

Indiana Cooperative Agricultural Pest Survey

2010 Annual Report

1 January – 31 December



Department of Entomology Purdue University

Indiana Department of Natural Resources

United State Department of Agriculture
Animal and Plant Health Inspection Service, Plant Protection and Quarantine

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29 March 2011

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Indiana CAPS Accomplishment Report

State: **Indiana** Year: **2010**

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

List dates covered by this report: **1 January – 31 December 2010**

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 -2010;

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.

A1. Infrastructure Work Plan

Objectives: The overall infrastructure objectives represented program administration and included the development, coordination, execution, and archiving results of surveys intended to detect and/or monitor exotic pest threats to commodities that are of national and Indiana concern. Each accomplishment listed in the bullet list below fulfills one or more of these interrelated goals. The execution and the archiving of data for each survey will appear in survey-specific work plans.

Accomplishments

- The Cooperative Agricultural Pest Survey (CAPS) Indiana State Survey Coordinator (SSC), Larry Bledsoe, maintained an office in the Department of Entomology at Purdue University, West Lafayette, Indiana 47907-2089.
- The SSC directly managed a total program budget of \$110, 089. Farm Bill funding represented an additional \$14,409.75 under direct (Enhanced Grape Commodity Survey) and indirect (Plum Pox Survey). Department of Natural Resources personnel managed an additional \$35,000 in Farm Bill-funded Honey Bee and Sudden Oak Death Water Surveys.
- The SSC managed 5 temporary interns who worked both full time and/or part time relative to specific duties and time of year.
- The SSC maintained laboratory infrastructure, 2 trucks for survey, and a wide assortment of survey traps and equipment.
- The SSC cooperated with agencies and third parties by coding and uploading pest information to NAPIS database for the following non work plan pests:
 - emerald ash borer, *Agrilus planipennis*
 - gypsy moth, *Lymantria dispar*
 - National Karnal Bunt Survey, *Tilletia (Neovossia) indica*
 - brown marmorated stink bug, *Halyomorpha halys*
- The SSC is a member of the Data Collection and Management working group reporting to the Indiana Invasive Species Council.
- The SSC is a member of the Indiana Exotic Pest Advisory Committee.
- SCC represented Indiana CAPS program at Central Plant Board, Minneapolis, MN, 8-11 March 2010.

- The SSC conducted outreach presentations to 12 Indiana Master Gardener meetings.
- CAPS sub committee met on 9 March 2010. Full committee met for work plan development on 3 June and conference call on 15 July 2010.

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

Full Committee	Organization	Discipline
Dr. Bruce Bordelon	Purdue University	Horticulture
Steve Cain	Purdue University, EDEN	Disaster Education & Outreach
Thomas Creswell	Purdue University, PPDL	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, PPDL	Plant Disease Diagnostics
Tom Creswell	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

A2. Soybean Commodity Survey

Objective: This was a survey for exotic pests of soybean including old world bollworm, *Helicoverpa armigera*, summer fruit tortrix, *Adoxophyes orana*, silver Y-moth *Autographa gamma*, golden twin-spot moth, *Chrysodeixis chalcites*, and Egyptian cotton leafworm, *Spodoptera littoralis*.

