



2016 ANNUAL REPORT

**Southern Integrated Pest
Management Center**

Southern Integrated Pest Management Center

The Southern IPM Center serves 13 U.S. Southern states, Puerto Rico and the U.S. Virgin Islands and is supported by a grant from USDA's National Institute of Food and Agriculture.

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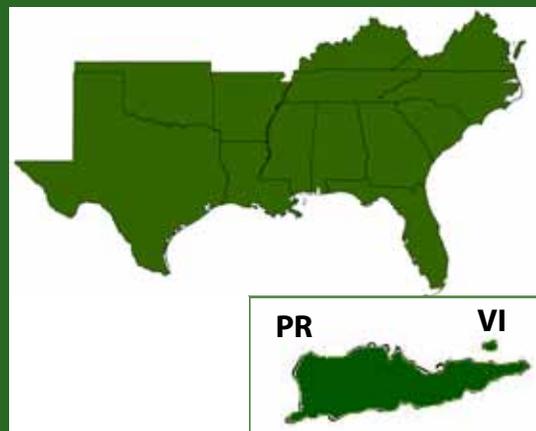


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Directors' Address

This has been another great year in the southern region for integrated pest management. Many of our programs and working groups have made great progress in helping to advance IPM and drive adoption of the best practices for effective, economic, and environmentally compatible pest management.

The 2016 IPM Enhancement Grants competition resulted in the creation of two new working groups. The Southern Pea working group has been hard at work gathering information to help growers and highlight major issues. They are launching USVigna.org while beginning their gathering of information on what varieties are grown in the South and which pest problems are most troublesome. Likewise, the Southern Brown Marmorated Stink Bug (BMSB) working group has set up www.edd-maps.org/bmsb to coordinate and highlight their efforts. Since BMSB is a great hitchhiker, it has been difficult to determine where it has truly established and where it takes a ride with people going on vacation to escape colder climates. Their major focus is aimed at determining how far south BMSB has established reproducing populations through real-time reporting of nymphs. Members of the working group are encouraging anyone to report sightings through the website to better understand the activity and distribution.



Danesha Seth Carley

Many of you are familiar with the IPM Data project - this is an effort to take older, static crop profiles and pest management strategic plans and transform them into living documents. This new format allows for easy section updates rather than requiring an entirely new document to be created. The system has gone live and can be found at <https://ipmdata.ipmcenters.org/>. We encourage all stakeholders to explore the new system and consider how it can help them communicate a more complete picture how pests are managed and which challenges need better solutions.



Joe LaForest

We have two exciting announcements for the Southern IPM Roundtable. First, a new location and format! Second, we have recognized that there is no one location that works well for all individuals funded through Crop Protection and Pest Management to meet. We want the Southern IPM Roundtable to have real value for the participants and be far more than just another thing someone has to do to fulfill a grant. While we will make every effort to include awardees in an in-person meeting as a presenter, we are opening up a new option - taking part in a webinar to highlight the accomplishments of their project. The Southern IPM Center will publicize and host the event to help people see the great work that has been done. We'll also feature the recording in the IPM eAcademy, a joint effort of the IPM centers to highlight recent developments in IPM. This will bring national attention to work in the Southern Region and help us highlight outstanding work made possible by these programs. More about next year's Roundtable is included on page 10.



Henry Fadamiro

Starting on page 12 you will find some information on the outcomes from some of our 2015 projects. Last year we changed our IPM Enhancement Grant RFA to focus on outcomes, and the projects included in this report are the first to be conducted with this outcome-based approach.

As 2016 turns to football season, changing leaves and crisper air, be on the lookout for ways the SIPMC can help you grow your program or help you connect with others in the Region around IPM challenges. We can't help your football team have a winning season, but we can help keep their turf healthy! We are looking forward to another great year and we hope you are too.

Co-Directors - Joe LaForest and Danesha Seth Carley

About this Report

This annual report is a compilation of the activities of the Southern IPM Center for the 2015-16 fiscal year. The Southern IPM Center is one of four regional IPM Centers funded by a USDA National Institute of Food and Agriculture (NIFA) grant.

Mission

The mission of the Southern IPM Center is to foster the development and adoption of IPM to generate economic, environmental and human health benefits. We work in partnership with stakeholders from agricultural, urban and rural settings to identify and address regional priorities for research, education and outreach.

