

Indiana Cooperative Agricultural Pest Survey

2008 Annual Report

1 January – 31 December



Department of Entomology at Purdue University

Indiana Department of Natural Resources (IDNR)

United State Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ)

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Indiana CAPS Accomplishment Report

State: **Indiana**

Year: **2008**

Is this a quarterly, semi annual or final report? **Final Report**

List dates covered by this report: **1 January 2008 – 31 December 2008**

Cooperator: **Indiana Department of Natural Resources**

Cooperators Project Coordinator:

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This final report follows the form of, and provides information required by, 7 CFR 3016.40 and 7 CFR 3019.51

- A. Compare actual accomplishments to objectives established for the period as indicated in the work plan. When the output of the project can be quantified, a computation of cost per unit of output is required when useful.
- B. If appropriate, explain why objectives were not met.
- C. Where appropriate, explain any cost overruns.

The following information will be included for surveys:

1. Survey Methodology (trapping protocol)
2. Rationale underlying survey methodology
3. Survey dates
4. Taxonomic services
5. Benefits and results of survey
6. NAPIS database submissions: Program pest and date of submission per state as they appear on the NAPIS web site

Accomplishments

Indiana CAPS Work Plan Objectives-2008;

Objective 1. Maintain a State Cooperative Agricultural Pest Survey Committee that will meet at least once a year to discuss fostering goals of CAPS.

1A. State CAPS Primary Committee:

Indiana State Survey Coordinator (SSC): Larry W. Bledsoe
 Purdue University, Department of Entomology
 901 West State Street
 West Lafayette, Indiana 47907

Cooperative Agreement Representative
 State Plant Regulatory Official (SPRO): Philip Marshall
 Indiana Department of Natural Resources
 Division of Entomology and Plant Pathology
 402 West Washington, Room W-290
 Indianapolis, Indiana 46204

State Plant Health Director (SPHD): Gary Simon
 USDA APHIS PPQ
 1305 Cumberland Ave, Suite 102
 West Lafayette, Indiana 47906

Department of Entomology
 (Department Head) Dr. Steve Yaninek
 901 West State Street
 West Lafayette, Indiana 47907

2A. Full committee

Name	Organization	Discipline
Steve Cain	Purdue University, EDEN	Disaster Education & Outreach
Thomas Creswell	Purdue University, PDDL	Plant Pathology
Jodie Ellis	Purdue University	Entomology/Outreach Education
Dr. Peter Hirst	Purdue University	Horticulture
Dr. Carole Lembi	Purdue University	Invasive Aquatic Plants
Dr. Ray Martyn	Purdue University	Center for Crop Biosecurity
Glenn Nice	Purdue University	Weed Science
Dr. Chris Oseto	Purdue University	Entomology/ Identification
Gail Ruhl	Purdue University, PDDL	Plant Disease Diagnostics
Tom Creswell	Purdue University, PDDL	Plant Disease Diagnostics
Dr. Cliff Sadof	Purdue University	Ornamental Pests/ Identification
Susan Schechter	Purdue University, CERIS	National Ag Pest Information Svc
Dr. Robert Waltz	Purdue University	Indiana State Chemist
Cloyce Hedge	IN Dept. Natural Resources	Plant Ecology/ Identification
Doug Keller	ID Dept. Natural Resources	Invasive Aquatic Plants
James Manor, PSS	USDA APHIS PPQ	Regulatory Science
Ellen Jacquart	The Nature Conservancy	Plant Ecology/ Identification

1C. Committee Meetings:

- i. 8 April 2008, preliminary planning for surveys
- ii. 30 April 2008 planning meeting for FY2009 program
- iii. 15 May 2008 planning meeting for FY2009 program

Objective 2. Cooperate with agencies carrying out field surveys, trapping, and data collection, setting emphasis on pest/diseases particularly identified that may pose an immediate risk to the agriculture of this state and the United States. Responsible for coding and uploading Indiana information to NAPIS database only.

2A. Emerald Ash Borer, *Agrilus planipennis*.

