Indiana Cooperative Agricultural Pest Survey

2013 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)

Prepared by Larry W. Bledsoe
Department of Entomology
Purdue University

24 March 2014

Table of Contents

CAPS 2013 Annual Report

Year:	2013
State:	INDIANA
Cooperative Agreement Name:	Indiana Agricultural Pest Surveys (CAPS) 2013
Cooperative Agreement Number:	13-8218-0332-CA
Project Funding Period:	1 January 2013 – 31 December 2013
Project Report:	CAPS Infrastructure and Survey Annual Report
Project Document Date:	31 March 2014
Cooperators Project Coordinator:	Larry W. Bledsoe
Name:	Philip Marshall
Agency:	Indiana Department of Natural Resources
Address:	402 West Washington, Room W-290
City/ Address/ Zip:	Indianapolis, Indiana 46204
Telephone:	317-232-4189
E-mail:	pmarshall@dnr.IN.gov

Quarterly Report	☐
Semi-Annual Accomplishment Report	☐
Annual Accomplishment Report	☒

A. Compare actual accomplishments to objectives established as indicated in the workplan. When the output can be quantified, a computation of cost per unit is required when useful.

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:

Cooperative Agreement Representative	Philip Marshall
State Plant Regulatory Official (SPRO):	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
Indiana State Survey Coordinator (SSC):	Larry W. Bledsoe Purdue University, Department of Entomology 901 West State Street West Lafayette, Indiana 47907

1b. Full committee

Name	Organization	Discipline
Bruce Bordelon	Purdue University	Horticulture
Tom Creswell	Purdue University	Plant Disease Diagnostics
Dr. Peter Hirst	Purdue University	Horticulture
Dr. Jeffery Holland	Purdue University	Entomology, Forest Landscape Ecol
Michelle Mikula	USDA-APHIS	Pest Survey Specialist
Dr. Chris Oseto	Purdue University	Entomology/ Identification
Gail Ruhl	Purdue University	Plant Disease Diagnostics
Dr. Cliff Sadof	Purdue University	Ornamental Pests/ Identification
Susan Schechter	Purdue University	National Ag Pest Information Svc
Dr. Robert Waltz	Purdue University	Indiana State Chemist
Cloyce Hedge	IN Dept. Natural Resources	Plant Ecology/ Identification
Ellen Jacquart	The Nature Conservancy	Plant Ecology/ Identification

1c. Committee Meetings:

11 June 2013. Full committee: Agenda-2013 review and 2014 planning

Objective 2. Cooperate with state and federal agencies carrying out field surveys, trapping, and data collection, setting emphasis on pest/diseases particularly identified that may pose an immediate risk to agriculture. SSC responsible for coding and uploading Indiana information to NAPIS database.

2a. Emerald Ash Borer, *Agrilus planipennis*. (IDNR) visual and trap surveys
Date Range: 01-01-2013 thru 12-31-2013
Counties 37 Traps or Visual Observ 105 Pos 105 Neg 0

2b. European Hardwood Ambrosia Beetle *Trypodendron domesticum.* (PPQ)
Date Range: 01-01-2013 thru 12-31-2013
Counties 11 Sites 13 Pos 0 Neg 116

2c. Velvet longhorned beetle, *Trichoferus campestris.* (PPQ)
Date Range: 01-01-2013 thru 12-31-2013
Counties 11 Sites 25 Pos 0 Neg 231

2d. Karnal Bunt, *Telletia (Neovossia) indica* . (PPQ)
Date Range: 01-01-2013 thru 12-31-2013
Counties 26 Sites 30 Pos 0 Neg 30

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

3a. SSC was not able to attend Central Plant Board Annual Meeting, Manhattan, KS (28 April -2 May) due to prior commitments. No Annual meeting was held.

3b. SSC provided a presentation to the Indiana Invasive Species Council Early Detection and Rapid Response Workshop. 29 October 2013

Objective 4. Utilize Cooperator and APHIS program funding, as outlined in the Financial Plan within the authorized parameters to support survey activities.

4a**.** Soybean commodity survey:
Proposed data were 1,200 records.
Actual data were 1,400 records.
Proposed Funding was $4,452 and actual funding was $3,565*
*Survey efficiency was optimized by careful coordination with a separately-funded survey for spotted wing drosophila.

4a1. Survey Methodology (trapping protocol): 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). Four high-risk trap sites 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 cottonworm, *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 13-15 May and were serviced weekly through the end of the reporting period (12 -16 August).

4a2. Survey locations and dates;

1. La Porte Co. Pinney-Agricultural Center, Wanatah, IN, set 15 May.
2. Knox Co. Southwest-Purdue, Vincennes, IN, set 13 May.
3. Randolph Co. Davis-Purdue Agricultural Center, Farmland, IN, set 14 May,
4. Tippecanoe Co. Meigs-Purdue Horticultural Center, Lafayette, IN, set 15 May.

