

Indiana Cooperative Agricultural Pest Survey

2021 Annual Report for Survey

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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Pest Detection / CAPS Survey Accomplishment Report – FY2021

Year:	2021
State:	Indiana
Cooperative Agreement Name:	Indiana Agricultural Pest Surveys (CAPS) 2021
Cooperative Agreement Number:	21-8218-0332-CA
Project Funding Period:	1 January 2021– 31 December 2021
Project Report:	PD / CAPS Survey Report
Project Document Date:	31 March 2022
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Quarterly Report	<input type="checkbox"/>
Semi-Annual Accomplishment Report	<input type="checkbox"/>
Annual Accomplishment Report	<input checked="" type="checkbox"/>

- A. Write a brief narrative of work accomplished. Compare actual accomplishments to objectives established as indicated in the work plan. If reporting on a combined surveys work plan, report accomplishments by survey. When the output can be quantified, a computation of cost per unit is required when useful.*

Indiana Cooperative Agricultural Pest Surveys in 2021 were Field Crops Commodities (Corn and Soybean), Nursery and Retail Plants, and Exotic Wood Borer/Bark Beetle. All aspects of the Field Crops Commodities survey for soybean were planned, executed and reported by the SSC. Only moth and invasive plant monitoring for the corn component of this survey were planned, executed and reported by the SSC. The disease monitoring portion of the corn survey was a CAPS collaboration with the Purdue Plant Pest Diagnostic Laboratory (PPDL) and the Indiana Crop Improvement Association (ICIA). Corn tissue samples were collected by ICIA, screened by PPDL, and results reported by the SSC. The Nursery and Retail Plants survey was a collaborative effort of CAPS, Indiana Department of Natural Resources (IDNR), and PPDL. IDNR assisted in setting and servicing traps and obtaining foliar samples. PPDL collaborated with the collection of foliar disease samples and screened them for disease. The SSC assisted in survey planning/logistics, processing samples, and archiving/reporting results. The Exotic Wood Borer/Bark Beetle survey was a collaborative effort with PPQ and CAPS. Pathway analysis was used to identify high-risk trap sites. PPQ co-planned the survey and set and serviced traps. The SSC co-planned the survey, retrieved, processed, archived samples, and reported results. Survey data from PPQ (khapra beetle), IDNR (gypsy moth), and IDNR PPA 7721-Specialty Crops were coded and/or uploaded. Taxonomic services for suspect invasive species were provided by the SSC to IDNR and PPDL on about 15 occasions.

Proposed number of survey records was 5,015.
Actual number of records was 6,148.
Total proposed and actual survey funding was \$31,015.
Cost per record was \$5.04.

Survey details follow.

A.1. Field Crops Commodity Survey:

Accomplishments:

Proposed and actual funding was \$10,825.
Proposed data were 2,992 records. Actual data were 3,786 records.
Cost per record was \$2.86.

- A.1.a. Proposed total moth data were 6 sites x 3 moth pests x 5 traps/pest/crop x 2 crop types (corn, soybean) x 12 visits = 2160 records. Additionally, there were 6 sites x 1 moth pest x 1 crop type (soy) x 12 visits = 360 records. Total moth records representing four species for 2 crops were 2,520. Proposed beetle records were 6 sites x 1 target beetle x 1 observation x 2 crops x 3 visits = 36. Proposed plant records were 6 sites x 1 target plant per crop x 2 crops x 3 sample dates = 36. Proposed corn disease survey records were 100 sites x 4 pests x 1 visit = 400 records. Actual number of records appear in table below.

	Records	
	Proposed	Actual
(Moths)		
1. Egyptian cottonworm, <i>Spodoptera littoralis</i> (corn, soy)	720	778
2. Old world bollworm, <i>Helicoverpa armigera</i> (corn, soy)	720	764
3. Silver Y-moth, <i>Autographa gamma</i> (corn, soy)	720	772
4. Golden twin-spot moth, <i>Chrysodeixis chalcites</i> (soy)	360	480
(Beetles)		
5. Cucurbit beetle, <i>Diabrotica, speciosa</i> (corn, soy)	36	36
(Plants)		
6. Yellow witchweed, <i>Alectra vogelii</i> (soy)	18	18
7. Asiatic witchweed, <i>Striga asiatica</i> (corn)	18	18
(Corn Diseases)		
8. Philippine downy mildew, <i>Peronosclerospora philippinensis</i>	100	230
9. Late wilt of corn, <i>Magnaportheiopsis maydis</i>	100	230
10. Tar spot, <i>Phyllachora maydis</i>	100	230
11. Bacterial leaf streak, <i>Xanthomonas vasicola pv. vasculorum</i>	100	230
Totals	2,992	3,786

