

# Integrated Pest Management Program Highlights – 2017



**THE OHIO STATE UNIVERSITY**

COLLEGE OF FOOD, AGRICULTURAL,  
AND ENVIRONMENTAL SCIENCES



# Greetings

The Ohio State University Extension Integrated Pest Management (IPM) Program is pleased to share our achievements and accomplishments during FY2017. These highlights were generated from the first year of the USDA National Institutes of Food and Agriculture Crop Protection and Pest Management competition under the Extension Implementation Projects category (2017-70006-27174).

Our collective mission is to increase the adoption of IPM principles and practices of all citizens across commercial scale operations, small farms, and urban food production systems, including homeowner and community-based programs. Our goal is to provide economically efficient, socially acceptable, and environmentally responsible ways to manage pests.

The IPM program functions as a multidisciplinary team relying on faculty and staff from the Departments of Entomology, Extension, Horticulture and Crop Science, and Plant Pathology. We also work with many stakeholder groups to help keep our focus current and multiply our outreach efforts.

This brochure highlights the scope and breadth of our IPM projects in Agronomic Crops, Specialty Crops, Pest Diagnostic Clinic, Pollinator Health and Community IPM through workshops, conferences, field days, webinars and other outreach methods but by no means captures all of the IPM research and Extension efforts at The Ohio State University.

I hope you enjoy perusing the highlights and accomplishments of our multidisciplinary IPM team. Please feel free to contact any of the collaborators listed in this brochure or myself for more details about any of the projects.

Respectfully,  
**James R. Jasinski**  
IPM Program Coordinator



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Brad Bergefurd – Department of Extension

Ohio’s hop farms continue to grow in numbers to meet demand for locally grown ingredients for Ohio’s 250-plus craft breweries. This year six workshops and field days were held across the state to teach IPM strategies for hop farmers.

In partnership with the Ohio Hop Growers Guild, OSU Extension specialists and educators conducted the workshops to teach the importance of IPM principles such as pest identification and management tools to increase productivity for their hop farm. Growers, brewers and others interested in learning about hop production attended the workshops that featured OSU Extension experts in horticulture, plant pathology, entomology, and weed science. Topics discussed included site preparation,

trellis construction, plant and field maintenance, encouraging natural enemies, harvesting methods, and marketing. The question and answer portion of the workshops were interactive with participants engaging with specialists about the topics discussed.

After one workshop, 13 participants who completed evaluations were asked to rate their confidence in identifying and managing pests that affect hop production. Participants were slightly more confident in identifying and managing spider mites and downy mildew after the workshop.

Participants also identified an increased confidence using IPM strategies for their hop production after attending the workshop.



Cindy Folck – Department of Extension

Reducing non-target herbicide drift on vulnerable crops was the theme for the 2018 Drift Mitigation Workshop held in the spring for grain farmers, specialty crop growers and commercial pesticide applicators. Over 65 people attended the workshop including 29 who joined online using the webinar option. The workshop featured a session on recognizing weather conditions such a wind speed and temperature favorable to inversions to help applicators avoid drift when using auxin herbicides such as dicamba and 2,4-D. After-workshop surveys were completed by 32 participants and 32 percent indicated the workshop increased their knowledge for defining and recognizing weather conditions favorable to an inversion. The survey participants also showed a 32 percent increase in their confidence to recognize an inversion in the field with over 80 percent noting they would be likely to check for an inversion before making a spray application.

The workshop also included an overview of the Ohio Sensitive Crop Registry by FieldWatch, an online database and mapping program designed for specialty crop growers and pesticide applicators to communicate about the presence of vulnerable crops. On average, the survey participants were confident the sensitive crop registry would provide data to help avoid damage to sensitive crops; 45 percent were moderately confident, 24 percent were very confident, and 17 percent were extremely confident.

The webinar recording was turned into a video and posted on the OSU Extension IPM website ([ipm.osu.edu](http://ipm.osu.edu)) where an additional 16 people viewed the presentation.





# Pumpkin Pest Management

**Jim Jasinski** – Department of Extension

Ohio produces around 6,500 acres of jack-o'-lantern carving pumpkins annually, placing it in the top five or six states nationally. To continue to support growers and production in the state, a pumpkin field day covering a wide range of pest management topics was held in late August at the Western Agricultural Research Station in South Charleston.