Trap period extended weekly mid May to mid August (14 sample dates).

4a3. Benefits and Results of Survey:

No target species were recovered. As in previous years, several species of endemic torticid and noctuid moths responded to the specific pheromones resulting in large numbers of moths to screen. This resulted in many hundreds specimens of endemic *Helicoverpa zea* and cryptic tortricid spp. received and screened by micro-dissection.

4a4. Database submissions:

Old world bollworm, *Helicoverpa armigera*,
Date Range: 01-01-2013 thru 12-31-2013
Counties 4 Sites 4 Pos 0 Neg 280

Egyptian cottonworm, *Spodoptera littoralis,*
Date Range: 01-01-2013 thru 12-31-2013
Counties 4 Sites 4 Pos 0 Neg 280

Silver Y-moth *Autographa gamma*;
Date Range: 01-01-2013 thru 12-31-2013
Counties 4 Sites 4 Pos 0 Neg 280

Summer fruit tortrix, *Adoxophyes orana*; and
Date Range: 01-01-2013 thru 12-31-2013
Counties 4 Sites 4 Pos 0 Neg 280

Golden twin-spot moth, *Chrysodeixis chalcites*.
Date Range: 01-01-2013 thru 12-31-2013
Counties 4 Sites 4 Pos 0 Neg 280

4b**.** Corn commodity survey:

Proposed data were 945 records.
Actual data were 1,134 records.
Proposed Funding was $4,606 and actual funding was $3,565.*
*Survey efficiency was optimized by careful coordination with a separately-funded survey for spotted wing drosophila.

4b1. Survey Methodology (trapping protocol): 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 Corn Commodity Guidelines (23 July 2010). Four high-risk trap sites that have high concentrations of grain crops (Field corn and soybean), vegetables (primarily tomato, sweet bell pepper, and sweet corn), were chosen for this survey. Five universal bucket traps (green/yellow/white) with lure and kill strips were placed at four locations for each of old world bollworm, *Helicoverpa armigera*, Egyptian cottonworm, *Spodoptera littoralis*, and silver Y-moth *Autographa gamma*. Traps were set on 13-15 May and were serviced weekly through the end of the reporting period (12 -16 August). Plant diseases were assessed by testing visually symptomatic tissue from 25 counties in collaboration with survey conducted by the Purdue Plant Pest and Diagnostic Laboratory.

4b2. Survey locations and dates;

1. La Porte Co. Pinney-Agricultural Center, Wanatah, IN, set 15 May.
2. Knox Co. Southwest-Purdue, Vincennes, IN, set 13 May.
3. Randolph Co. Davis-Purdue Agricultural Center, Farmland, IN, set 14 May,
4. Tippecanoe Co. Meigs-Purdue Horticultural Center, Lafayette, IN, set 15 May.

Trap period extended weekly mid May to mid August (14 sample dates).

Disease survey locations and sample dates

5. Allen Co. 8/28
6. Benton Co. 8/28
7. Boone Co. 9/8
8. Elkhart Co. 8/14
9. Hamilton Co. 8/21
10. Jasper Co. 9/13
11. Kosciusko Co. 8/14
12. LaGrange Co. 8/21 - 9/13
13. Lake Co. 9/3
14. LaPorte Co. 8/21 - 9/19
15. Miami Co. 8/21
16. Montgomery Co. 9/3
17. Newton Co. 8/28
18. Noble Co. 8/14
19. Parke Co. 8/21
20. Porter Co. 9/3
21. Pulaski Co. 9/13
22. St. Joseph Co. 8/14, - 9/19
23. Starke Co. 9/3
24. Steuben Co. 8/21 - 9/13
25. Tippecanoe Co. 9/3
26. Tipton Co. 8/14
27. Wabash Co. 9/3
28. Warren Co.8/14
29. White Co. 9/13

4b3. Benefits and Results of Survey:

No target species were recovered. As in previous years, several species of endemic noctuid moths responded to the specific pheromones resulting in large

numbers of moths to screen. This resulted in many specimens of endemic noctuid moths received and screened by micro-dissection.