Goals

The Southern IPM Center's goals reflect broader goals of IPM as expressed in the National IPM Roadmap: to sustain and enhance environmental, economic and human health by applying IPM in all appropriate settings. SIPMC's role in the context of these grand global goals include:

- To increase coordination and improve efficiency of IPM research and extension efforts by organizing timely responses to emerging issues of regional importance;
- To facilitate collaboration by acting as a focal point and facilitator of communications that promote sound IPM-related decisions;
- To promote further development and adoption of IPM through regional information networks, collaborative team building and broad-based stakeholder participation;
- To document the impacts and value of IPM strategies, techniques, programs and projects, building support for IPM among the general public and public policymakers.



Bagged peaches for a Clemson University project. Story on p. 13
Credit: Juan Carlos Melgar, Clemson University

Increase Coordination

SIPMC relies on several mechanisms to promote IPM in the region. The Regulatory Information Network answers inquiries from USDA the Environmental Protection Agency when pesticides are being studied for registration. IPM Enhancement Grants give researchers and extension specialists the funding they need to find or disseminate information about new ways to manage pests. The National IPM Database contains information about pests, pesticides and management techniques to give pest management professionals information on management of pests based on the crops they attack.

Regulatory Information Network

We are proud to say that the SIPMC has a RIN liaison in every state in our region (with the exception of VI, whose EIP Coordinator recently left his position). Fadamiro, LaForest and Seth Carley continue to serve as liaisons for AL, GA, and NC, respectively. We are proud to announce the addition of a liaison from The Magnolia State (Mississippi). As a group, we responded to three requests this past year; one for Aldicarb recently drew responses from seven southern states. With the knowledge that the Paperwork Reduction Act has modified the way the EPA and OPMP are handling requests for information, the RIN hopes to find a way to better assist those agencies and groups in the most efficient way possible, while still honoring the Paperwork Reduction directive.

The RIN liaisons include:

- Henry Fadamiro - Alabama
- Glenn Studebaker - Arkansas
- Norm Leppla - Florida
- Joe LaForest - Georgia
- Patty Lucas - Kentucky
- Clayton Hollier - Louisiana
- M. Eugene Merkl - Mississippi
- Wanda Almodovar - Puerto Rico
- Danesha Seth Carley - North Carolina
- Kelly Gilkerson - South Carolina
- Mark Matocha - Texas and Oklahoma
- Darrell Hensley - Tennessee
- Mike Weaver - Virginia

Increase Coordination

IPM Enhancement Grants

This grants program is a foundational mechanism used by SIPMC to address important issues affecting the region that has produced many significant outputs and favorable outcomes addressing Global Food Security challenges including invasive species, endangered species, pest resistance, and impacts resulting from regulatory actions. We use a competitive process each year to solicit and select projects for funding.

Our 2017 Enhancement Grants Program will continue to focus on outcome based funding and allow for the following project types: Working group, Seed, and Capstone Projects, and Critical and Emerging Issues. We are working to revise the 2017 RFA address several issues that have come up in our post-panel review. Expected funding for this program is \$230,000 (which is a slight increase from last year's funding level).

WORKING GROUPS

A new IPM working group for sustainable production of southern pea, *Vigna unguiculata*, in the Southern Region

David Riley, University of Georgia, \$10,000

Establishment of a Southern Region brown marmorated stink bug working group

Michael Toews, University of Georgia, \$10,000

Southeast regional pest management guide for nursery crops and landscape plantings

Joseph Neal, North Carolina State University, \$38,521

SEED AND CAPSTONE PROJECTS

Cover crop interseeding to manage herbicide-resistant weeds

Erin Haramoto, University of Kentucky, \$27,921

Developing IPM practices for bermudagrass stem maggot in forage production

Allen Knutson, Texas A&M AgriLife, \$27,980

Enhancing weed management systems in container nurseries for reduced costs

Joseph Neal, North Carolina State University, \$29,736

Exploring critical use of a systemic acquired resistance inducer against rose rosette disease

Mathews Paret, University of Florida, \$29,960

Impervious surface tree planting thresholds for the Southeast

Steven Frank, North Carolina State University, \$29,996

Sustainable management of *Bemisia tabaci* biotype B on tomato in protected structures

Hugh Smith, University of Florida, \$28,417



Witches' broom of rose rosette on rose
Credit: Missouri Botanical Garden

Increase Coordination

National IPM Database (IPM Data)

Nearly all IPM professionals, whether they are federal regulators, extension specialists, researchers, IPM coordinators, private consultants or advocacy professionals, need information on pieces of the IPM puzzle. In the past, the Southern IPM Center kept a list of documents known as crop profiles and pest management strategic plans containing information about pests and management strategies for various crops. The information contained in these documents was valuable, but to access individual pieces of data, a person would have to download the document and flip the pages to find what he or she was looking for.