Traditionally, the field day program consists of OSU Extension specialists in the Departments of Entomology, Extension, Plant Pathology, and Horticulture and Crop Science who present research

results and demonstrate new products, practices, technology, and hybrids.

During the 2018 field day, in addition to presentations on insect, weed and disease management, the agenda was expanded to showcase the integration of cover crops such as cereal rye, hairy vetch, mustard, tillage radish, crimson clover, etc., into pumpkin production to help reduce pests, stabilize soil, scavenge mobile nutrients, and enhance the soil microbial community.



## Targeting Spotted Wing Drosophila Surveillance

**Celeste Welty** – Department of Entomology

Spotted wing Drosophila (SWD) is a new invasive pest that is causing significant crop losses in raspberries, blackberries, and blueberries. A three-hour workshop on SWD was held in April 2018, in southeastern Ohio, attended by 10 fruit growers who collectively manage 350 acres of fruit crops. Topics included how to:

- Identify male and female SWD flies with help of a microscope
- Monitor adults with baited traps
- Verify larvae in fruit with salt water tests
- Manage SWD with chemical and non-chemical tactics

At the conclusion of the workshop, an evaluation completed by the participants showed the growers had gained confidence in their ability to manage SWD,

with 50 percent of them feeling very confident. A majority of the participants said that they planned to try using salt tests to monitor the presence of SWD larvae in fruit and bait traps to monitor the SWD adults. They commented that learning how to identify the pest was the most valuable part of the workshop.

Several weeks after the workshop, similar topics were presented in a 90-minute webinar that was recorded and posted on the OSU Extension IPM YouTube channel for continued availability. The webinar targeted new SWD trap cooperators who do not grow fruit, but work with fruit growers. Seven people who attended the webinar also provided feedback in a survey given afterwards. The participants were confident in their ability to manage SWD, with 50 percent of them feeling very confident. The webinar recording was viewed 51 times during the first 3 months of posting.





**Denise Ellsworth** – Department of Entomology

Pollinators face many threats, including lack of forage, damaging pathogens, climate change and harm from pesticides. Two workshops were held in 2018 to help Ohioans make positive changes to enhance pollinator health. The first one, Pollinators on Ohio Farms, brought 65 attendees together to focus on farm pollinator biology, bee identification, mason bee management, protecting pollinators from conservation and pollinator conservation. The second workshop focused on Bumble Bees in Ohio with 68 attendees who learned to identify common bumble bee species, received training to conduct queen bee foraging and nesting surveys, and learned strategies to conserve bumble bees. Many participants in these winter workshops attended field sessions in spring and summer to practice bee identification skills.

In addition to the workshops, 50 pollinator plots were developed or enhanced for demonstration or outreach activities. Each plot consisted of locally sourced native plants which provided pollen and nectar sources for the various pollinators. Twenty of these sites are actually part of The Ohio State University phenology gardens, monitored by citizen scientists for pollinator visitation at sites such as Chadwick Arboretum on Ohio State's Columbus campus, the Licking County Extension office in Newark, and at the A.I. Root Company in Medina. Additional sites feature cooperative efforts with Ohio Department of Agriculture Soil and Water Districts, Holden Arboretum and various park districts. Interpretive signage was also developed and placed at the plots to help communicate the importance of pollinators and their habitat.



## Connecting Pollinators and Citizen Science

**Mary Gardiner, Kayla Perry** – Department of Entomology

Pollination by bees is a valuable ecosystem service necessary for approximately 35 percent of the global food supply! Declines in bee populations have been documented worldwide, threatening these pollination services provided to natural and agricultural landscapes. To better understand pollination in urban, suburban, and rural landscapes of Ohio, the Pollination Investigators program engages citizen scientists in the study of pollinators by measuring pollination services in their home garden. Pollination services were measured by comparing fruit number, fruit weight, and seed set sweet pepper plants grown in the presence and absence of pollinators in home gardens across the state of Ohio.