A.1.b. Survey Methodology: Methods were adapted from the CAPS Corn and Soybean References 2020 and 2021. Six statewide high-risk trap locations with high concentrations of grain crops (soybean and field corn) were chosen for this survey. Trap numbers and types placed at each location included: five bucket traps (green/yellow/white) with lure and kill strips for each of Old World bollworm, *Helicoverpa armigera*, Egyptian cottonworm, *Spodoptera*, silver Y-moth, *Autographa gamma*, and golden twin-spot moth, *Chrysodeixis chalcites*. Traps were set on 24-31 May and were serviced weekly through the end of the reporting period, 23-26 August. Golden twin spot moth was sampled until 5 October. Yellow witchweed, *Alectra vogelii*, (soybean), Asiatic witchweed, *Striga asiatica* (corn) and cucurbit beetle, *Diabrotica speciosa*, surveys were 20-minute rapid, visual searches in an “M” shaped pattern across a field performed monthly from 1 July to 10 September. This survey method was based on the generally recommended search pattern for pest insects and weeds by the Purdue Cooperative Extension Service and widely used in the Midwest. Disease targets including Philippine downy mildew, *Peronosclerospora philippinensis*, late wilt of corn, *Magnaportheiopsis. maydis*, bacterial leaf spot, *Xanthomonas vasicola pv. vasculorum*, and tar spot, *Phyllachora. Maydis*, were sampled in 85 counties from 19 May through 27 October. All samples were screened and evaluated by Purdue Plant and Pest Diagnostic Laboratory.

A.1.c. Survey locations, trap service and weed search dates;

Moth survey

1. Jennings Co. Southeast-Purdue Agricultural Center, Butlerville, IN.
Trap dates; weekly from 6/1 to 10/2.

2. Knox Co. Southwest-Purdue Agricultural Center, Vincennes, IN.
Trap dates; weekly from 6/2 to 10/7.
3. La Porte Co. Pinney-Agricultural Center, Wanatah, IN.
Trap dates; weekly from 6/2 to 10/5.
4. Randolph Co. Davis-Purdue Agricultural Center, Farmland, IN.
Trap dates; weekly from 6/4 to 10/5.
5. Tippecanoe Co. Meigs-Purdue Horticultural Center, Lafayette, IN.
Trap dates; weekly from 6/1 to 10/10
6. Whitley Co. Northeast-Purdue Agricultural Center, Columbia City, IN.
Trap dates; weekly from 6/1 to 10/5.

Weed and beetle surveys

7. Jennings Co. Southeast-Purdue Agricultural Center, Butlerville, IN.
Weed and beetle search dates; 7/6, 8/3, 9/9
8. Knox Co. Southwest-Purdue, Vincennes, IN.
Weed and beetle search dates; 7/7, 8/4, 9/9
9. La Porte Co. Pinney-Agricultural Center, Wanatah, IN.
Weed and beetle search dates; 7/1, 8/5, 9/7
10. Randolph Co. Davis-Purdue Agricultural Center, Farmland, IN.
Weed and beetle search dates; 7/6, 8/3, 9/7
11. Tippecanoe Co. Meigs-Purdue Horticultural Center, Lafayette, IN.
Weed and beetle search dates; 7/9, 8/2, 9/10
12. Whitley Co. Northeast-Purdue Agricultural Center, Columbia City, IN.
Weed and beetle search dates; 7/6, 8/3, 9/9

Exotic corn diseases: Philippine mildew, bacterial leaf streak, late wilt of corn, and corn tar spot survey locations, sample dates (number of sites for a sample date).