1. Survey Methodology: Survey sites with soybean/corn/vegetable production were located in La Port (one of five traps was in Porter), Tippecanoe, Randolph, and Knox Counties. Five Heliothis traps (Scentry Corp.) were baited with old world bollworm lure. Five baited universal moth traps were set for silver Y moth and golden twin spot moth. Five wing traps (Pherocon 1C) per site were used to monitor for Egyptian cotton leafworm moth. Five baited red paper delta traps were used to monitor for summer fruit tortrix. Trap sets were placed at least 700 ft apart at each site and geo-referenced. Moths were collected weekly, placed in containers labeled by location-date-trap number, transported in coolers to the laboratory, and frozen. Lures were replaced according to use directions.
2. Rationale underlying survey methodology: Survey methods were adapted from Vennette, et al. 2003. Mini Risk Assessment, Old World Bollworm *Helicoverpa armigera*, Hubner [Lepidoptera : Noctuidae] (CAPS Pest Risk Assessment publication) and the Soybean Commodity Survey Guildline, 25 July 2007. Sullivan and Jones, USDA-APHIS PPQ.
3. Survey dates; Trapping began 24-27 May and ended 16-19 August 2010.
4. Taxonomic services: The SSC, or his aids under supervision, prescreened 278 accidentally caught *H. zea* moths by micro-dissection of internal genitalia. No suspect old world bollworm moths were detected. The SSC or his aids under supervision prescreened several hundred other moths that were morphologically similar to the other target moths by examining internal genitalia. No other target moths were detected.
5. Benefits and results of survey: The Indiana CAPS program participated in a pest survey that resulted in information about the presence or absence of potentially high priority, exotic pests. Knowledge of the presence/threat of these pests is crucial to Indiana agriculture as the state grows about 5 million acres of soybeans (and about 6 million acres of corn-both are hosts of old world bollworm). These two principal field crop commodities have a combined annual value of about \$8.0 billion (soybeans, \$3.1 billion and corn, \$4.9 billion) in Indiana. Indiana tomatoes and other vegetables have an annual value exceeding \$35 million dollars.
6. NAPIS database submissions: Date Range: 01-01-2010 thru 12-31-2010
Negative data presented only where approved survey methods were used.

Target Pest	Counties	Samples	Pos	Neg
old world bollworm, <i>Helicoverpa armigera</i> ,	5	220	0	220
summer fruit tortrix, <i>Adoxophyes orana</i>	5	220	0	220
silver Y-moth, <i>Autographa gamma</i>	5	220	0	220
golden twin-spot moth, <i>Chrysodeixis chalcites</i>	5	220	0	220
Egyptian cotton leafworm, <i>Spodoptera littoralis</i>	5	220	0	220

A3. Sudden Oak Death, *Phytophthora ramorum*, National Survey

Objectives: Species known to be susceptible to Sudden Oak Death (SOD) disease that can be grown outdoors in Indiana, include witch hazel, Douglas fir, Japanese pieris, rhododendrons, viburnums and lilacs. In addition, many other plants can serve as hosts on which this fungus-like organism can form spores and spread to other susceptible plants. The objective of this survey was to randomly assess commercial sources of known hosts of SOD and to identify host origin(s) of any positive samples.

1. Survey Methodology: In 2010 Indiana Department of Natural Resources (IDNR) personnel selected symptomatic parts of Camellia, Rhododendron, Viburnum, Pieris, and Kalmia (generally) from 21 out of about 600 Indiana nurseries and other landscape plant retail outlets inspected 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 400 samples using an enzyme-linked immunosorbent assay (ELISA) specific to *P. ramorum*. Suspect positive samples were forwarded to Michigan State University, Center for Integrated Plant Systems for conclusive testing using polymerase chain reaction (PCR).
2. Rationale underlying survey methodology: Methods were consistent with the *Phytophthora ramorum* Nursery Survey Manual (Revised April 30, 2007) USDA-PPQ.
3. Survey dates: 2 June to 13 August 2010
4. Taxonomic services: Prescreening was performed by the Purdue University Pest & Plant Diagnostic Laboratory. Suspect positive samples were forwarded to Michigan State University, Center for Integrated Plant Systems.
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. . Indiana has 1.8 million acres of oak and hickory type trees and ranks 6th in the nation for retail lawn and garden sales. Undetected infections of *P. ramorum* on nursery and garden center plants, could significantly impact the \$3.4 billion retail lawn and garden industry not to mention oaks in Indiana’s forests. 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 2010.
6. NAPIS database submissions: Date Range: 01-01-2010 thru 12-31-2010
Negative data presented only where approved survey method was used.