Citizen scientists participating in the 2018 Pollination Investigators program attended an instructional workshop in April as part of a larger

event, A Bug's Life in the City: The Often Unseen Biodiversity that Surrounds Us and Why it Matters. The workshop covered the goals of Pollination Investigators, results from the 2017 experiment, and an introduction to the experimental design for summer 2018 program. Evaluations were provided to participants to gauge their understanding of Pollination Investigators and their knowledge about pollinators. Following the workshop, 94 percent of participants indicated that their experiences with pollinators have been generally positive, and 100 percent of participants correctly identified bees, butterflies, moths, birds, and bats contribute to pollination. Further, 100 percent of participants indicated that pollinators were important for their gardens and that pollinator conservation was important to them.

The Pollination Investigators website can be accessed at [u.osu.edu/pollinationinvestigators](http://u.osu.edu/pollinationinvestigators).



# Promoting Soybean Cyst Nematode Management

Anne Dorrance – Department of Plant Pathology

Three trainings held in February, 2018, focused on soybean IPM practices with talks on current research to manage insects, weeds, and disease. Almost 180 people attended the trainings that were held in Wilmington, Fremont, and Napoleon, Ohio, representing growers, industry representatives, and Extension educators. Emphasis was placed this year on outreach for the Soybean Cyst Nematode (SCN) Coalition’s efforts to raise awareness of this pest in Ohio. Several key areas were addressed: yield losses

attributed to SCN, the results from recent surveys on where SCN has been found, and more importantly, the adaptation to the most used resistance in Ohio populations. After the presentation, program evaluations were given to participants to measure the impact of the SCN presentation at Wilmington and Napoleon.

Respondents were asked to consider management tactics that were presented at the meeting and rate their effectiveness. The questions measured the impact of the concepts presented based on the respondents’ responses. The evaluations were completed by 45 respondents and almost half of the respondents (49 percent) indicated they planned to sample for SCN after attending the training. Sixty-seven percent of the respondents expressed concern about SCN affecting their yields and 66 percent were confident they could pick the right resistance for their fields after attending the training.



# Winter Malting Barley Outreach

Laura Lindsey – Department of Horticulture and Crop Science

Winter malting barley is a relatively new crop for Ohio farmers. However, acreage is rapidly increasing due to an increase in craft brewery and malting facilities and demand for local products. In response to this growing clientele, we released a “Management of Ohio Winter Malting Barley” guide to provide information on winter malting barley production, including crop establishment, soil fertility recommendations, and weed, insect and disease control. The guide has been downloaded 225 times ([stepupsoy.osu.edu/winter-malting-barley](http://stepupsoy.osu.edu/winter-malting-barley)) and distributed to approximately 100 farmers at field days across the state.

Additionally, winter malting barley management and double crop soybean practices were discussed

at the Small Grains Field Day in Wooster and Agronomic Field Day at the Northwest Agricultural Research Station. Twenty-seven percent of the field day attendees were currently growing winter malting barley with an additional 31 percent of the attendees intending to grow winter malting barley within the next three years. We will continue to develop resources and extension programming to meet the growing demand for winter malting barley production and management.







**Andy Michel, Kelley Tilmon** – Department of Entomology  
**Anne Dorrance, Pierce Paul** – Department of Plant Pathology  
**Mark Sulc** – Department of Horticulture and Crop Science

The OSU Extension State Specialists in agronomic crops trained approximately 40 farmers, crop consultants and extension personnel as part of an agronomy field day at the Western Agricultural Research Station. The proper methods of how to identify and scout for the presence of key pests and damage in alfalfa, corn and soybean were demonstrated. In alfalfa, Dr. Mark Sulc demonstrated how to identify and sweep for potato leafhopper, and then discussed treatment thresholds. In corn, Dr. Andy Michel provided recommendations on how to scout for Western bean cutworm, a new pest for Ohio but one that is slowly spreading across the state. Dr. Pierce Paul showed farmers scouting techniques for various corn diseases while in soybean, Dr. Anne Dorrance trained farmers how to identify frog-eye leaf spot and other soybean diseases. Dr. Kelley Tilmon finished the scouting school by explaining why soybean plants can withstand what appears to be a large amount of defoliation from insects before economic damage occurs, which was followed up by a field exercise to collect and estimate percent defoliation.