That has all changed with the new version of the crop profile and PMSP database, the National IPM Database (IPM Data) website application. The IPM Data website application has two sides – data input and data retrieval.

Data is entered into the database by approved users that log into a secure administrative panel of the website application. Data is retrieved from the database via the public side of the website application. Login is not required to search and view the data.

Currently, IPM Data includes crop profiles, pest management strategic plans (PMSPs), timelines, and elements. Located at <https://ipmdata.ipmcenters.org>, IPM Data captures the following data for crops in the United States:

- Crops
- States
- Executive Summary
- Priorities
- Worker Activities
- Production Facts (i.e., acres planted and harvested, production costs and value, and rank in the United States)
- Production Counties
- Production Practices
- IPM Practices
- Pests
- Beneficials
- Pollinator Protection
- Priorities
- Controls (biological, physical, cultural, and chemical active ingredients)
- Efficacy
- Resistance management
- Toxicity
- Timelines (production, pest occurrence, crop growth stages, chemical controls, and worker activities)

As new information becomes available, sources can now easily be entered or updated through the online website.

Facilitate Collaboration

The Southern IPM Center is a regional network that builds and maintains mutually beneficial partnerships that successfully identify and address challenges and opportunities in IPM.

In general, our partnerships follow the same idea as our networking: we partner with a multitude of groups, both regionally and nationally, to advance IPM in the U.S. More specifically, we invite experts throughout the nation to band together with a common goal. These invitations have brought individuals together to form working groups to solve regional pest issues and provided technical tools for IPM professionals to use to facilitate their networks.

Working Groups

SIPMC supported four working groups last year that are bridging gaps between the “hands in the field” and federal and research decisions.

School IPM Working Group

Janet Hurley (Texas A&M AgriLife), with co-chair Fudd Graham (Auburn University), continue coordinating the group’s contribution to the eXtension Urban IPM Community of Practice. Last year Hurley received an IPM Enhancement award to quantify the costs of School IPM. Results from the study, which collected data from states throughout the country, are presented in the story on page 15.

Southern Nursery IPM Working Group

This group, also called SNIPM, received a 2015 IPM Enhancement Grant award to produce a second volume of the IPM for Shrubs iBook series. The book aims to educate commercial growers, landscape professionals and county Extension agents on systems-based approaches to pest management in five grower-identified, economically important ornamental plant genera by creating a comprehensive IPM guide for each genus.

Tawny Crazy Ant Working Group

The tawny crazy ant working group is a new working group funded by a 2015 IPM Enhancement grant. During the first meeting, the group established extension, research and regulatory priorities for integrated management of the tawny crazy ant. More information on this working group can be found on page 16.

eFly

The Spotted Wing Drosophila Working Group, or eFly, received a \$6.7 million USDA Specialty Crop Research Initiative grant to help find ways for berry growers to successfully battle SWD without the high rate of insecticides that it currently requires. The group also maintains an online SWD monitoring and mapping system at <http://www.eddmaps.org/swd>.

Sustainable Production of Southern Pea Working Group

Researchers from the University of Georgia are forming a new IPM working group to explore sustainable production of southern pea. Also known as cowpea or black-eyed pea, southern pea is one of the most culturally significant specialty crops in the Southeast. Currently southern peas are sold fresh or frozen, but a huge threat to production is the cowpea curculio, *Chalcodermus aeneus*. A small weevil that is difficult to control, the curculio has caused up to 40 percent losses and has forced hundreds of southern pea farmers out of the region because of the zero tolerance for curculio damage in frozen production.

Facilitate Collaboration

Southern Brown Marmorated Stink Bug (BMSB) Working Group

Thirty-one scientists from six organizations (5 land grants, USDA ARS, Dow Agrosiences) will tackle the brown marmorated stink bug issue with a Southern Region working group to complement the national working group that grew out of the Northeast. Until recently, the BMSB has been only a nuisance pest in the South, but after 2011 the pest started invading agricultural areas of warm states like Georgia. The Southern Region BMSB Working Group will examine the BMSB in relation to southern crops, climate and ecology and work with the BMSB working group in the Northeast to update hosts and distribution maps. In addition, the group will focus on developing research and extension priorities for the South and aid North Carolina State University in a new Specialty Crops Research Initiative project dealing with BMSB.