4b4. Database submissions:

Old world bollworm, *Helicoverpa armigera*,
Date Range: 01-01-2013 thru 12-31-2013
Counties 4 Sites 4 Pos 0 Neg 280

Egyptian cottonworm, *Spodoptera littoralis*,
Date Range: 01-01-2013 thru 12-31-2013
Counties 4 Sites 4 Pos 0 Neg 280

Silver Y-moth *Autographa gamma*;
Date Range: 01-01-2013 thru 12-31-2013
Counties 4 Sites 4 Pos 0 Neg 280

Philippine Downy Mildew, *Peronosclerospora philippinensis*,
Date Range: 01-01-2013 thru 12-31-2013
Counties 25 Sites 98 Pos 0 Neg 98

Java Downy Mildew, *Peronosclerospora maydis*,
Date Range: 01-01-2013 thru 12-31-2013
Counties 25 Sites 98 Pos 0 Neg 98

Brown Stripe Downy Mildew, *Sclerophthora rayssiae*,
Date Range: 01-01-2013 thru 12-31-2013
Counties 25 Sites 98 Pos 0 Neg 98

4c. Nursery and Retail Plant Survey. This is a collaborative survey between CAPS. Indiana DNR (IDNR), Purdue University Plant Pest Diagnostic Laboratory (P&PDL).

Proposed data collection = 1,120 records.
Actual collection = 1,171 records. (526 Boxwood blight records represented 26 counties and 173,020 plants).
Proposed funding was $18,252 and actual funding was $17,202.

4c1. Survey Methodology: 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 tested using an enzyme-linked immunosorbent assay (ELISA) consistent with the *Phytophthora ramorum* Nursery Survey Manual (Revised April 30, 2007) USDA-PPQ. Confirmation testing (PCR) of suspect positive samples was performed by Michigan State University and/or USDA CPHST. Boxwood blight, *Calonectria pseudo*, was assessed visually by examining plants grown and/or sold by dealers and nurseries. Universal bucket traps (green/yellow/white) with lure and kill strips were placed at forty five

plant dealers or nursuries for old world bollworm, *Helicoverpa armigera* for a minimum 3 months of biweekly samples.

4c2. Survey dates: Sudden oak death *P. ramorum,* 5/20 – 7/3; Boxwood Blight *Calonectria pseudonaviculatum,* 4/22 – 6/19; Old world bollworm *Helicoverpa armigera,* 5/8 – 9/9.

4c3. Benefits and results of survey: In Indiana, sudden oak death could impact 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 $586.6 million were paid in total Indiana wages to horticultural firms in 2004. Further, the total economic contribution in 2004 attributable to the horticultural industry in Indiana was nearly $2.05 billion.

4c4. Database submissions:

Sudden Oak Death, *Phytophthora ramorum;*
Date Range: 01-01-2013 thru 12-31-2013
Counties 20 Sites 20 Pos 0 Neg 345

Boxwood blight, *Calonectria pseudonaviculatum*
Date Range: 01-01-2013 thru 12-31-2013
Counties 27 Sites 63 Pos 0 Neg 525
(172,998 plants examined as 525 single plants and bunches)

Old world bollworm, *Helicoverpa armigera*
Date Range: 01-01-2013 thru 12-31-2013
Counties 23 Sites 45 Pos 0 Neg 300

4d: Risk-based survey for exotic woodborers/bark beetles (in cooperation with PPQ statewide trapping network). Velvet longhorn beetle, *Trichoferus campestris,* visual, and European hardwood ambrosia beetle, *Trypodendron domesticum*, trapping surveys were informally bundled with the funded wood borer/bark beetle survey (see Objective 2).

Proposed risk based exotic woodborers/bark beetles survey = 2,832 records.
Actual data collection = 5,165 records.
Proposed funding was $4,528 and actual funding was $3,150.

4d1. Survey Methodology (trapping protocol): These surveys were an APHIS-PPQ/CAPS collaborative effort. PPQ set up and sampled traps and CAPS processed, identified, and archived samples. Exotic Woodborer/Bark Beetle National Survey Guidelines-July 2011, were followed. Survey targets are Redhaired pine bark beetle, *Hylurgus ligniperda;* sixtoothed bark beetle, *Ips sexdentatus;* European spruce bark beetle, *Ips typographus,* Japanese pine sawyer beetle, *Monochamus alternatus*, Mediterranean pine engraver,

Orthotomicus erosus; sixtoothed spruce bark beetle, *Pityogenes chalcographus;* pine shoot beetles *Tomicus destruens* and *T. piniperda*.

a. One hundred seventy six total wet cup Lindgren traps were deployed at 73 sites in 30 counties. Sites were identified by recognition of apparent risk of receiving target pests through commerce. Three 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: UHR alpha pinene, alpha pinene lure ungelled, UHR alpha pinene+ethanol, and IPS Tri-lure.
b. Non-work plan velvet longhorn beetle, *Trichoferus campestris*, survey was bundled at 25 sites in 5 counties using approved visual methods.
c. Non work plan European hardwood ambrosia beetle, *Trypodendron domesticum*, survey was bundled at 15 sites in 10 counties using Lineatin lure in Lindgren funnel wet cup traps.

4d2. Survey dates: Traps from the exotic woodborers/bark beetles survey were in serviced in southern Indiana from 9 March to 2 October; 4 May to 15 October in central Indiana and from 23 April to 16 August in northern Indiana. Traps were serviced about every two weeks.