13. Adams Co. 7/28, 8/5, 8/24, 9/14
14. Allen Co. 9/14
15. Bartholomew Co. 9/20
16. Benton Co. 8/9 (2), 8/17, 8/27 (3), 9/7, 9/15, 10/20
17. Blackford Co. 9/14
18. Boone Co. 10/6
19. Brown Co. 9/20
20. Carroll Co. 7/27, 8/11
21. Cass Co. 7/30
22. Clark co. 9/14
23. Clay Co. 6/22 (new county detection), 8/20 (3)
24. Clinton 7/22, 8/24
25. Crawford Co. 9/20
26. Daviess Co. 5/27, 7/30, 8/4, 9/21
27. De Kalb Co. 9/14
28. Dearborn Co. 9/15

29. Decatur Co. 5/26, 9/17, 10/13
30. Delaware Co. 9/17, 9/23
31. Dubois Co. 6/1, 8/4
32. Elkhart Co. 9/14
33. Floyd Co. 9/14
34. Fountain Co. 6/10, 6/11, 8/3, 8/5, 10/1, 10/27
35. Franklin Co. 9/17
36. Fulton Co. 7/30 (2)
37. Gibson Co. 8/2 (new county detection), 8/26, 9/14, 9/22
38. Grant Co. 7/30 (new county detection), 9/14 (2)
39. Greene Co. 10/18
40. Hamilton Co. 5/28, 6/23, 7/27, 8/10
41. Hancock Co. 8/9, 9/17 (2)
42. Harrison Co. 7/23
43. Hendricks Co. 9/17
44. Howard Co. 8/4, 8/10, 8/16, 10/1
45. Huntington Co. 6/17, 7/7, 8/27, 9/15
46. Jackson Co. 5/21 (2), 9/14
47. Jasper Co. 6/1 (2), 6/17, 7/12, 7/14, 9/3 (2), 9/27, 10/1 (2)
48. Jefferson Co. 9/14 (2)
49. Jennings Co. 7/23, 8/3, 8/13 (2), 9/20
50. Johnson Co. 5/19, 8/10, 9/17, 9/20, 9/27
51. Knox Co. 7/16 (2), 7/28, 7/30, 8/3 (2), 9/21, 10/18
52. Kosciusko Co. 9/7, 9/14
53. La Porte Co. 8/13 (2)
54. Lagrange Co. 8/13
55. Lawrence Co. 9/15, 9/17, 9/22
56. Madison Co. 6/15 (2)
57. Marion Co. 9/17
58. Martin Co. 9/21
59. Miami Co. 7/30, 8/15, 8/24
60. Monroe Co. 9/20
61. Montgomery Co. 7/22, 8/4, 8/16
62. Morgan Co. 9/20
63. Newton Co. 6/24, 10/1
64. Noble Co. 7/15 (2)
65. Ohio Co. 9/14
66. Orange Co. 7/23, 9/22
67. Owen Co. 9/20
68. Parke Co. 6/14
69. Perry Co. 9/21
70. Pike Co. 9/21
71. Porter Co. 8/13
72. Posey Co. 5/21, 8/9, 9/21
73. Pulaski Co. 7/30
74. Putnam Co. 8/6, 9/16

75. Randolph Co. 8/20, 9/15
76. Ripley Co. 9/14, 10/1
77. Rush Co. 9/17
78. St. Joseph Co. 7/15, 8/11
79. Scott Co. 9/14
80. Shelby Co. 6/24, 7/23, 9/14, 9/17
81. Spencer Co. 8/2, 8/4, 9/21
82. Sullivan Co. 8/13, 9/21
83. Switzerland Co. 9/14
84. Tippecanoe Co. 5/25, 7/16, (5), 7/27, 7/30, 8/3, 10/19 (20)
85. Tipton Co. 6/7, 7/21, 8/4 (2), 8/13 (2)
86. Union Co. 9/15
87. Vanderburgh Co. 9/21
88. Vermillion Co. 7/16
89. Vigo Co. 5/21, 7/23, 8/3, 9/30
90. Wabash Co. 9/17
91. Warren Co. 8/9, 10/1
92. Warrick Co. 8/4, 9/21
93. Washington Co. 7/23 (new county detection), 9/14 (2), 9/22
94. Wayne Co. 9/15
95. Wells Co. 9/14
96. White Co. 7/30, 8/3, 8/11, 8/19 (2)
97. Whitley Co. 8/3 (3), 8/27, 9/15

A.1.d. Benefits and Results of Survey:

As in previous years, several similar endemic noctuid loopers were attracted to the all the moth lures. This resulted in approximately 287 specimens that required screening by micro-dissection and/or external morphology. Old World bollworm, *Helicoverpa armigera*, silver Y moth, *Autographa gamma*, and Egyptian cottonworm, *Spodoptera littoralis* were not detected. Golden twin spot Moth, *Chrysodiexis chalcites*, was detected as first record county at Pinney-Purdue Agricultural Center, LaPorte County on 7/1/2021. (note: this moth was also detected in Lagrange Co., 6/9/2021 (first record in state), and in Grant Co. as first record in county, 7/13/2021, in a PPA7721 survey). Cucurbit beetle, *Diabrotica speciosa*, Asiatic witchweed, *Striga asiatica*, and yellow witchweed, *Alectra vogelii*, were not detected. Tar spot, *Phyllachora maydis*, was confirmed at 68 sites in 39 counties resulting in 4 new county records: Clay, Gibson, Grant, and Washington Counties. No other exotic corn disease targets were detected.

A.1.e. Database submissions:

Egyptian cottonworm, *Spodoptera littoralis*,
 Date Range: 6-1-2021 thru 9-9-2021
 Counties 6 Locations 6 Pos 0 Neg 778

Old world bollworm, *Helicoverpa armigera*,
 Date Range: 6-1-2021 thru 9-9-2021
 Counties 6 Locations 6 Pos 0 Neg 764

Silver Y-moth *Autographa gamma*;
 Date Range: 6-1-2021 thru 9-9-2021
 Counties 6 Locations 6 Pos 0 Neg 772

Golden twin spot Moth, *Chrysodiexis chalcites*,
 Date Range: 6-1-2021 thru 10-10-2021
 Counties 6 Locations 6 Pos 1 Neg 479

Cucurbit beetle, *Diabrotica speciosa*,
 Date Range: 7-1-2021 thru 9-10-2021
 Counties 6 Locations 6 Pos 0 Neg 18

Yellow witchweed, *Alectra vogelii*,
 Date Range: 7-1-2021 thru 9-10-2021
 Counties 6 Locations 6 Pos 0 Neg 18

Asiatic witchweed, *Striga asiatica*
 Date Range: 7-1-2021 thru 9-10-2021
 Counties 6 Locations 6 Pos 0 Neg 18

Philippine downy mildew, *Peronosclerospora philippinensis*
 Date Range: 5-19-2021 thru 10-27-2021
 Counties 85 Locations 230 Pos 0 Neg 230

Late wilt of corn, *Magnaporthiopsis maydis*
 Date Range: 5-19-2021 thru 10-27-2021
 Counties 85 Locations 230 Pos 0 Neg 230

Tar spot, *Phyllachora maydis*,
 Date Range: 5-19-2021 thru 10-27-2021
 Counties 85 Locations 230 Pos 68 Neg 162

Bacterial leaf streak, *Xanthomonas vasicola*, pv. *vasculorum*
 Date Range: 5-19-2021 thru 10-27-2021
 Counties 85 Locations 230 Pos 0 Neg 230

A.2. Nursery and Retail Plants Survey.

A.2.a. Proposed old world bollworm, *Helicoverpa armigera*, observations were 270 records.
 Proposed total boxwood blight, *Calonectria pseudonaviculata*, observations were 200 records.
 Proposed collections for sudden oak death (SOD), *Phytophthora ramorum*, were 200 records.

Accomplishments:

Proposed and actual funding was \$16,580

Proposed data were 670 records. Actual data were 690 records.

Cost per record was \$24.03.

	Records	
	Proposed	Actual
1. Old world bollworm, <i>Helicoverpa armigera</i>	270	333
2. boxwood blight, <i>Calonectria pseudonaviculata</i>	200	153
3. sudden oak death, <i>Phytophthora ramorum</i>	200	204
Totals	670	690

A.2.b. Survey Methodology: This survey was integrated with the annual plant nursery and retail commercial and landscape inspections conducted by Indiana Department of Natural Resources. Subsets of sites for various pests were sampled from about 360 sites visited annually. State nursery inspectors set and monitored traps for Old World bollworm, *H. armigera*, at 46 locations in 19 counties; observed and sampled foliage of ornamental boxwood cultivars, *Buxus spp.* for boxwood blight, *C. pseudonaviculata*; at 44 sites in 25 counties; and observed and sampled a wide range of susceptible perennial plant foliage for sudden oak death, *P. ramorum* symptoms at 31 sites in 20 counties. Moth samples were sent to the SSC and foliar samples were sent to Purdue University Plant Pest & Disease Laboratory for prescreening/diagnoses.