Southern IPM Roundtable

This past year was our first for the Southern IPM Roundtable. Teaming up with the Southeastern Branch of the Entomological Society meeting in March, SIPMC staff facilitated a session in which four extension professionals discussed the outcomes of their projects. Two of the projects discussed were a non-chemical approach to protecting peaches from pests and diseases, and an inventory of the costs associated with school IPM implementation in school districts. Both projects are highlighted in the Document Impacts section of this report. We also participated in the SERA-003 meeting, held at the Center for IPM at NC State University.

As mentioned in the Directors' address on page 3, next year we will organize the Roundtable in conjunction with the Southern Division American Phytopathological Society and Southern Plant Diagnostic Network in College Station, Texas on February 19. We are excited to highlight plant pathology's contributions to IPM and the important role that diagnostics plays in enabling effective IPM. Speakers in the first part of this symposium will highlight work funded through the USDA NIFA Crop Protection and Pest Management program. Following that, we plan for a facilitated discussion to help setting the path forward for IPM in the region. If you are interested in being more involved, contact anyone at SIPMC for more information.

For those who are not part of either meeting or cannot travel to Texas for that conference, SIPMC will work with the project directors to participate in a webinar. The recorded webinar will be featured in the IPM eAcademy, which will bring national attention to work in the southern region.

IPM eAcademy

Located on the National IPM website, this program features online presentations and webinars addressing important IPM-related issues. The eAcademy can be found at <https://www.youtube.com/user/IPMeAcademy>.

This past year SIPMC staff facilitated a webinar on Red Blotch disease of Grapevine. The live webinar had 309 attendees. An additional 182 people who registered for the webinar but who did not attend received links to the recorded sessions. The recorded webinars have received 892 views on the IPM eAcademy YouTube channel with 111 hours of viewing time.

Promote IPM Adoption and Development

Facilitation of Innovation Through Technology (FITT)

FITT provides complimentary database, communications, and related IT support for working groups and other collaborative efforts. Some project directors and several IPM Coordinators are using FITT to aid in their communication efforts with colleagues or stakeholders.

Through FITT's services, Virginia, Tennessee, and the Midcoast of Texas are now distributing their newsletters through a service called MailChimp. MailChimp collects stories from blogs and repurposes them into an e-mailed newsletter. Instead of copying and pasting blog posts into a static form, MailChimp allows the user to set up a form and automatically populates it with news from the blog. The user, in turn, can spend more time working on research or extension projects and less time copying and pasting. In 2016, these campaigns have had 39,486 successful deliveries to those that have subscribed with 37% of recipients opening the message and 10% clicking on items in the newsletter to get more information. For Virginia Tech, clicks from the newsletter represent 46% of the traffic to their site while Tennessee's newsletter is providing 16% approximately the same as users visiting from other links or direct urls.

Eight working groups are using a communication and scheduling online program called Basecamp to facilitate discussions and document sharing. The eFly (spotted wing drosophila) working group has used the program the most. With members scattered throughout the country, group members say that Basecamp helps them work more efficiently as they develop sampling protocols for the coming year, coordinate grants, and develop publications.

FITT is providing a web presence to multiple working groups including Crapemyrtle Bark Scale, Kudzu Bug, Southern BMSB, Spotted Wing Drosophila Monitoring Network, and the Southern Pea working group. Tawny Crazy Ant Working Group is planning to join these groups as they begin encouraging citizen scientists, county agents, consultants, and any other interested parties to help in tracking the ant with EDDMapS next year. Like several of the other projects, they will be using the existing tools provided by EDDMapS and the Southeast Early Detection Network to receive reports of new infestations, route that information to specific verifiers and provide the information needed for follow-up. If confirmed, the maps for the species are automatically updated anywhere they are used, allowing for a consistent message and less work for those updating online outreach information.