Date Range: 01-01-2008 thru 12-31-2008

<u>Target Pest</u>	<u>Counties</u>	<u>Sites* Plants</u>	<u>Traps</u>	<u>Pos</u>	<u>Neg</u>
Emerald Ash Borer GEN PEST OBS:LAB CONFIRMED	2	30		30	0
Emerald Ash Borer VIS;COUNT UNSPECIFIED NUM;DIAGONAL	2	2		2	0
Emerald Ash Borer VIS: EMERALD ASH BORER SURVEY	10	68		68	0
Emerald Ash Borer TRAP;EAB PROTOTYPE; PURPLE	3	8		8	0
Emerald Ash Borer TRAP TRAP;EAB PROTOTYPE; PURPLE	52		5457	8	5449

2B. Gypsy Moth *Lymantria dispar*

Date Range: 01-01-2008 thru 12-31-2008

<u>Target Pest</u>	<u>Counties</u>	<u>Sites* Plants</u>	<u>Traps</u>	<u>Pos</u>	<u>Neg</u>
Gypsy Moth (European) TRAP;MILK CARTON PHEROMONE (GYP MOTH)	12		2046	1601	445
Gypsy Moth (European) TRAP;DELTA PHEROMONE	87		12934	2263	10671

2C. Karnal Bunt, *Tilletia (Neovossia) indica*

Date Range: 01-01-2008 thru 12-31-2008

<u>Target Pest</u>	<u>Counties</u>	<u>Sites* Plants</u>	<u>Traps</u>	<u>Pos</u>	<u>Neg</u>
Karnal Bunt ELEVATOR;SPEC SITE, NAT. KARNAL BUNT SURVEY;OPTICAL SCAN	27		32	0	32

Objective 3. Have representation at National and/or Regional annual meetings.

3A. Central Plant Board, Madison Wisconsin, 11 March, 12 March SSC conference call.

3B. National CAPS annual meeting, Phoenix, AZ, 3-4 December

Objective 4. Utilize Cooperator and APHIS program funding, as outlined in the Financial Plan within the authorized parameters to support survey and detection activities. In addition, specific appropriated funding in the level authorized by the PPQ Eastern Region will be dedicated to the delivery of CAPS objectives.

4A. Giant African Land Snail Education and Outreach. *Achatina fulica* (Bowditch)

Giant African Land Snail (GALS) outreach materials were sent to 90 of 92 Indiana county Cooperative Extension, Agriculture and Natural Resources (ANR) area educators on 17 November 2008. The two counties omitted did not have ANR educators at the time of the mailing. The mailing tubes consisted of a letter describing the potential risks of GALS to Indiana agriculture, a request for assistance in disseminating the information provided in the mailing, large and small information color posters and small information cards. All education products were provided by APHIS-PPQ. The ANR educators interact with high school science teachers, 4-H organizations, and the general public on a nearly daily basis and serve as excellent disseminators of information. Additionally, the SSC disseminated GALS information to approximately 400 students in 11 Master Gardener (9) and Master Naturalist (2) meetings throughout the year. The ANR educators and Master Gardeners/Naturalists have the potential to interact with thousands of the public to raise the awareness of GALS threat. No reports of GLS occurrence were reported to the CAPS program in 2008.

4b. Exotic bark beetle and wood-boring insects survey (RBS-EBB) in cooperation with PPQ statewide trapping network. National Exotic Woodborer/Bark Beetle Survey

1. Survey Methodology (trapping protocol): This was a national APHIS-PPQ/CAPS collaborative survey. PPQ was responsible for surveying 50 Indiana sites and the CAPS SSC was responsible for 6 sites. Sites were identified through Emergency Action Notifications as locations where solid wood packing materials (dunnage) were received, or by recognition of apparent risk. Three Lindgren funnel traps containing dilute propylene antifreeze glycol were placed at each site. Traps contained one of the following lures: Ultra High Release (UHR) ethanol, UHR ethanol+alpha-pinene, and Tri-lure. All trap samples (approx 1800) were sent to CAPS SSC and were prescreened and pinned/pointed. Target organisms were identified and archived. All records were entered into the NAPIS database by 1 December 09.

RBS-EBB target insects included:

<u>Scientific Name:</u>	<u>Common Name:</u>
<i>Anoplophora chinensis</i> (Forster)	Citrus longhorned beetle
<i>Anoplophora glabripennis</i> (Motschulsky)	Asian longhorned beetle
<i>Callidiellum rufipenne</i> (Motschulsky)	Small Japanese cedar longhorned beetle
<i>Chlorophorus annularis</i> Fabricius	Bamboo/tiger bamboo longhorned beetle
<i>Hesperophanes (Trichoferus) campestris</i> (Faldermann)	Chinese longhorned beetle
<i>Hylurgops (Hylurgus) palliatus</i> Gyllenhal (conifer)	Exotic bark beetle
<i>Hylurgus ligniperda</i> (Fabricius)	Golden-haired bark beetle
<i>Ips sexdentatus</i> (Boerner)	Six-spined engraver beetle