For the moth survey, one plastic bucket trap with Old World bollworm lure and kill strip was placed at each site. The sample interval was approximately biweekly. Sampling for boxwood blight, *C. pseudonaviculata*, was visual at plant nurseries, retail outlets, and landscapes with suspect boxwood leaf tissue submitted for microscopic confirmation at Purdue Plant Pest Diagnostic Laboratory (PPDL). Random and directed visual observations of potential host plants suspected of sudden oak death, *P. ramorum* lesions were tested at PPDL using an enzyme-linked immunosorbent assay (ELISA) consistent with the USDA-APHIS *Phytophthora ramorum* protocols. Confirmation testing (PCR) was performed by an APHIS-approved lab at Michigan State University, East Lansing, MI.

The relatively high cost of the Nursery and Retail Plants survey was due to laboratory supplies and labor required for disease screening and confirmation.

A.2.c. Old World bollworm survey locations; trap service dates;

- | | |
|---------------------------------------|---|
| 01. Allen Co. 5/27 - 9/2; 5 sites | 11. Knox Co. 6/8 – 10/1; 1 site |
| 02. Boone Co. 6/3 - 9/17; 2 sites | 12. La Porte Co. 5/26 – 9/1; 1 site |
| 03. Clark Co. 5/24 – 9/29; 2 sites | 13. Madison Co. 6/7 – 8/6; 2 sites |
| 04. Delaware Co. 6/7– 8/13; 2 sites | 14. Marion Co. 7/9 – 11/27; 3 sites |
| 05. Dubois Co. 6/8 - 10/17; 1 site | 15. Marshall Co. 6/11– 9/17; 5 sites |
| 06. Floyd Co. 5/24 – 9/8; 2 sites | 16. Owen Co. 5/14 -8/6; 1 site |
| 07. Hamilton Co. 6/18 – 8/16; 1 site | 17. Porter Co. 5/26 – 9/13; 4 sites |
| 08. Harrison 5/24 – 9/8; 1 site | 18. Putnam Co. 5/14 – 8/6; 2 sites |
| 09. Hendricks Co. 6/3 – 9/17; 4 sites | 19. Vanderburgh Co. 6/7 – 9/29; 3 sites |
| 10. Johnson Co. 7/9– 10/20; 2 sites | |

Boxwood blight survey locations and dates.

- | | |
|--------------------------------------|---|
| 01. Allen Co. 6/8, 6/22; 2 sites | 14. Madison Co. 7/7; 1 site |
| 02. Bartholomew Co. 5/11; 1 site. | 15. Monroe Co. 5/5, 5/7; 2 sites |
| 03. Benton Co. 8/2; 1 site | 16. Montgomery Co. 8/3; 1 site |
| 04. Clinton Co. 4/28; 2 sites | 17. Perry Co. 6/8; 1 site |
| 05. Daviess Co. 9/9; 1 site | 18. Randolph Co. 5/27; 1 site |
| 06. Dubois Co. 9/3; 1 site | 19. Scott Co. 4/28; 1 site |
| 07. Greene Co. 5/24; 1 site | 20. Spencer Co. 8/5; 1 site |
| 08. Hamilton Co. 5/28, 8/17; 2 sites | 21. Tippecanoe Co. 4/29, 8/2; 2 sites |
| 09. Hendricks Co. 5/7; 1 site | 22. Vanderburgh Co. 4/23 to 8/25; 3 sites |
| 10. Howard Co. 5/15, 5/18; 2 sites | 23. Vigo Co. 4/29 to 5/25; 6 sites |
| 11. Jackson Co. 4/28; 2 sites | 24. Washington Co. 4/28, 1 site |
| 12. Jefferson Co. 5/6; 1 site | 25. Wayne Co. 8/31; 3 sites |
| 13. Knox Co. 5/10, 9/7; 2 sites | |