Scouting sessions like this were conducted at several field days at research stations across the state. Based on surveys of the attendees given after the scouting school, participants at the field day had greater confidence in scouting and managing these key pests of agronomic crops at the conclusion of the session compared to when they began the training.

**Pierce A. Paul** – Department of Plant Pathology

A small grains field day was conducted at the OARDC research farm near Wooster, OH in June 2018. The event was attended by close to 120 participants, representing growers, students, crop consultants and advisors, and OSU Extension educators. Several aspects of small grain production were covered through research plot demonstrations, lectures, and hands-on exercises including disease resistance screening, in-field diagnosis, and management. The three primary areas covered during the barley diseases section of the program were:

- Identification of Fusarium head blight (also known as scab or head scab) and other diseases of barley
- Determining the optimum growth stage for fungicide application for head scab management in barley
- Use of disease quantification methods to evaluate the efficacy of disease management programs.

Participants walked fields and learned how to identify foliar and spike diseases and evaluated differences in the reactions of varieties and advanced breeding lines to head scab. They also quantified and compared the efficacy of different fungicide and integrated management programs for head scab management.

The impact of the program was evaluated with a retrospective post-test for participants to rate their change in knowledge after attending the field day. The evaluation was completed by 43 participants who increased their knowledge in the areas of identifying head scab, determining optimum growth stage for a fungicide application to control head scab, and

measuring foliar and spike disease severity on barley. The percentages of knowledge included:

**Identifying head scab**

- Before the field day: 67 percent rated their knowledge as poor or fair
- After the field day: 95 percent rated their knowledge as good or excellent

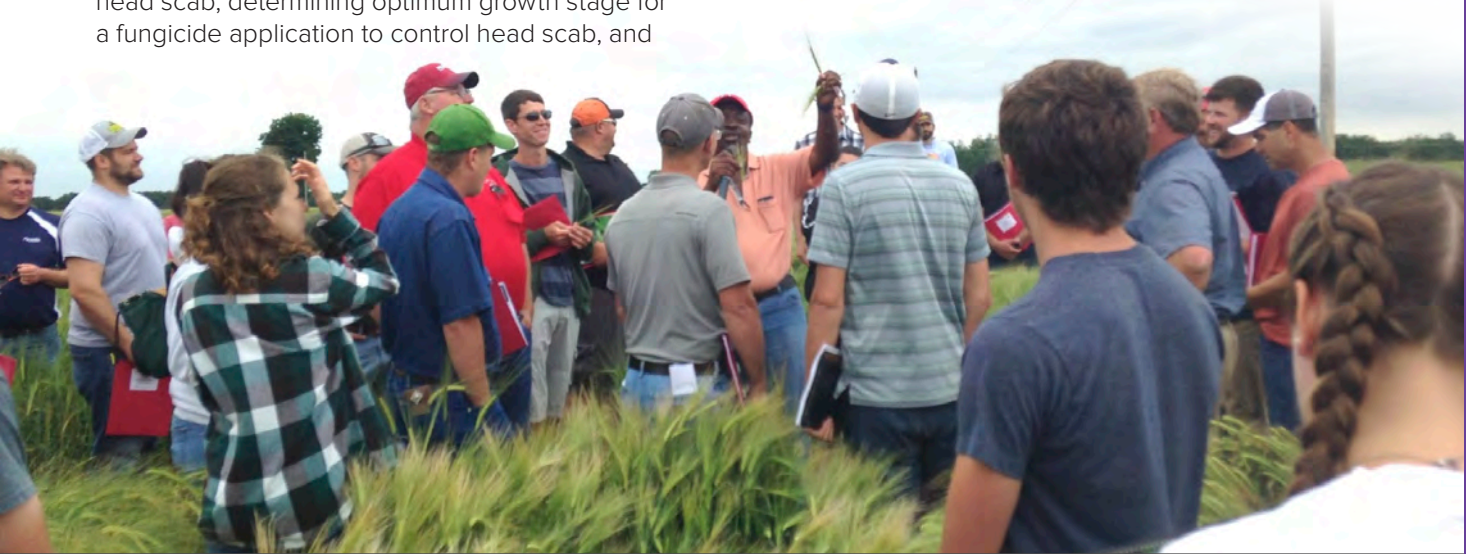
**Determining optimum growth stage for fungicide application to control head scab:**