We've also had our first request to help an existing program with providing a stable place to run their program. MyIPM has been developed at Clemson University and has done an excellent job of including collaborators from multiple universities including University of Massachusetts, Pennsylvania State University, North Carolina State University and the University of Georgia. In looking for a sustainable location to host the application, Guido Schnabel reached out the Southern IPM Center to see if FITT could help. The administrative interface and data that the 3 apps (<http://apps.bugwood.org/apps/myipmseries/>) connect to are now delivered from part of the infrastructure supported by the Southern IPM Center. We look forward to working with their group to preserve and sustain that application as they continue building the resource.

Co-Director LaForest is still working with specialists from Texas to develop apps for school and structural IPM. The app has grown beyond the original scope of converting the "Pests in and Around Buildings" field guide (<http://bit.ly/2bSi5wc>) and now includes information from "Common pests found in schools and day care centers: Midwest region" (https://www.ncipmc.org/action/school_pests_deck.pdf). Through collaboration with an EPA project lead by Janet Hurley, Fudd Graham, and Faith Oi, it will also include decision support for directing effective management of key pests groups.

A complete list of services offered through FITT can be found at <http://ipmcenters.org/IPMDelivery>.

Promote IPM Adoption and Development

Promoting IPM Practices to Protect Pollinators Working Group

President Obama's 2014 Presidential Memorandum created a federal task force to develop a national strategy to promote the health of honey bees and other pollinators. As such, the Promoting IPM Practices to Protect Pollinators working group has been working with the U.S. Environmental Protection Agency and other interested federal partners to engage states and tribes in the development of pollinator protection plans. The EPA's first step was to encourage states to develop a managed pollinator protection plan (MP3) as an effective means of increasing communication between stakeholders and mitigating acute exposures of bees to pesticides. Members of our working group attended the Federal MP3 Symposium in D.C. in March 2016. The group is also working on developing a website to make all the participating southern states' MP3 documents available. Members of the group have also been attending field days and taking advantage of other outreach opportunities to share the message around the importance of pollinator protection and conservation. More information about MP3s can be found here: <http://honeybeehealthcoalition.org/managed-pollinator-protection-plan-mp3-resources/>.

It is worth mentioning that this working group is still struggling to find its "voice." With various opinions on MP3 plans, and the many disparate groups working on this topic, the group is still working to figure out what the best "niche" will be for the group. To date, the group has agreed to take a "wait and see" approach and tackle issues as they arise. Working with an eye to the future, group members remain in contact and continue to identify areas where they can collaborate and move forward.

Leveraging

Because the IPM Enhancement grants are relatively small (\$30,000 max for most projects), the funds are not intended to fund major research or extension projects. Rather, the funds often help project directors collect data needed to secure a much larger grant. Below are some of this year's projects that leveraged funding from other sources. Stories about the projects begin on the next page.

Tawny Crazy Ant Working Group

TCA insecticide demonstration trial in Theodore, AL using Arilon

Sponsor: Syngenta \$6000, Jeremy Pickens, Fudd Graham and Kelly Palmer

Arilon Insecticide Trial (companion to Arilon demonstration)

Sponsor: Syngenta \$25,000: \$12,500 to each PI, Robert Puckett and Danny McDonald

Investigating Novel *Alphitobius diaperinus* Control Strategies

Development of Improved Integrated Pest Management Programs to Control Vectors of Salmonella on Hen Farms, \$24,000, 2015-2017

Document Impacts

Project Spotlight: A new approach that may reduce reliance on pesticides for the production of high-quality peaches in the Southeast

PDs: Juan Carlos Melgar and Guido Schnabel, Clemson University

With some bags and a bit of elbow grease, sustainable and organic peach production may be a reality in the Southeast.



Guido Schnabel and grad student Jaine Allran place bags on peach tree
Credit: Juan Melgar

Currently California, Oregon and Washington account for most of the organic peach market in the United States. Peaches in South Carolina are a \$64 million industry, with the state being second in national peach production. Consumer demand for high-quality fruit with no pesticide residue is on the rise, but the hot,

humid conditions, in addition to the lack of disease-resistant cultivars, make peach production in the Southeast challenging, and organic peach production almost impossible. In fact, only one grower in South Carolina grows organic peaches.

Diseases such as brown rot, peach scab, bacterial spot and anthracnose, in addition to insect pests such as plum curculio, thrips, scale and mites make peaches one of the most heavily sprayed crops in the Southeast and puts peaches on the Environmental Working Group's "Dirty Dozen" list.