Sudden oak death survey locations and dates

- | | |
|------------------------------------|--|
| 01. Allen Co. 5/29, 6/21; 3 sites | 11. Jefferson Co. 5/24; 1 site |
| 02. Boone Co. 5/20; 1 site | 12. La Porte Co. 6/3; 1 site |
| 03. Clark Co. 3/12 – 5/24; 2 sites | 13. Madison Co. 7/7; 1 site |
| 04. Clinton Co. 4/28; 1 site | 14. Marion Co. 4/26 - 6/3; 6 sites |
| 05. Decatur Co. 4/19; 1 site | 15. Monroe Co. 6/4; 2 sites |
| 06. Delaware Co. 5/11; 1 site | 16. Montgomery Co. 8/3; 1 site |
| 07. Dubois Co. 8/10; 1 site | 17. St. Joseph Co. 6/17, 6/22; 2 sites |
| 08. Floyd Co. 5/24; 1 site | 18. Spencer Co. 8/5; 1 site |
| 09. Hamilton Co. 6/2; 1 site | 19. Tippecanoe Co. 5/17; 1 site |
| 10. Hendricks 5/7, 7/22; 2 sites | 20. Vanderburgh Co. 5/11; 1 site |

A.3.e. Database submissions:

Old World bollworm, *Helicoverpa armigera*,
 Date Range: 5-14-2021 thru 11-27-2021
 Counties 19 Sites 46 Pos 0 Neg 333

Boxwood blight, *Calonectria pseudonaviculata*,
 Date Range: 4-23-2021 thru 9-9-2021
 Counties 25 Sites 42 Pos 0 Neg 153 (=71,468 stems)

Sudden oak death, *Phytophthora ramorum*
 Date Range: 3-12-2021 thru 8-10-2021
 Counties 20 Sites 31 Pos 0 Neg 204

A.3 Exotic Woodborers/Bark Beetles Survey

A. 3.a. Proposed data collection for the risk-based, exotic woodborers/bark beetles survey were: Asian longhorned beetle, *Anoplophora glabripennis* (18 records), large pine weevil *Hylobius abietis* (245 records), sixtoothed bark beetle, *Ips sexdentatus* (245 records), European spruce bark beetle *Ips typographus* (245 records), Japanese pine sawyer beetle, *Monochamus alternatus* (245 records), black fir sawyer *Monochamus urussovii* (245 records), oak ambrosia beetle, *Playpus quercivorus* (80 records); oak processionary moth, *Thaumetopoea processionea* (30 records).

Accomplishments;

Proposed and actual funding was \$3,608

Proposed data were 1,353 records. Actual data were 1,672 records.

Actual cost per record was \$2.16.

	Records	
	Proposed	Actual
1. Asian longhorned beetle, <i>Anoplophora glabripennis</i>	18	18
2. large pine weevil, <i>Hylobius abietis</i> , black fir sawyer	245	278
3. sixtoothed bark beetle, <i>Ips sexdentatus</i>	245	278
4. European spruce bark beetle, <i>Ips typographus</i>	245	278
5. Japanese pine sawyer beetle, <i>Monochamus alternatus</i>	245	278
6. black fir sawyer, <i>Monochamus urussovii</i>	245	278
7. oak ambrosia beetle, <i>Playpus quercivorus</i>	80	237
8. oak processionary moth, <i>Thaumetopoea processionea</i>	30	27
Totals	1,353	1,672

A.3.b. Survey Methodology: This survey is an APHIS-PPQ/IDNR/CAPS collaborative effort. PPQ and IDNR set and sampled traps and CAPS processed, identified, and archived samples. Exotic Woodborer/Bark Beetle Survey Reference, 2019, was followed. Sixty-two Lindgren traps (12-funnel) were deployed at 41 Indiana sites representing 18 counties. Sites were chosen by recognition of apparent risk of receiving target pests through commerce, or by vulnerable habitat. One to two (varies by site) traps with wet cups containing dilute propylene glycol were placed at each site. Traps contained one of the following lures: Monochamol+alpha-pineneUHR+ethanol, P. quercivorus, or IPS (tri-lure). Traps were serviced about every two weeks. Oak processionary moth survey was one plastic wing trap at five railroad siding yards, representing 5 counties, monitored every two weeks. Asian longhorned beetle survey consisted of a 30-minute random search in a mixed hardwood forest once monthly in July, August, and September at 6 state-wide counties

A.3.c. Survey location and dates: Lindgren traps were located at 41 Indiana sites in 18 counties. Traps were deployed from 23 March to 1 September. Asian longhorned beetle (ALB) visual surveys were located in 6 sites representing 6 counties. Visual surveys occurred from 1 July to 10 September. Oak processionary moth (OPM) survey sites were located in 5 sites representing 5 counties. OPM monitoring occurred 7 June to 12 October. ALB

searches were made between 6/24 and 8/21. There were 52 total EBB sites representing 25 counties.

