above freezing. The best foliar herbicide activity will occur when you have a few days of warm daytime air temperatures (50's or higher) and applications are made in the

middle of this period. If fall applied herbicides are needed, one should not leave the sprayer in the shed if daytime temperatures do not get into the 50's. Just remember that the foliar activity of glyphosate (Roundup, Touchdown, Glyphomax, others) is less in cool conditions. In these conditions, it would be advisable to use residual products tankmixed with the foliar products to provide residual activity for periods when weather conditions might allow additional weed emergence.

- 4) Dandelions can still be controlled with fall applications of 2,4-D or a glyphosate product. Use a minimum of 1 qt. / A of 4 lb. / gallon 2,4-D products and 32 oz. / A (0.75 lb ae / A) of a glyphosate product. This would equate to 22 oz. / A of Roundup Weathermax. Either 2,4-D or a glyphosate product works very effectively in the fall. Since we have had a couple of hard frosts, the dandelions may be a little tougher to control, so don't rely on reduced rates.
- 5) In fields with heavy corn residue, increase spray volume or decrease speed to increase carrier volume. Many weeds will be shielded by residue, so spray coverage can be compromised. In addition, use of residual products in these situations will increase the consistency of winter weed control because these products can be washed off of the corn residue with precipitation and into the soil where they can be effective.

Bits & Pieces

Weed Meeting in Louisville, KY - (Bill Johnson and Glenn Nice) -

Almost everything you would want to know about weeds will be available at the annual North Central Weed Science Society meeting December 2, 3, and 4 in Louisville. If you don't care to attend the entire conference, 1 day registrations are available for \$40. Additional registration and program information can be found at the NCWSS website listed below. I took the liberty of reproducing the Program Chair's (Dr. Jerry Doll, University of Wisconsin) comments from the fall edition of the NCWSS Newsletter to give you a feel for the information available at this year's conference.

The program is rich in papers and posters with the latest in weed management information. The general

sessions include "It's sexy. It's safe. Everybody wants to do it"; "Future opportunities in weed science: my views"; and "I'm not a real weed scientist but I play one in D.C." Sections that will have both papers and posters include corn and sorghum, soybeans and annual legumes, herbicide physiology, cereals and oilseeds, forage and range, horticultural crops, equipment and application methods, and weed ecology and biology.

Each day will feature a symposium. Tuesday's symposium will provide a review and assessment of genomics applications in weed science organized by those active in the herbicide physiology section of NCWSS. Wednesday's symposium will move us "Beyond Thresholds: Applying Multiple Tactics Within Integrated Weed Management Systems" with five in-depth presentations, one by a noted Dutch weed

scientist. Thursday morning's symposium will direct our attention to the future role of weed science extension. This one is very timely because the rapid pace of changes in our discipline has as many or perhaps more implications for our outreach activities and personnel as it does for those in research and teaching.

Cost for the entire conference is \$210 if you preregister, \$230 if you register on-site. Full registration includes the proceedings of the papers and posters presented, the Wednesday evening awards banquet, and refreshment breaks. One-day registrations are \$40. For registration and hotel information, contact the NCWSS executive secretary, Robert A. Schmidt, 1508 W. University Ave., Champaign, IL 61821-3133 (217-352-4212; raschwssa@aol.com). You can find additional program information and the registration form at <http://www.ncwss.org>.

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Purdue University Hands-on Post Harvest Training and Recertification Workshop – (Linda Mason) –

Purdue University is offering a "Hands-on Post Harvest Training and Recertification Workshop" to be held December 5, 2003 from 8 AM to 5 PM at the Marion County Extension Office in Indianapolis, IN. This workshop is Co-organized by the Indiana Grain and Feed Association and Purdue Cooperative Extension Service. CCH and CCA credits are available. A pre-registration fee of \$70.00 is due by Nov. 28 and on-site registrations are \$80.00. Registration is limited and checks should be made payable to Agribusiness Council of Indiana and mailed to:

Agribusiness Council of Indiana
c/o Joy Melnyk
135 N. Pennsylvania St., Suite 22350,
Indianapolis, IN 46204
Phone: (866) 222-6943 (toll free)
Fax: (317) 223-0438
Email: jmelnyk@inagribiz.org

For more information please contact Dr. Linda Mason, Dept. of Entomology, Purdue University, (765) 494-4586 or email to linda_mason@entm.purdue.edu

You can find program information and the registration form at: <http://www.entm.purdue.edu/entomology/ext/index.htm>.

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First Notice

2004 - Crop Management Workshops

Rochester
Monday, January 26, 2004
Fulton County Fairgrounds
One mile east of U.S. 31 on 3rd Street

Auburn
Tuesday, January 27, 2004
Kruse Auction Park
Interstate 69 at Exit 126

West Lafayette
Friday, January 30, 2004
University Inn and Conference Center
U.S. 52 (west) and Cumberland Road

New Castle
Wednesday, January 28, 2004
Smith Building at Memorial Park
Just north of State Roads 3 and 38

Lake Monroe
Thursday, January 29, 2004
Fourwinds Resort
East of Harrodsburg Exit off State Road 37

General

The Purdue Pest Management Program is offering a series of Crop Management Workshops (CMWs) to be held at five locations throughout Indiana. The topics of these meetings are adapted from the previous cropping year, new technologies, questions asked by agribusiness personnel, and suggestions from past CMWs. Five (5) Continuing Certification Hours (**CCHs**) will be awarded to commercial applicators certified in Category 1A and four (4) Category RT. Seven (7) Continuing Education Units (**CEUs**) will be awarded to Certified Crop Advisors (**CCAs**). **There will be limited seating at each site, and because the CMWs typically fill, we encourage you to preregister!** Seats will be assigned on a first-come, first served basis. Should it be necessary to cancel this program, registered participants will receive a full refund of program fees paid. In the event of such cancellation, however, Purdue University shall not be responsible for any other expenses incurred by the registrant. Written requests for refunds received prior to January 16, 2004, will be honored in full.

Topics

(for each location)

Disease, Insect, and Weed Updates and Control Strategies
Infield Diagnostic Approaches
State and Federal Pesticide Regulations
A Corny Diary from 2003

Schedule

(times listed are Eastern Standard Time)

8:30 - 9 a.m.	Registration
9 - 12	Morning Presentations
12 - 12:45	Lunch Provided
12:45 - 4:20	Afternoon Presentations
4:20	CCH/CEU Forms

Detach and Send

2004 Crop Management Workshops

9109-PGH

CIRCLE ONE LOCATION

Rochester - January 26 Auburn - January 27 New Castle - January 28 Lake Monroe - January 29 West Lafayette - January 30

Name: _____ Company Name: _____
Please print

Business Address: _____ Business Phone: _____

City: _____ State: _____ Zip: _____

(Please duplicate this form for additional registrants)

_____ Registration \$60 per person

\$ _____ Total Enclosed

☐ I require auxiliary aids/services because of a disability.
Please contact me at the above address.

<input type="checkbox"/> Personal Check <input type="checkbox"/> MasterCard <input type="checkbox"/> Visa <input type="checkbox"/> Discover <input type="checkbox"/> AmEx <small>Make checks payable to Purdue University</small>
<small>Credit Card Number and Expiration Date</small>
<small>Authorized Signature</small>

Return to: Conference Division Business Services, Purdue University, Stewart Center, Room 110, 128 Memorial Mall,
West Lafayette, IN 47907-2034 Phone: (765) 494-7219 or (800) 359-2968, Fax: (765) 494-0567

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