<u>Target Pest</u>	<u>Counties</u>	<u>Samples</u>	<u>Pos</u>	<u>Neg</u>
Sudden Oak Death; <i>Phytophthora ramorum</i>	15	400	0	400

A4. Grape Commodity Survey

Objectives: Several exotic moth species capable of severe grape defoliation and fruit damage were monitored. These species include *Adoxophyes orana* (summer fruit tortrix), *Autographa gamma* (silver-Y moth), *Lobesia botrana* (European grapevine moth), *Spodoptera littoralis* (Egyptian cotton leafworm), and *Spodoptera litura* (rice/cotton cutworm). Additionally, Candidatus *Phytoplasma australiense*, the causal agent of Phytoplasma Yellows, also referred to as Grape Yellows (GY) (or Australian grapevine yellows) and ranked 24 on the 2010 AHP list was monitored. In Indiana, there have been reports of vine and production decline over the past several years that may have been caused by GY, exotic insect pests, or a combination of these pests. Australian Grapevine Yellows (GY) is an important disease of many crops in Asia and Europe and is a high priority CAPS target for the US.

1. Survey Methodology: Six vineyards in southern counties and one vineyard in one northern county were monitored. At each site, three high-risk cultivar rows were marked and sampled monthly from June to October. Three baited universal moth traps were set for each of silver Y moth, moth, Egyptian cotton leafworm moth, and rice (cotton) cutworm. Three baited red paper delta trap were used to monitor for summer fruit tortrix. For European grapevine moth three baited wing traps per site were sampled monthly. For GY detection, one composite sample of 5 leaves and 100 sweeps with a 38cm diameter net through the vegetation at the base of a row were obtained for each of three cultivars for genetic testing. One additional composite leafhopper sample of 100 sweeps with a 38cm diameter net through the vegetation at the base each of three cultivars was obtained for insect species determination. Samples were sent to Agdia Inc for PCR determination for the presence of *Phytoplasma* spp. *Phytoplasma* positive samples were sent to Dr. Robert Davis USDA-ARS Molecular Plant Pathology Laboratory, Beltsville, MD 20705, for species determination. All leafhoppers and planthoppers in the samples were identified by the SSC in consultation with the curator of the Purdue Entomological Research Collection in the Department of Entomology, Purdue University. Trap and leaf samples were collected monthly from June through September.
2. Rationale underlying survey methodology: General protocols followed guidelines found in the Grape Commodity-based Survey Reference (CAPS December 2007). Exceptions to the published reference were 1) visual symptoms of GY-infected plants/leaves were impossible to distinguish from many endemic grape diseases, therefore, random leaf samples were genetically tested for the presence of the disease. 2) The regional complex of potential leafhopper/planthopper vectors is unknown. Therefore a leafhopper composite of 100 sweeps was genetically tested to determine if the disease resides in transplanted stock only and/or resides in potential vectors. No attempt was made to isolate individual leafhopper species for disease determination in 2010.
3. Survey dates: Sampling dates for genetic evaluations of grape leaf and leafhopper/planthopper samples were 9, 10, and 11 June; 14, 15 July; 10, 11, and 12 August; and 10, 13, and 14 September.
4. Taxonomic services: Samples were sent to Agdia Inc. for PCR determination for the presence of *Phytoplasma* spp. *Phytoplasma* positive samples were sent to Dr. Robert

Davis USDA-ARS Molecular Plant Pathology Laboratory, Beltsville, MD, for species determination by molecular sequencing.

5. Benefits and results of survey: This survey served to (1) develop and refine Indiana GY survey methodologies allowing for more efficient and effective future survey efforts; (2) demonstrate the occurrence of endemic non symptomatic Phytoplasmas in Indiana grape stock and in native leafhopper; (3) four known leafhopper vectors of grape viruses were detected (4) data on the regional leafhopper/planthopper guild has been augmented. The primary vector of GY in the US, *Scaphoideus titanus*, was not detected. Six leafhopper samples and two leaf samples tested tentative positive for GY. Molecular sequencing by USDA-ARS is in progress and results are pending. No exotic Lepidoptera were detected.
6. NAPIS database submissions Date Range: 01-01-2010 thru 12-31-2010
 Negative data presented only where approved survey methods were used.