- Before the field day: 79 percent rated their knowledge as poor or fair
- After the field day: 84 percent rated their knowledge as good or excellent

**Measuring foliar and spike disease severity on barley:**

- Before the field day: 74 percent rated their knowledge as poor or fair
- After the field day: 86 percent rated their knowledge as good or excellent

The workshop participants were asked how likely they were to scout for diseases in barley after attending the field day. A majority of the participants were likely to scout; ranging from 31 percent who indicated they were very likely, 26 percent indicating fairly likely and 14 percent as likely. A majority of the participants (64 percent) were confident in their ability to manage barley disease after attending the field day.





Kelley Tilmon, Andy Michel, and Amy Raudenbush – Department of Entomology, The Ohio State University

Monitoring seasonal or invasive insect pests is an important tool in IPM programs, which alerts growers to increasing problems or new threats. The OSU Extension IPM Program provides monitoring in key counties for seasonal population trends of Western bean cutworm, an important corn pest in the state. In the summer of 2018 we expanded the scope of pest monitoring to include the Ohio Kudzu Bug First Detection network. Kudzu bug is an invasive insect pest that has been extremely damaging to soybeans in the southeastern United States. Since its first detection in 2009 its range has spread dramatically. Although it has not been found in Ohio yet, it has been found adjacent to our southern border in the Commonwealth of Kentucky. With the I-75 corridor connecting Ohio to the Southeastern US where this pest is very prevalent, our network remains vigilant to detect it.

Our trapping network is designed to provide an early alert for the appearance of kudzu bug in Ohio. This will allow us to mobilize OSU Extension educators to inform the growers most likely to be affected by it. This year traps were deployed in nine counties in southern Ohio (Adams, Athens, Butler, Clermont, Madison, Meigs, Montgomery, Ross and Washington). This is a collaborative effort with Ohio State Extension Educators, who maintain, check and report trap activity weekly to Ohio State Department of Entomology Extension Specialists from May through June. Although the kudzu bug has yet to be found in Ohio, these monitoring efforts are important because of the expanding distribution of this pest and potential economic impact.

Figure 2. Kudzu bug trap.



Figure 1. Adult kudzu bugs on underside of leaf with dime for size comparison (Jeremy Greene, Clemson University, Bugwood.org, 5426274).



Susan Jones – Department of Entomology

Even the mention of bed bugs can cause audience members to begin scratching and nervously squirming in their seats. But the adage “Knowledge is power!” is more important than ever, particularly for bed bugs—a worldwide public health pest. In March 2018, two webinars were presented to OSU Extension Educators and community members in counties throughout Ohio, and each was immediately followed up with an evaluation to measure program impact. The audience noted the relevance of the information provided in the first webinar (Bed Bugs: Know Your Enemy), with 67 percent reporting it as very relevant and 33 percent reporting fairly relevant. Following the first webinar, respondents reported that they were more knowledgeable of how bed bugs disperse through a home or apartment. Furthermore, 56 percent were highly confident and 44 percent were fairly confident in their ability to dispense information about bed bugs to help their clientele.

