Indiana Cooperative Agricultural Pest Survey

2011 Semi Annual Report

1 January – 30 June

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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Table of Contents

Indiana CAPS Accomplishment Report

State: **Indiana** Year: **2011**
Is this a quarterly, semi annual or final report? **Semi Annual Report**
List dates covered by this report: **1 January 2011 – 30 June 2011**
Cooperator: **Philip T. Marshall, Indiana Department of Natural Resources**

Cooperators Project Coordinator:

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This 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-2011;

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

1B. Full committee

Name	Organization	Discipline
Bruce Bordelon	Purdue University	Horticulture
Tom Creswell	Purdue University, PPDL	Plant Disease Diagnostics
Dr. Peter Hirst	Purdue University	Horticulture
Dr. Jeffery Holland	Purdue University	Entomology, Forest Landscape Ecology
Dr. Ray Martyn	Purdue University	Center for Crop Bio-security
Glenn Nice	Purdue University	Weed Science
Dr. Chris Oseto	Purdue University	Entomology/ Identification
Gail Ruhl	Purdue University, PPDL	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. 09 March. CAPS administrative (core) group review and planning meeting
ii. 02 June. CAPS 2010 review/2011 planning meeting (committee)

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.

2A. Emerald Ash Borer, *Agrilus planipennis*. (IND DNR)

Date Range: 01-01-2011 thru 06-30-2011

Target Pest	Counties	Sites	Traps	Pos	Neg
Emerald Ash Borer	14	39		39	0
VISUAL					
Agrilus planipennis					
EMERALD ASH BORER SURVEY					

2B. Gypsy Moth, *Lymantria dispar*. (IND DNR and PPQ)

Date Range: 01-01-2011 thru 06-30-2011
No data received during period

2C. Pine Shoot Beetle Survey *Tomicus piniperda.* (PPQ)

Date Range: 01-01-2011 thru 06-30-2011

	Counties	Sites*Plants	Traps	Pos	Neg
Pine Shoot Beetle, *Tomicus piniperda* EWB/BBUSDA-APHIS	3		24	3	21

2D. Karnal Bunt Survey (PPQ)

Date Range: 01-01-2011 thru 06-30-2011
No data received during period

2E. Miscellaneous pests

Date Range: 01-01-2011 thru 06-30-2011

	Counties	Sites*Plants	Traps	Pos	Neg
Black Timber Beetle					
Xyleborus (*Xylosandrus*) *germanus* IN DNR	2	2		2	0
Brown Marmorated Stink Bug					
Halyomorpha halys IND DNR	1	1		1	0
Univ Extension	2	2		2	0
Pear Blight Beetle, *Xyleborus dispar* IND DNR	1	1		1	0

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

3A. 7-10 March. Central Plant Board Annual Meeting (St Louis, MO)

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. Soybean Commodity survey

1. Survey Methodology (trapping protocol): Four high-risk trap sites (Tippecanoe, Knox, Randolph, and La Porte Counties) that have high concentrations of grain crops (soybean and field corn), vegetable (primarily tomato, sweet bell pepper, and sweet corn), and alfalfa hay were chosen for this survey. Trap numbers and types placed at each site include: five universal bucket traps (green/yellow/white) with lure and kill strips for each of old world bollworm, *Helicoverpa armigera*, Egyptian cotton leafworm, *Spodoptera littoralis*, and silver Y-moth *Autographa gamma;* five red paper delta traps (2 sides sticky with ends open) with lure for summer fruit tortrix, *Adoxophyes orana*; and five wing traps with lure for golden twin-spot moth, *Chrysodeixis chalcites*. Traps were set on 10-13 May and have been serviced weekly. Like last year, several species of torticid moths have responded to the specific pheromones resulting in large numbers of moths to screen. Morphology and/or dissection screening is underway. No target species have been identified.

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] and the CAPS Soybean Commodity Guidelines (25 July 2007).

3. Survey dates; Trap locations and initiation dates were;
   1. La Porte Co. Pinney-Agricultural Center, Wanatah, IN, set 10 May.
   2. Knox Co. Southwest-Purdue, Vincennes, IN, set 11 May.
   3. Randolph Co. Davis-Purdue Agricultural Center, Farmland, IN, set 12 May,
   4. Tippecanoe Co. Meigs-Purdue Horticultural Center, Lafayette, IN, set 13 May.

   Trap period will extend to late August.

4. Taxonomic services: The SSC is screening all moths in consultation with USDA area identifiers. Moth morphology and genitalia are being used to discriminate targets from hundreds of endemic moths (primarily Noctuidea and Torticidiae) that are being attracted to the specific pheromones.