<i>Ips typographus</i> (Linnaeus)	European spruce bark beetle
<i>Monochamus alternatus</i> Hope	Japanese pine sawyer beetle
<i>Orthotomicus erosus</i> (Wollaston)	Mediterranean pine engraver beetle
<i>Pityogenes chalcographus</i> (Linnaeus)	Six-toothed spruce engraver
<i>Sirex noctilio</i> (Fabricius)	European wood wasp (<i>Sirex</i>)
<i>Tetropium castaneum</i> Linnaeus	Black spruce longhorned beetle
<i>Tetropium fuscum</i> (Fabricius)	Brown spruce longhorned beetle
<i>Tomicus minor</i> (Hartig)	Lesser pine shoot beetle
<i>Tomicus piniperda</i> (Linnaeus)	Common pine shoot beetle
<i>Trypodendron domesticum</i> (Linnaeus)	European hardwood ambrosia beetle
<i>Xyleborus</i> spp.	Exotic bark beetles
<i>Xylotrechus</i> spp.	Exotic longhorned beetles

2. Rationale underlying survey methodology: The Indiana survey methodology used in 2008 was adapted for Indiana by Shayne Galford (PPQ/Indiana) from the National Exotic Woodborer/Bark Beetle Survey Plan, 2003/2004.
3. Survey dates: Traps were deployed approximately mid-April in southern Indiana and mid to late May in central and northern Indiana and serviced every two weeks until early-October (approximately 12 sampling dates). Visual surveys for invasive wood boring beetles and metallic wood boring beetles also occurred bi-weekly.
4. Taxonomic services: Preliminary identification of potential target organisms was coordinated by the CAPS SSC and Mr. Arwin Provonsha, curator of the Purdue University Entomological collection, and suspect target organisms were confirmed by Dr. Robert Brown, USDA APHIS-PPQ Area identifier.
5. Benefits and results of survey: In Indiana, over 4.3 million acres of high quality hardwood forests support an industry which employs 47,000 Hoosiers. These hardwood forests are at risk of exotic invasive bark beetles and other wood boring insects. Businesses and warehouses in Indiana that receive exotic, solid wood packing material (SWPM) represent potential focal points of pest introduction into the United States. The intent of this survey is early detection of threats to the forest products industry.
6. NAPIS database submissions: Date Range: 01-01-2008 thru 12-31-2008

Target Pest	Counties	Sites*		Traps	Pos	Neg
		Plants				
<i>Anoplophora glabripennis</i> , Bamboo Borer Longhorned Beetle	27			56	0	56
<i>Anoplophora chinensis</i> , Citrus Longhorned Beetle	27			56	0	56
<i>Anoplophora glabripennis</i> , Asian Longhorned Beetle	27			56	0	56
<i>Callidiellum rufipenne</i> , Japanese Cedar Longhorn Beetle	27			56	0	56
<i>Chlorophorus annularis</i> , Bamboo Borer Longhorned Beetle	27			56	0	56
<i>Hesperophanes (trichoferus) campestris</i> Chinese Longhorned Beetle	27			56	0	56
<i>Hylurgops palliatus</i> , Lesser Spruce Shoot Beetle	27			56	0	56
<i>Hylurgus ligniperda</i> , Redhaired Pine Bark Beetle	27			56	0	56
<i>Ips sexdentatus</i> , Sixtoothed Bark Beetle	27			56	0	56
<i>Ips typographus</i> , Spruce Bark Beetle	27			56	0	56
<i>Monochamus alternatus</i> , Japanese Pine Sawyer Beetle	27			56	0	56
<i>Pityogenes chalcographus</i> , Sixtoothed Spruce Bark Beetle	27			56	0	56
<i>Tetropium castaneum</i> , Black Spruce Long-horn Beetle	27			56	0	56
<i>Tetropium fuscum</i> , Brown Spruce Longhorned Beetle	27			56	0	56
<i>Tomicus minor</i> , Lesser Pine Shoot Beetle	27			56	0	56
<i>Tomicus piniperda</i> , Pine Shoot Beetle (Psb)	1			1	1	0