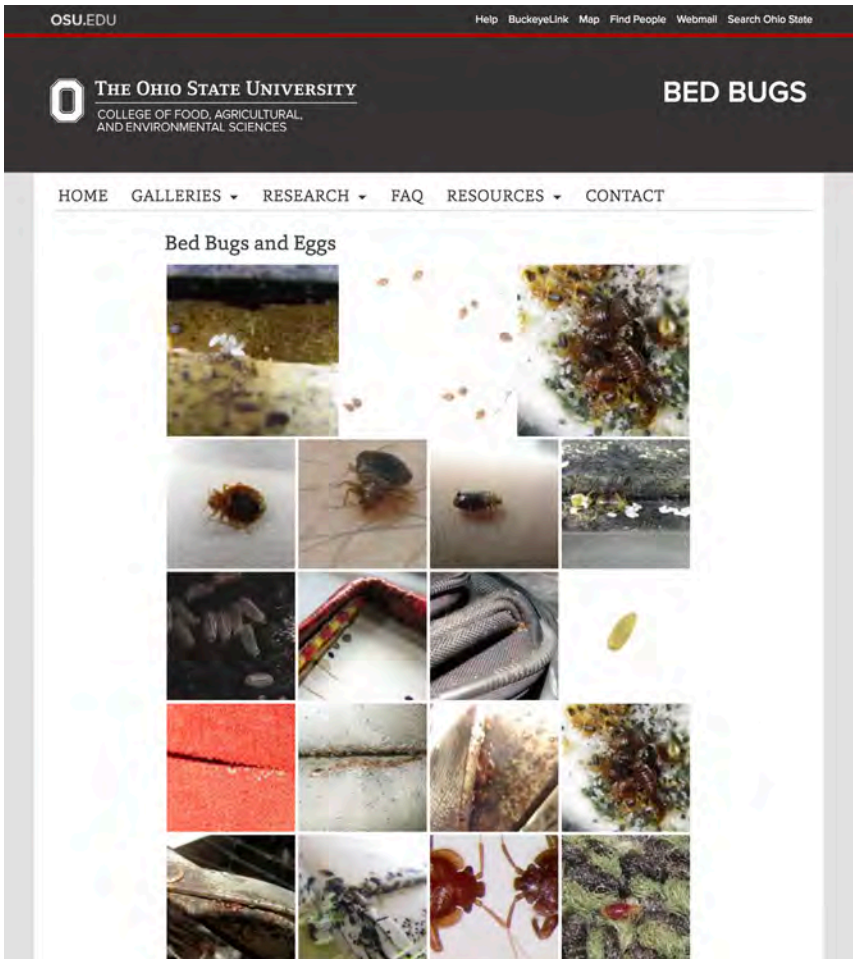
Following the second webinar (Treating for Bed Bugs: Integrated Pest Management Strategies), 64 percent were highly confident and 36 percent were fairly confident in their ability to provide accurate information on bed bug treatment. When asked to choose tactics that were useful to solve an identified bed bug infestation in a home with residents that lacked insecticide sensitivity, 91

percent of respondents selected residual insecticides, drying items, vacuuming, steam cleaning, and pitfall traps as discussed in the webinars.

Both webinars had a multiplier effect, with attendees expressing their intent to share the bed bug information with their clientele. Additionally, the webinars are publicly accessible at:

- [u.osu.edu/bedbugs](http://u.osu.edu/bedbugs) (resources tab)
- [ipm.osu.edu](http://ipm.osu.edu) (community tab)
- Ohio State Extension’s IPM YouTube page

Frequent updates have been made to the Ohio State hosted website ([u.osu.edu/bedbugs](http://u.osu.edu/bedbugs)) which seeks to increase public awareness of bed bugs and effective strategies for managing them. The frequently asked questions section has been reorganized and expanded to include detailed answers to more than 75 questions representing those commonly asked at workshops and other educational events. Additionally, the ‘research references’ tab now lists more than 350 published journal articles along with a summary or abstract of each.