Target Pest	Counties	Samples	Pos	Neg
Australian Grapevine Yellow; Candidatus <i>Phytoplasma australiense</i>				
Grape leaves	6	82	0	82
Leafhoppers/planthoppers composite	6	78	0	78
		Sub total		160
		(GY samples pending analysis)		8
		Total GY		168
leafhopper, <i>Scaphoideus titanus</i> (not on WP)	6	81	0	81
summer fruit tortrix, <i>Adoxophyes orana</i>	6	84	0	84
silver-Y moth, <i>Autographa gamma</i>	6	84	0	84
Egyptian cotton leafworm, <i>Spodoptera littoralis</i>	6	84	0	84
cotton/rice cutworm, <i>Spodoptera litura</i>	6	84	0	84
European grapevine moth, <i>Lobesia botrana</i>	6	84	0	84

A5. National Exotic Bark Beetle and Wood-Boring Insects Survey Survey

Objective: This was an national APHIS-PPQ/CAPS collaborative survey of high-risk sites for exotic bark beetles and other wood-boring insects, most of which are not known to occur in the US. The primary objectives for the SSC were to prescreen, process, identify, archive and report samples obtained by APHIS-PPQ personnel.

Target Insects

Exotic bark beetle, *Hylurgops (Hylurgus) palliatus* Gyllenhal
 Golden-haired bark beetle, *Hylurgus ligniperda* (Fabricius)
 Six-spined engraver beetle, *Ips sexdentatus* (Boerner)
 European spruce bark beetle, *Ips typographus* (Linnaeus)
 Japanese pine sawyer beetle, *Monochamus alternatus* Hope
 Lesser pine shoot beetle, *Tomicus minor* (Hartig)
 Common pine shoot beetle, *Tomicus piniperda* (Linnaeus)
 Mediterranean pine engraver, *Orthotomicus erosus* (Wollaston)

1. Survey Methodology. The Exotic Wood Borer Bark Beetle National Survey Field Manual (PPQ-EDP-EP 3/10/2006) was used to develop protocols for this survey. PPQ was responsible for surveying 50 Indiana sites (two to four baited Lindgren funnel traps per site). Trap sites were visited every two to three weeks. The CAPS SSC was responsible for prescreening, preparation, identification, archiving, and reporting samples to NAPIS. Traps were located at sites with risk of exotic species due to importation of high-risk materials (e.g. solid wood packing material). Some site visits produced samples (traps) without insects and, therefore, no vial was supplied.
2. Rationale underlying survey methodology: The survey methodology was adapted from the National Exotic Woodborer/Bark Beetle National Survey Field Manual, 3/10/2006.
3. Survey dates: Trap deployment began on 1 April. Traps were serviced every two to three weeks until 8 September (approximately 12 sampling dates).
4. Taxonomic services: The SSC and Mr. Arwin Provonsha, curator of the Purdue University Entomological collection coordinated the preliminary identification of potential target organisms. Suspect target organisms were forwarded to 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. 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. No CAPS target pests were detected. Seven other pests of interest were detected.
6. NAPIS database submissions: Date Range: 01-01-2010 thru 12-31-2010
Negative data presented only where approved survey methods were used.

<u>Target Pest</u>	<u>Counties</u>	<u>Samples</u>	<u>Pos</u>	<u>Neg</u>
exotic bark beetle, <i>Hylurgops (Hylurgus) palliatus</i>	23	418	0	418
golden-haired bark beetle, <i>Hylurgus ligniperda</i>	23	418	0	418
six-spined engraver beetle, <i>Ips sexdentatus</i>	22	418	0	418
European spruce bark beetle, <i>Ips typographus</i>	22	418	0	418
Japanese pine sawyer btl, <i>Monochamus alternatus</i>	23	418	0	418
lesser pine shoot beetle, <i>Tomicus minor</i>	23	418	0	418
common pine shoot beetle, <i>Tomicus piniperda</i>	23	418	0	418
Mediterranean pine engraver, <i>Orthotomicus erosus</i>	22	418	0	418