4d3. Benefits and results of survey: Three positive records were recovered for the low risk-pine shoot beetle, *Tomicus piniperda*. No high-risk species were recovered. Protecting Indiana's forests is essential as over 4.3 million acres of high quality hardwood forests support an industry which employs 47,000 Hoosiers.

4d4. Database submissions:

Redhaired pine bark beetle, *Hylurgus ligniperda;*
Date Range: 01-01-2013 thru 12-31-2013
Counties 30 Sites 73 Pos 0 Neg 733

Sixtoothed bark beetle, *Ips sexdentatus*
Date Range: 01-01-2013 thru 12-31-2013
Counties 30 Sites 49 Pos 0 Neg 733

European spruce bark beetle, *Ips typographus*
Date Range: 01-01-2013 thru 12-31-2013
Counties 30 Sites 49 Pos 0 Neg 733

Japanese pine sawyer beetle, *Monochamus alternatus*
Date Range: 01-01-2013 thru 12-31-2013
Counties 30 Sites 73 Pos 0 Neg 733

Mediterranean pine engraver, *Orthotomicus erosus*
Date Range: 01-01-2013 thru 12-31-2013
Counties 30 Sites 49 Pos 0 Neg 733

Sixtoothed spruce bark beetle, *Pityogenes chalcographus*
Date Range: 01-01-2013 thru 12-31-2013
Counties 3 Sites 3 Pos 0 Neg 33

Pine shoot beetle, *Tomicus destruens*
Date Range: 01-01-2013 thru 12-31-2013
Counties 30 Sites 73 Pos 0 Neg 733

Pine shoot beetle, *Tomicus piniperda*.
Date Range: 01-01-2013 thru 12-31-2013
Counties 30 Sites 49 Pos 3 Neg 731

4e. Oak Commodity Survey: This is a survey of the Wabash River, White River and Muscatatuck River watersheds for exotic lepidopteran pests of oak. Public and private land was surveyed.

Proposed data collection = 300 records.
Actual data collection = 420 records.
Proposed funding was 5,405 and actual funding was $3,524*.
*Survey efficiency was optimized by careful coordination with a separately-funded survey for spotted wing drosophila.

4e1. 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, revised 2010. Ten hardwood sites in 9 counties that had been selectively harvested within the last 2 to 4 years, and still had slash remaining, were surveyed. One set of traps was placed at each site. Traps with lure were placed between 10 to 27 May and were serviced every 2-3 weeks. Trap interval varied by location. Appropriate traps (bucket, wing and delta. purple panel) with and without lures for exotic lepidopteran pests, summer fruit tortrix, *Adoxophyes orana;* green oak tortrix, *Tortrix veridana;* variegated golden tortrix, *Archips xylosteanus;* and Egyptian cottonworm, *Spodoptera littoralis*, and the goldspotted oak borer, *Agrilus auroguttatus* and oak splendor beetle, *A. biguttatus*, were included at all sites

4e2. Survey dates: Traps were placed between 3 to 9 May and are serviced every 2-3 weeks. Last samples were collected 16 August to 23 October.

4e3. Benefits and results of survey: No target pests were detected. 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.

4e4. Database submissions:

Summer fruit tortrix, *Adoxophyes orana*
Date Range: 01-01-2013 thru 12-31-2013
Counties 9 Sites 10 Pos 0 Neg 70

Green oak tortrix, *Tortrix veridana*
Date Range: 01-01-2013 thru 12-31-2013
Counties 9 Sites 10 Pos 0 Neg 70

Variegated golden tortrix, *Archips xylosteanus*
Date Range: 01-01-2013 thru 12-31-2013
Counties 9 Sites 10 Pos 0 Neg 70

Egyptian cottonworm, *Spodoptera littoralis*,
Date Range: 01-01-2013 thru 12-31-2013
Counties 9 Sites 10 Pos 0 Neg 70

Goldspotted oak borer, *Agrilus auroguttatus*
Date Range: 01-01-2013 thru 12-31-2013
Counties 9 Sites 10 Pos 0 Neg 70

Oak Splendor Beetle, *Agrilus biguttatus*
Date Range: 01-01-2013 thru 12-31-2013
Counties 9 Sites 10 Pos 0 Neg 70

B. If appropriate, explain why objectives were not met.
All objectives for reporting period (1 January to 31 December) were met.

C. Where appropriate, explain any cost overruns or unobligated funds in excess of $1,000.
All funds were expended with no cost overruns.

D. Supporting Documents (if applicable**)** none attached

---

indicates information is required per 7 CFR 3016.40 and 7 CFR 3019.5

Approved and signed by

_____ Date: _____
Philip T. Marshall (Cooperator)

_____ Date: _____
Gary W. Simon (ADODR)