Joy Pierzynski – Department of Plant Pathology

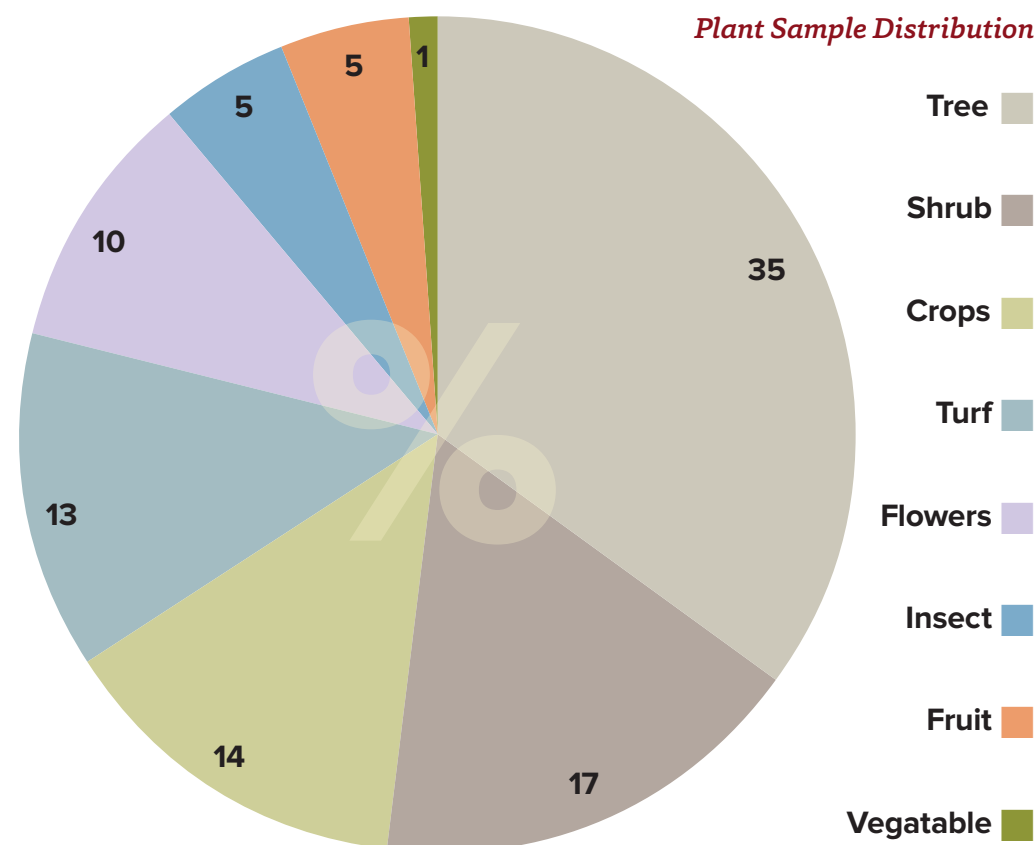


In June 2018, The Ohio State University welcomed me as the new Program Director of the C. Wayne Ellett Plant and Pest Diagnostic Clinic (PPDC). After obtaining BS and MS degrees from Michigan State University and a PhD from Kansas State University, I was trained in diagnostics by the

Program Director for the Research & Extension Plant Disease Clinic at Kansas State University.

The PPDC has served the green house and nursery industries, producers, researchers,

homeowners, arborists, and Extension Educators within and outside the state of Ohio for many decades using traditional plant diagnostic methods including visual and microscopic inspection, culturing, and in more recent years serologic and molecular diagnostic methods. With specific diagnostic capabilities located in Columbus and Wooster campuses, the Reynoldsburg lab will continue to coordinate all diagnostic services for a seamless interface to our clientele. Over the past year, the clinic processed over 400 samples through its Reynoldsburg location. Additional information can be found at [ppdc.osu.edu](http://ppdc.osu.edu).



Cindy Folck, Jim Jasinski  
– Department of Extension

The IPM program provides online and social media resources for growers and stakeholders looking for information on tactics and activities. Last year, 17 new videos were uploaded to the IPM YouTube channel including how-to and information videos about:

- Bed Bugs
- Submitting diagnostic samples
- Identifying and monitoring Spotted Wing Drosophila (SWD)
- Trapping and scouting for pests in fruit, corn, and soybeans
- Managing hop yard pests

The videos on SWD and Western Bean Cutworm have been popular, with 209 and 230 views in the first four months of being posted. Over 100 people have viewed the hop yard pest management videos and almost 200 people have viewed the bed bug webinar. The primary website, [ipm.osu.edu](http://ipm.osu.edu), had 3,500 pageviews last year. Bed bugs were popular, with over 400 pageviews. Agronomic crops was the next most visited page with almost 170 pageviews.