<u>Other endemic pests of interest not on WP</u>	<u>Counties</u>	<u>Samples</u>	<u>Pos</u>	<u>Neg</u>
banded elm bark beetle, <i>Scolytus schevyrewi</i>	9	n/a	25	0
scolytid Beetle, <i>Xyleborus atratus</i>	9	n/a	12	0
ambrosia Beetle, <i>Xyleborus pelliculosus</i>	1	n/a	1	0
camphor shoot beetle, <i>Xylosandrus mutilatus</i>	2	n/a	2	0
European bark beetle, <i>Hylastes opacus</i>	5	n/a	6	0
granulate Ambrosia btl, <i>Xylosandrus crassiusculus</i>	13	n/a	32	0
scolytid beetle, <i>Euwallacea (Xyleborus) validus</i>	7	n/a	7	0

A6. Oak Commodity Survey

Objective: The purpose of this survey was to monitor for the presence/absence of exotic pests of oak in Indiana hardwood forests.

1. Survey Methodology: This survey was integrated with a pest-monitoring program in the Indiana Hardwood Ecosystem Experiment 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 two years were selected. One set of traps was placed at each site. Recently harvested hardwood sites have been shown to emit large volumes of volatile compounds that are highly attractive to the families of beetles that include the exotic species, *Agrilus biguttatus*, *Playpus quercivourus*, and others. Visual and nonselective trapping methods were used to sample these pests. These methods have been used in Indiana at hardwood harvest sites with great success in capturing wood boring and longhorned beetles for several years. Traps baited for exotic lepidopteran pests, *Adoxophyes orana*, (orange paper delta) and *Spodoptera littoralis* (g/w/y universal bucket trap), were monitored at all sites using 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 17 to 28 May to 31 August/7 September and were serviced every 3 weeks.
4. Taxonomic services: Dr. Jeff Holland or his staff, Department of Entomology, Purdue University, screened all samples. Suspect specimens forwarded to Bobby Brown, 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. No target species were detected.
6. NAPIS database submissions: Date Range: 01-01-2010 thru 12-31-2010. Negative data presented only where approved survey methods were used.

Target Pest	Counties	Samples	Pos	Neg
Oak splendour beetle, <i>Agrilus biguttatus</i>	6	70	0	70
Oak ambrosia beetle, <i>Playpus quercivourus</i>	6	70	0	70
Summer fruit tortrix, <i>Adoxophyes orana</i>	6	70	0	70
Egyptian cottonworm, <i>Spodoptera littoralis</i>	6	70	0	70
Other pests of interest	Counties	Samples	Pos	Neg
banded elm bark beetle, <i>Scolytus schevyrewi</i>	1	1	1	0
scolytid Beetle, <i>Xyleborus atratus</i>	11	21	21	0

ambrosia Btle, <i>Xyleborus pelliculosus</i>	8	16	16	0
Gran. ambrosia btl, <i>Xylosandrus crassiusculus</i>	6	10	10	0
scolytid beetle, <i>Euwallacea (Xyleborus) validus</i>	9	19	19	0

A7. Farm Bill Funded *Lobesia botrana* (enhanced Grape Commodity) Survey

Objective: Because the European grapevine moth, *Lobesia botrana*, was an Indiana CAPS-funded target, approval was obtained from APHIS to enhance the existing survey. Therefore, five grape viruses, a bacterial disease and its vector were added to the survey.