WB/EBB survey locations (counties) and date range.

Lindgren traps for exotic bark beetles

- | | |
|--------------------------------------|--------------------------------------|
| 01. Clark Co. 3/23 – 9/28; 3 sites | 11. LaPorte Co. 4/2– 9/21; 4 sites |
| 02. Daviess Co. 4/16 – 9/24; 1 site | 12. Lawrence Co. 5/27 – 9/23; 1 site |
| 03. Dubois Co. 3/23 -9/28; 1 site | 13. Orange Co. 4/15 – 9/23; 1 site |
| 04. Elkhart Co. 4/2 – 9/21; 2 sites | 14. Pike Co. 3/30 – 9/21; 3 sites |
| 05. Floyd Co. 4/15 – 9/23; 1 site | 15. Porter Co. 4/1 – 9/20; 12 sites |
| 06. Gibson Co. 3/25 – 9/30; 3 sites | 16. Ripley Co. 3/26 – 10/1; 1 site |
| 07. Greene Co. 3/25 – 9/30; 1 site | 17. Scott Co 4/20 - 9/28; 2 sites |
| 08. Jackson Co. 4/20 – 9/28; 1 site | 18. Starke Co. 4/2 – 9/21; 2 sites |
| 09. Jefferson Co. 3/26 – 10/1 1 site | |
| 10. Lake Co. 4/2 – 9/20; 1 site | |

ALB Visual search (3) of mixed hardwood forest.

- | | |
|---------------------------------------|--|
| 1. Jennings Co. 7/6, 8/3, 9/9; 1 site | 4. Randolph Co. 7/6, 8/3, 9/7; 1 site |
| 2. Knox Co. 7/7, 8/5, 9/7; 1 site | 5. Tippecanoe Co. 7/9, 8/2, 9/10; 1 site |
| 3. LaPorte Co. 7/1, 8/3, 9/9; 1 site | 6. Whitley Co. 7/6, 8/3, 9/7; 1 site |

OPM Wing trap monitoring

- | | |
|--------------------------------------|--|
| 1. Allen Co. 7/2 – 10/12; 1 site | 4. Porter Co. 6/14 – 8/24; 1 site |
| 2. Elkhart Co. 6/22 – 8/31; 1 site | 5. Vanderburgh Co. 6/15 – 9/10; 1 site |
| 3. Hendricks Co. 6/7 – 10/27; 1 site | |

A.4.d Benefits and results of survey: Total vial samples received and screened and in-field visual records were 563. Total records processed for all target species were 1,672. No target species were detected.

A.4.e. Database submissions:

Asian longhorned beetle, *Anoplophora glabripennis*

Date Range: 7-1-2021 thru 9-10-2021

Counties 6 Sites 6 Pos 0 Neg 18

Large pine weevil, *Hylobius abietis*

Date Range: 3-23-2021 thru 10-1-2021

Counties 19 Sites 41 Pos 0 Neg 278

Sixtoothed bark beetle, *Ips sexdentatus*

Date Range: 3-23-2021 thru 10-1-2021

Counties 19 Sites 41 Pos 0 Neg 278

European spruce bark beetle, *Ips typographus*
Date Range: 3-23-2021 thru 10-1-2021
Counties 19 Sites 41 Pos 0 Neg 278

Japanese pine sawyer beetle, *Monochamus alternatus*
Date Range: 3-23-2021 thru 10-1-2021
Counties 19 Sites 41 Pos 0 Neg 278

Black fir sawyer, *Monochamus urussovii*
Date Range: 3-23-2021 thru 10-1-2021
Counties 19 Sites 41 Pos 0 Neg 278

Oak ambrosia beetle, *Playpus quercivorus*
Date Range: 4-2-2021 thru 9-28-2021
Counties 17 Sites 19 Pos 0 Neg 210

Oak processionary moth, *Thaumetopoea processionea*
Date Range: 6-7-2021 thru 10-27-2021
Counties 5 Sites 5 Pos 0 Neg 18

B. If appropriate, explain why objectives were not met. All objectives for reporting period 1 January 2021 to 31 December 2021 were met.

C. Where appropriate, explain any cost overruns or unobligated funds in excess of \$1,000. There were 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

Megan L. Abraham (Cooperator) (ROCR) Date: _____

Jason Allen (SPHD/ADODR) Date: _____