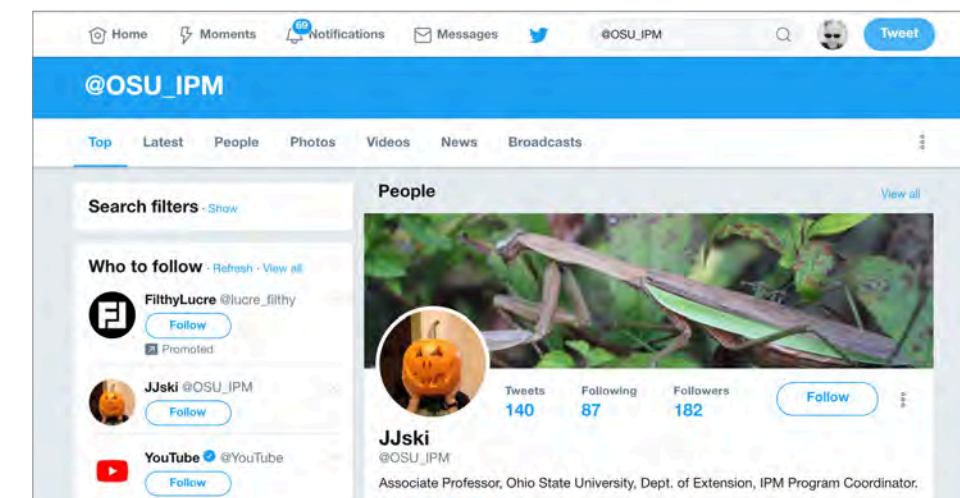
The OSU Extension IPM Program has a Twitter account, follow us @OSU\_IPM. We tweet 1-2 times a week about various IPM related topics. To date we have tweeted 138 times and have 178 followers.



Spotted Wing Drosophila



Western Bean Cutworm





# Survey Says ... Impact of Workshops and Field Days

Cindy Folck, Jim Jasinski – Department of Extension

Like all USDA funded grants, evaluating what clientele learn and documenting impact is a major focus of each program conducted. This year, the OSU Extension IPM program asked questions at multiple workshops and field days to discover if the participants were

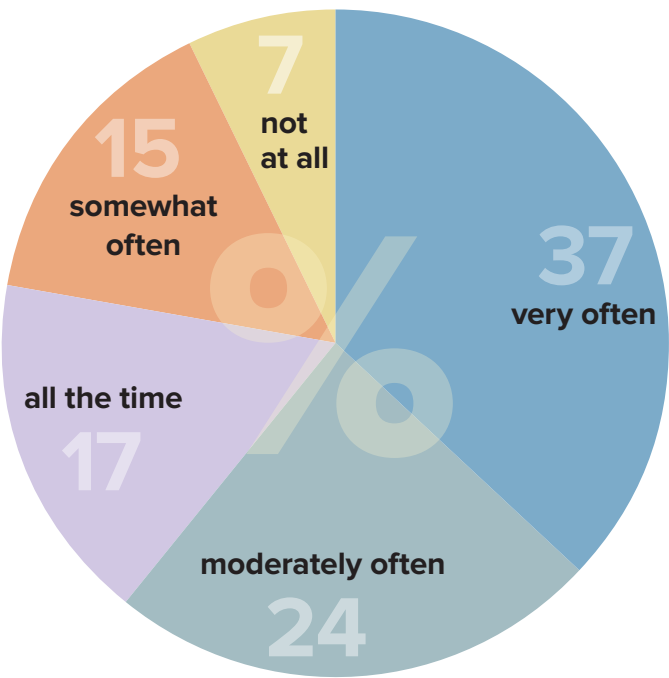
helped by the information presented at the meeting and if they planned to incorporate IPM concepts and ideas in their farming operation. The surveys were completed by 88 people and in relation to the information presented at the workshops:

- **90** percent expressed the information was helpful for their farming operation
- **85** percent said they were likely to use at least one new IPM tactic
- **82** percent indicated at least one IPM tactic was likely to save them money in their farming operation

When asked how often participants use the IPM process to manage pests in their farming operation, we saw this range of responses:  
When asked how often participants use Ohio



OSU Extension provided resources such as crop and pest websites, newsletters, videos, etc. to learn and incorporate IPM tactics into their production systems, we saw this range of responses:



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A special thank you to Cindy Folck for her substantial efforts in the preparation of this highlight brochure

Graphic Design: Brian Deep Art & Design LLC





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United States Department of Agriculture  
National Institute of Food and Agriculture

This project was funded by the USDA NIFA Crop Protection and Pest Management Competitive Grants Program (Grant number: 2017-70006-27174).

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