5. Benefits and results of survey: This is a national soybean commodity survey that results in information about the presence or absence of exotic pest in the United States. Knowledge of the existence of these pests is crucial to a state that grows nearly 12

million acres of corn and soybeans. 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: 01-01-2011 thru 06-30-2011
As of 30 June, no target moths were detected by gross morphology, microscopic observation of genitalia, or wing venation. Identifications are ongoing and no data have been uploaded.

Target Pest	Counties	Sites	Traps	Pos	Neg
Helicoverpa armigera, old world bollworm	4		20		
Spodoptera littoralis, Egyptian cotton leafworm	4		20		
Adoxophyes orana, summer fruit tortrix	4		20		
Autographa gamma, silver Y-moth	4		20		
Chrysodeixis chalcites, golden twin-spot moth	4		20		

4B. Exotic Woodborers/Bark Beetles (in cooperation with PPQ statewide trapping network) including Risk Based, Chinese longhorn beetle, and European hardwood ambrosia beetle surveys.

1. Survey Methodology (trapping protocol): These surveys were an APHIS-PPQ/CAPS collaborative effort. PPQ set up and sampled traps and CAPS processed and identified samples.
   a. One hundred seventy seven RBS traps were set at 52 sites in 22 counties. Sites were identified by recognition of apparent risk of receiving target pest through commerce. One to four (varies by site) Lindgren funnel traps containing dilute propylene glycol antifreeze were placed at each site. Traps contained one of the following lures: Ultra High Release (UHR) ethanol, UHR alpha-pinene, IPS Tri-lure, or Chalcogran. Species identification is in progress.
   b. Chinese longhorn beetle was surveyed at 25 sites in 6 counties using unapproved UHR ETOH in Lindgren funnel traps and approved visual methods. Trap samples dated from 5 May to 24 June have been received and processed with no positive records.
   c. Pine shoot beetle was trapped at 70 sites in 10 counties using UHR alpha-pinene in Lindgren funnel traps. Trap samples dated 1 March to 4 June were received and processed with 3 positive records.
   d. European hardwood ambrosia beetles were trapped at 15 sites in at least 10 counties using lineatin lure in Lindgren funnel traps. Trap samples dated from 1 March to 24 June have been received and processed.

2. Rationale underlying survey methodology: The survey methodology used in 2011 was adapted for Indiana from the National Exotic Woodborer/Bark Beetle Survey Plan, 2003/2004.

3. Survey dates: Traps from 4 sources were deployed approximately late February in southern Indiana, mid May in central Indiana, and mid/late May in northern Indiana. Traps will be serviced about every two weeks until early-October.

4. Taxonomic services: Preliminary identification of potential target organisms was coordinated by the Larry Bledsoe (SSC), Mr. Arwin Provonsha (curator of the Purdue University Entomological collection), and Dr. Jeffery Holland (forest landscape entomologist). Suspect targets will be 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: 01-01-2011 thru 06-30-2011.

CAPS staff has pinned/pointed specimens from 491 vials as of 30 June. Specimens are being taxonomically evaluated and no RBS results are available.

Target Pest	Counties	Sites* Plants	Traps	Pos	Neg
Hylurgops (Hylurgus) palliatus					
Hylurgps ligniperda					
Ips sexdentatus					
Ips typographus					
Monochamus alternatus					
Tomicus destruens					
Tomicus piniperda					
Tomicus piniperda (PSB survey)	10	24		3	21
Hesperophanes campestris					
Trypodendron domesticum					

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

1. Survey Methodology: In 2011 Indiana Department of Natural Resources (IDNR) personnel selected symptomatic parts of *Camellia, Rhododendron, Viburnum, Pieris,* and *Kalmia* (generally) from Indiana nurseries and other landscape plant retail outlets to test for the presence of *P. ramorum*. Samples were shipped overnight to the Purdue University Pest & Plant Diagnostic Laboratory (P&PDL). P&PDL has received and tested 318 samples using an enzyme-linked immunosorbent assay (ELISA) specific to *P. ramorum*. No conclusive positive samples have been reported. Approximately 80 samples are expected to finish the survey.

2. Rationale underlying survey methodology: Methods were consistent with the *Phytophthora ramorum* Nursery Survey Manual (Revised April 30, 2007) USDA-PPQ.

3. Survey dates: June to July 2011. Additional dates to mid August.

4. Taxonomic services: Screening was performed by the Purdue University Pest & Plant Diagnostic Laboratory. Confirmation testing (PCR) of suspect positive samples performed by Michigan State University.

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.

6. NAPIS database submissions:
Date Range: 01-01-2011 thru 06-30-2011.

Target Pest	Counties	Sites* Plants	Traps	Pos	Neg
Sudden Oak Death; *Phytophthora ramorum*					

As of the latest date of data received (25 July 11), no positive *P. ramorum* samples were found in Indiana.