1. Survey Methodology: This project was an enhancement of the CAPS Grape Commodity Survey that already included *Lobesia botrana*. Sampling began 9 June and continued through 14 October. The enhanced survey included *Ampelovirus* sp. (Grapevine leaf roll associated virus 1&3 [GLRaV-1& 3]), and *Nepovirus* spp. (Tomato ringspot virus (ToRSV), Tobacco ringspot virus (TRSV), Grapevine fan leaf virus (GFLV) and Peach rosette mosaic virus (PRMV), the bacterial disease, *Xylella fastidiosa*, (Pierce's Disease) and its vector, the glassy winged sharpshooter. *Homalodisca vitripennis*.
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 (Purdue University, Department of Botany and Plant Pathology) and a viticulturalist (Purdue University, Dept Horticulture and Landscape Architecture). The glassy winged sharpshooter was sampled along with other leafhoppers/planhoppers by collecting 100 sweeps through the foliage between the grape rows.
3. Survey dates: Monthly following survey initiation on 9 June to 14 October.
4. Taxonomic services: Purdue Plant Disease Diagnostic Laboratory and Agdia Inc, 30380 County Road 6, Elkhart, IN
5. Benefits and results of survey: There are 45 Indiana vineyards/wineries growing grapes on about 500 acres. About one million visitors to Indiana wineries add about \$35 million dollars to the state economy annually. The International Wine Competition coordinated by the Indiana Wine Grape Council held at Purdue University is one of the largest wine competitions in the United States. Entries come 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. There were seven positives for the grape leaf roll virus and three positives for tomato ringspot virus. Pierce's disease was detected at one location, but was not considered established. The glassy winged sharpshooter was not detected. Undetermined native leafhopper(s) are likely vectors (see CAPS-funded grape survey above).

6. NAPIS database submissions: Date Range: 01-01-2010 thru 12-31-2010.
 Negative data presented only where approved survey methods were used.

Target Pest	Counties	Samples	Pos	Neg
grapevine leaf roll virus 1&3, <i>Ampelovirus</i> sp.	4	63	7	56
tomato ringspot virus, <i>Nepovirus</i> spp.	4	63	3	60
tobacco ringspot virus <i>Nepovirus</i> spp.	4	63	0	63
grapevine fan leaf virus <i>Nepovirus</i> spp.	4	63	0	63
peach rosette mosaic virus <i>Nepovirus</i> spp.	4	63	0	63
Pierce's Disease, <i>Xylella fastidiosus</i> ,	4	63	1	62
glassy winged sharpshooter, <i>Homalodisca vitripennis</i>	6	84	0	84

A8. Farm Bill Funded National Plum Pox Virus Survey

Objective: The objective of this project was to survey for Plum Pox Virus-D strain in Indiana stone fruit orchards.

1. Survey Methodology: Detection surveys for PPV in orchards are based on the use of a hierarchical sampling method. The hierarchical sampling method (25% sampling, 4 leaves per tree) –involved sampling from 25 percent of the trees in an orchard. Trees sampled were grouped into quadrates (groups of four trees) that were related spatially to one another. A total of 16 leaves (4 leaves from each tree) were collected from the four trees being ELISA tested as two 8-leaf samples. Peach orchards in three Indiana counties were selected. Five hundred eleven samples were collected.
2. Rationale underlying survey methodology: 2010 National PPV Survey Plan.
3. Survey dates: Sample dates were 19, 22, 30 July and 23 August.
4. Taxonomic services: Agdia Inc, 30380 County Road 6, Elkhart, IN. Suspect positive was forwarded to USDA-APHIS-Molecular Diagnostics Lab and USDA-APHIS-CPHST.
5. Benefits and results of survey: Although the amount of stone fruit acres in Indiana is not large, additions to the knowledge of Plum Pox distribution will benefit regional regulatory processes. Plum Pox Virus was not detected.
6. NAPIS database submissions: Date Range: 01-01-2010 thru 12-31-2010.
 Negative data presented only where approved survey method was used.

Target Pest	Counties	Samples	Pos	Neg
Plum Pox virus, D-Strain	3	511	0	511

A9. Farm Bill Funded National Honey Bee Survey

Objective: The primary objective of this Indiana survey are the exotic Asian parasitic mite, *Tropilaelaps spp.*, exotic bees and viruses. The secondary objective was honey bee health

evaluation.