<i>Trypodendron domesticum</i> Eur. Hardwood Ambrosia Beetle	27	56	0	56
<i>Xyleborus</i> spp of Indiana interest				
<i>Xyleborus atratus</i> , Scolytid Beetle	11	12	12	0
<i>Xyleborus pelliculosus</i> , Ambrosia Beetle	7	8	8	0
Other species of Indiana interest				
<i>Xylosandrus crassiusculus</i> , Granulate Ambrosia Beetle	13	30	30	0
<i>Scolytus schevyrewi</i> , Banded Elm Bark Beetle	5	8	8	0

4C. Old world bollworm survey, *Helicoverpa armigera*

1. Survey Methodology (trapping protocol): Survey sites with optimum hosts (vegetable and grain production) were located in La Port, Tippecanoe (2 sites), and Knox counties. Five Heliopsis traps (Scentry corp.) baited with *Helicoverpa armigera* pheromone were placed at least 200 ft apart at each site and geo-referenced. Moths were collected weekly, placed in containers labeled by location-date-trap number and transported in coolers containing ice to the laboratory, and frozen. *H. armigera* lures in traps were replaced every two weeks.
2. Rationale underlying survey methodology: Survey methods were adapted from the CAPS Pest Risk Assessment publication by Vennette, et al. 2003. Mini Risk Assessment, Old World Bollworm *Helicoverpa armigera*, Hubner [Lepidoptera : Noctuidae].
3. Survey dates; Traps were set 11-12 and 20 June.
4. Taxonomic services: *H. armigera* and *H. zea* are indistinguishable by external characteristics and *H. armigera* lure will attract *H. zea* resulting in hundreds or thousands of moths to screen. The SSC attended a one-day workshop on micro-dissection and identification of *Helicoverpa* with Steven Passoa, USDA national noctuidae specialist and identifier at The University of Ohio, Columbus, OH on 10 July 2008. This session along with multiple communications and one meeting with Julieta Brambila, USDA identifier resulted in a protocol that allowed the SSC to economically prescreen 1,438 *H. zea* moths that were accidentally captured. No suspect *H. armigera* moths were found.
5. Benefits and results of survey: The Indiana CAPS program collaborates in a national pest survey program that results in information about the presence or absence of OWB in United States. Knowledge of the existence of this pest is crucial to Indiana agriculture as the state grows nearly 12 million acres of corn and soybeans (two hosts of *H. armigera*). These two principal field crops in Indiana have an average farm gate value slightly over \$3 billion dollars. The production of alfalfa in Indiana averages approximately \$140 million dollars annually. The annual value of tomatoes and other vegetables in Indiana exceeds \$35 million dollars.
6. NAPIS database submissions: Date Range: 01-01-2008 thru 12-31-2008

<u>Target Pest</u>	<u>Counties</u>	<u>Sites*</u> <u>Plants</u>	<u>Traps</u>	<u>Pos</u>	<u>Neg</u>
<i>Helicoverpa armigera</i> , Old World Bollworm	3		20	0	20

4D. Sudden oak death survey, *Phytophthora ramorum*. P Ramorum National Nursery Survey

1. Survey Methodology: In 2008 Indiana Department of Natural Resources (IDNR) personnel selected symptomatic parts of *Camellia*, *Rhododendron*, *Viburnum*, *Pieris*, and *Kalmia* (generally) from 24 out of about 600 Indiana nurseries and other landscape plant retail outlets inspected annually for the presence of diseases and insects. Samples were kept cool and shipped overnight to The Purdue University Pest & Plant Diagnostic Laboratory (P&PDL). P&PDL tested 413 samples using an enzyme-linked immunosorbent assay (ELISA) specific to *P. ramorum*. Suspect positive samples were forwarded to University of Florida, Plant Disease Clinic for conclusive testing using polymerase chain reaction (PCR) as per federal guidelines/agreements.
2. Rationale underlying survey methodology: Methods were consistent with the *Phytophthora ramorum* Nursery Survey Manual (Revised April 30, 2007) USDA-PPQ.
3. Survey dates: 21 May to 14 July 2008
4. Taxonomic services: Prescreening was performed by the Purdue University Pest & Plant Diagnostic Laboratory. Confirmation of suspect positive samples was performed by the University of Florida, Plant Disease Clinic.
5. Benefits and results of survey : In Indiana, over 4.3 million acres of high quality hardwood forests support an industry which employs 47,000 Hoosiers. According to the Indiana University Center for Urban Policy and the Environment, the horticulture industry employed over 25,700 employees and paid \$5.66 for every \$1,000 in total Indiana wages paid in 2004. Further, the total economic contribution in 2004 attributable to the horticultural industry in Indiana was nearly \$2.05 billion. If *P. ramorum* is detected in Indiana, rapid response would limit the spread of the pathogen and to prevent its introduction into nursery and forest products industries. No positive *P. ramorum* samples were found in Indiana in 2008.
6. NAPIS database submissions:

Date Range: 01-01-2008 thru 12-31-2008

<u>Target Pest</u>	<u>Counties</u>	<u>Sites*</u>		<u>Traps</u>	<u>Pos</u>	<u>Neg</u>
		<u>Plants</u>				
Sudden Oak Death; <i>Phytophthora ramorum</i>	18	413			0	413

4E. White Potato Cyst nematode, *Globodera pallida*. PCN National Survey

1. Survey Methodology: Survey methods were adapted following the USDA-PPQ 2008 Potato Cyst Nematode National Survey and Diagnostic Cyst Sample Forwarding

Protocols. Soil was evaluated for white potato cyst nematode (PCN) in 25 production potato fields. Though the selection was meant to be random, special attention was given to fields with a higher likelihood of infestation. Field location of each sample was GPS referenced and labeled. Between 10 and 20 -30 gram samples were taken for about every 5 acres per field. Each sample was thoroughly mixed and two 100 cc sub-samples were collected for processing. The remainder of each sample was stored. The 100 cc sub-samples were processed in the laboratory using the standard sieving and decanting methods similarly used to extract soybean cyst nematode.

2. Rationale underlying survey methodology: Survey and processing techniques based on those of soybean cyst monitoring protocols have been validated to be efficient and accurate.
3. Survey dates: 18 September to 31 October 2008.
4. Taxonomic services: Samples were identified by Jamal Faghihi and/or Virginia Ferris, Purdue University Nematology Laboratory
5. Benefits and results of survey: According to the Agricultural Marketing Research Institute (Iowa State University) 1.1 million acres of potatoes were harvested in the United States in 2007. The average yield was 396,00 pounds per acre and was valued at \$3.4 billion. While Indiana is not considered an important white potato producing state, it does represent a potential site of PCN infestation. The loss of the domestic use and export market of national potato stocks would severely impact US agriculture. The white potato cyst nematode was not detected in this survey
6. NAPIS database submissions: Date Range: 01-01-2008 thru 12-31-2008

Target Pest	Counties	Sites*			
		Plants	Traps	Pos	Neg
White Potato-cyst Nematode, <i>Globodera pallida</i>	5	600(300X2)	0	600	0

4F. Light Brown Apple Moth, *Epiphyas postvittana*

1. Survey Methodology: Fifty Jackson pheromone traps were placed in 19 locations covering 15 Indiana counties. Traps were placed at nurseries, orchards and one vineyard and monitored every two weeks starting in mid July by Indiana Department of Natural Resources nursery inspectors.
2. Rationale underlying survey methodology: Protocols followed the USDA APHIS PPQ 2008 Light Brown Apple Moth National Survey Guidelines for *Epiphyas postvittana*.
3. Survey dates: Varies; mid July to late October.

4. Taxonomic services: Moths were pre-screened by Marcus McDonough, Nursery Inspector and Compliance Officer, Indiana Department of Natural Resources, Division of Entomology and Plant Pathology.
5. Benefits and results of survey: Indiana falls into Tier 3 or low risk status. However, the wide host range of this pest makes Indiana vulnerable to economic losses should establishment occur. No suspect moths were forwarded to USDA identifiers for confirmation.
6. NAPIS database submissions:

Date Range: 01-01-2008 thru 12-31-2008

<u>Target Pest</u>	<u>Counties</u>	<u>Sites*</u>		<u>Traps</u>	<u>Pos</u>	<u>Neg</u>
		<u>Plants</u>				
Light Brown Apple Moth	15			50	0	50

Executive Summary; The Indiana CAPS program committee was active with three meetings addressing summer survey activities and 2009 work plan development. The SSC was directly or indirectly involved with five national surveys and one outreach program for exotic pests in Indiana. No exotic invasive target pests were found, and all survey data were uploaded to the National Agricultural Pest Information System (NAPIS). Additionally, the CAPS SSC cooperated with USDA-PPQ and USDA Forest Service, and Indiana Department of Natural Resources programs to upload data to NAPIS from three additional surveys. There were no cost overruns and 99.16 percent of the budget was expended.

Signature Page

Approved and signed by

_____ Date: _____

Cooperator

_____ Date: _____

ADODR