4D. Grape Commodity Survey

1. Survey Methodology: Seven vineyards were established as survey sites for *Phytoplasma australiense* and leafhopper vectors. The sites are in Knox (2), Monroe, Clark, Harrison, Dearborn, and Tippecanoe Counties. Susceptible grape varieties were identified and sample zones established. Genetic evaluations of leaf and insect samples were made on 7-8 June and will occur monthly through September 2011. Leaf (8 leaves per variety) and leafhopper (100 sweeps of 15 inch diameter net) sweep net samples were taken on 7-8 June and transferred to Agdia Laboratory for genetic PCR detection of the pathogen. As of 30 June, one leafhopper composite samples tested positive (PCR) and will be transferred to CAPS-approved lab for confirmation DNA sequencing. Grape pest moths have been sampled every 2 weeks since 7-8 June. No moth targets have been detected.

2. Rationale underlying survey methodology: Survey and processing techniques were based on the Grape Commodity-Based Survey Guidelines, 11 August 2008, for Phytoplasmas and on meetings with plant pathologists and a viticulturalist.

3. Survey dates: Monthly following survey initiation on 7-8 June 11 to September.

4. Taxonomic services: Purdue Plant Disease Diagnostic Laboratory and Agdia Inc, 30380 County Road 6, Elkhart, IN. Leafhopper identification assistance is available as needed in the Purdue University, Dept. of Entomology. Robert Davis, USDA, Molecular Plant Pathology Laboratory, USDA-Agricultural Research Service, Bldg. 004, Room 223, BARC West, 10300 Baltimore Avenue, Beltsville, MD 20705 (301) 504-6290

5. Benefits and results of survey: There are 45 Indiana vineyards/wineries growing grapes on about 600 acres. About one million visitors to Indiana wineries add about $35 million dollars to the state economy annually. The Indy International Wine Competition coordinated by the Indiana Wine Grape Council at Purdue University is one of the largest wine competitions in the United States. Entries in 2009 came from 42 states and 11 countries. The aim of this survey is first detection of an important disease and vectors that could threaten the Indiana wine industry.

6. NAPIS database submissions: Date Range: 01-01-2011 thru 06-30-2011. Genetic confirmation of Phyotplasma in 1 leafhopper tissue sample has not been received as of 25 July.

Target Pest	Counties	Sites* Plants	Traps	Pos	Neg
Lobesia botrana	7		21		
Adoxophyes orana	7		21		
Autographa gamma	7		21		
Spodoptera littoralis	7		21		
Spodoptera litura	7		21		
Candidatus australiense Phytoplasma in leaf tissue	7	21			
Candidatus australiense Phytoplasma in leaf hopper tissue	7	21			

4E. Oak Commodity Survey

1. Survey Methodology: This survey is integrated with a current hardwood pest-monitoring program under the direction of Dr. Jeffery Holland, assistant professor of spatial ecology and biodiversity, Purdue University. Methods were adapted according to the Oak Commodity Survey Guidelines, 25 April 2007. Ten hardwood sites in six counties that had been harvested within the last 2 to 3 years were surveyed. One set of traps was placed at each site. Traps with lure were placed between 10 to 27 May and have been serviced every 2-3 weeks. Pheromone traps with lures for exotic lepidopteran pests, *Adoxophyes orana, Tortrix veridan, Archips xylosteanus,* and *Spodoptera littoralis,* were included at all sites according to methods in the current Oak Survey Guidelines.

2. Rationale underlying survey methodology Methods were adapted according to the Oak Commodity Survey Guidelines, 25 April 2007.

3. Survey dates: Traps were placed between 11 to 27 May and have been serviced every 2-3 weeks.

4. Taxonomic services: Samples were screened by Dr. Jeff Holland and Larry Bledsoe, Purdue University. Suspect specimens will be confirmed by a 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 workers. Indiana has 22 species of oak that constitute a major component of its hardwood forests. This survey is expected to result in the early detection of exotic oak pests in Indiana hardwoods. Early detection and outreach education are the goals of this survey. As of 30 June, no target species have been detected.

6. NAPIS database submissions: Date Range: 01-01-2011 thru 06-30-2011.
As of 30 June, no target species have been detected.

Target Pest	Counties	Sites* Plants	Traps	Pos	Neg
Archips xylosteanus	6				
Tortrix viridana	6				
Adoxophyes orana	6				
Spodoptera littoralis	6				

Signature Page

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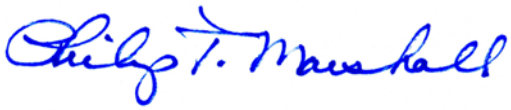

_____ Date: ____August 4, 2011

Philip T. Marshall (Cooperator)

_____ Date: _____

Gary W. Simon (ADODR)