1. Survey Methodology: Sampling protocol followed the 2010 National Honey Bee Survey Guidelines. Generally, 25 Indiana apiaries were sampled by collecting a composite of live adult bees, dead adult bees in alcohol, and filtered comb wash in alcohol from eight colonies per site. Samples were sent to the USDA ARS, Bee Research Lab, Beltsville, MD for determination.
2. Rationale underlying survey methodology: 2010 National Honey Bee Survey Guidelines.
3. Survey dates: Apiaries were sampled between 2 June and 4 October 2010.
4. Taxonomic services: USDA ARS, Bee Research Lab, Beltsville, MD
5. Benefits and results of survey: According to the USDA Honey Bee Pests and Disease Survey Project Plan (2010), importation of bees can not occur if bee pests and diseases in the exporting country are not known to occur in the US. Additionally, knowledge of the overall regional health of the bees will assist in understanding bee decline. No *Tropilaelaps sp* mites or tracheal mites were detected. The varroa mite was present at all sites. Nosema disease was present at 11 sites. Exotic bee and virus analyses are pending.
6. NAPIS database submissions: Date Range: 01-01-2010 thru 12-31-2010. Negative data presented only where approved survey methods were used.

<u>Target Pest</u>	<u>Counties</u>	<u>Samples</u>	<u>Pos</u>	<u>Neg</u>
Parasitic mite, <i>Tropilaelaps sp.</i>	16	25	0	25
Honey bee mite, <i>Acaripis woodi</i>	16	25	0	25
Nosema disease, <i>Nosema apis</i>	16	25	11	14
Varroa mite, <i>Varroa destructor</i>	16	25	25	0

A10. Farm Bill Funded Sudden Oak Death Water Survey

Objective: The primary objective of this survey was to augment the national foliar database for *Phytophthora ramorum* with observations of nursery water discharge and watershed water.

1. Survey Methodology: Sampling followed the USDA Retail Nursery Protocol, Appendix 7 Water Sampling Protocol (March 2010). Two water survey methods were employed; *in situ* water sampling with host material leaf baits and water filtration procedures. Samples were obtained in early summer and again in the fall.
2. Rationale underlying survey methodology: USDA Retail Nursery Protocol, Appendix 7 Water Sampling Protocol (March 2010).
3. Survey dates: Samples were obtained in early summer (10 June to 13 July), and fall (6-27 October).
4. Taxonomic services: Samples were evaluated by Michigan State University, Diagnostic

Services, East Lansing, MI.

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. . Indiana has 1.8 million acres of oak and hickory type trees and ranks 6th in the nation for retail lawn and garden sales. Undetected infections of *P. ramorum* on nursery and garden center plants, could significantly impact the \$3.4 billion retail lawn and garden industry not to mention the oaks in the Hoosier National Forest. 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* water samples were detected.
6. **NAPIS database submissions:** Date Range: 01-01-2010 thru 12-31-2010.
 Negative data presented only where approved survey methods were used.

<u>Target Pest</u>	<u>Counties</u>	<u>Samples</u>	<u>Pos</u>	<u>Neg</u>
Sudden Oak Death water bait, <i>P. ramorum</i>	9	32	0	32
Sudden Oak Death water filter, <i>P. ramorum</i>	1	2	0	2

B. If appropriate, explain why objectives were not met. All objectives were met.

C. Where appropriate, explain any cost overruns. There were no cost overruns and 100 percent of the budget was expended.

Executive Summary; Indiana CAPS sub and full committees were active with three meetings and multiple phone and direct communications addressing survey activities and 2011 work plan development. The SSC was directly involved with three commodity surveys (Soybean, Grape, and Oak and indirectly (sample processing/reporting) with National Exotic Bark Beetle and Wood-Boring Insects , the National Sudden Oak Death, Farm Bill-Funded Lobesia botrana Surveys. SSC assisted in Farm Bill-funded Sudden Oak Death Water, Honey Bee, and Plum Pox Virus surveys. The SSC assisted the Indiana Department of Natural Resources and the US Forest Service by coding and/or uploading emerald ash borer and gypsy moth data. The SSC was a representative of the Indiana CAPS program at the Central Plant Board annual meeting. The SSC conducted outreach by presentations to 12 Indiana Master Gardener meetings. No exotic, invasive target pests were found, however, eight Phytoplasma-positive samples are still pending molecular sequencing by USDA-ARS as of 28 March 2011. All survey data were uploaded to the National Agricultural Pest Information System (NAPIS). All objectives were met and there were no cost overruns.

Signatures

Approved by

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