Clemson University researchers Dr. Juan Carlos Melgar and Dr. Guido Schnabel intend to change that by adopting a technique that is used on several fruit crops in Asia, Australia and Spain that involves covering each fruit with a white, specifically designed paper bag that has twist ties attached to the opening. The bag is removed once the fruit is ripe.

The process of bagging each peach—which farmworkers in Asia can do in less than a second—took Dr. Melgar and his students longer, sometimes up to 10 seconds per peach until they grew more comfortable with the process.

Drs. Melgar and Schnabel were nervous about what they would find when they opened the bags, but to their relief the peaches were unblemished and rosy, although not as deep red as the peaches that were never bagged. All other qualities were the same among the three groups of peaches: weight, size, sugar content, acidity and sugar:acidity ratio.

Further comparisons revealed that the bagged peaches, particularly those that were bagged until harvest, had less incidence of brown rot and insect damage than the control peaches. Mid-season varieties fared especially well.

To test consumer reaction to the bagged peaches, Drs. Melgar and Schnabel surveyed people at the Clemson Farmers' Market and at a fruit stand near Clemson University. A total of 93 percent of people at the Farmers Market and 86 percent of people at the fruit stand said they preferred the bagged fruit despite the color difference. The majority of people said they would be willing to pay up to 80 percent more compared to conventionally-grown peaches.

Drs. Melgar and Schnabel calculated that growers might have to sell the bagged peaches at around \$0.10 to \$0.15 more per pound than conventional peaches to make up for the increased cost. The researchers are now working to determine if consumers would really be willing to pay enough of a premium to have pesticide-free peaches.

A story about the project that appeared in *American Fruit Grower* magazine resulted in several inquiries by farmers in Florida, Texas and New York who were interested in trying out the bags.

Document Impacts

Project Spotlight: Survey of Pest Practices and Management Practices in Rain Gardens PD: Helen Kraus, North Carolina State University

Scientists at North Carolina State University are working to keep rain gardens beautiful and functional.

Originally designed as natural water filtration systems for urban runoff, rain gardens have become scenic areas of their own. Or at least they're supposed to be. Like other gardens, they are plagued with insects and weeds, perhaps more so because they have to endure extreme conditions and are composed of sandy soils, perfect for any weed to sprout. The weeds make the garden un-sightly and force out preferred plants. Dr. Helen Kraus, a horticulturist at NC State University, surveyed common weeds in rain gardens.

Because rain garden plants and soils are used to filter nutrients, chemicals and sediment out of the stormwater and return purified water to ground water, rain garden managers can't use herbicides. One of the only options for weed control is hand pulling. However, because weeds are usually not removed consistently, they grow to levels that require hours of labor to eliminate.



Oxalis
Credit: Dan Nydick

To get a better idea of how much of a problem weeds were, Dr. Kraus and her colleagues surveyed 74 gardens across North Carolina and Virginia this past year. Some gardens were so overrun with weeds that the garden was no longer attractive.

After the survey, Dr. Kraus and her colleagues developed a list of the top 10 most common weed species plaguing rain gardens (numbers in parentheses are the frequency of occurrence in the rain gardens sampled):

1. Tree seedlings (64%)
2. Lespedeza (39%)
3. Oxalis (34%)
4. Dog fennel (33%)

5. American burn weed (31%)
6. Yellow nut sedge (31%)
7. Poke weed (20%)
8. Sowthistle (20%)
9. Spotted spurge (20%)
10. Blackberry (19%)



Purple coneflower, a common perennial planted in rain gardens

A variety of plants are used for rain gardens, ranging from trees and shrubs to grasses and perennials. Plants must be hearty and able to withstand periods of heavy dousing often followed by long periods of drought.

To keep weeds out, the researchers need to test both effective plants and effective but safe herbicides. Healthy plants might reduce weed populations to the point where they could be controlled by reduced-risk herbicides.

To test different herbicides, Dr. Kraus and her colleagues have built 20 rain gardens in which they can apply herbicides and then evaluate the movement of these chemicals in water. Any herbicide that does not damage the ornamental plants, or move with water, would then be listed as an option. If no herbicide options are found, she said, they will have to recommend returning to mechanical weed control methods such as hand-pulling.

Dr. Kraus and her colleagues hope they can find a solution that is effective and efficient.

Document Impacts

Project Spotlight: Novel *Alphitobius diaperinus* Control Strategies -- Diatomaceous Earth and *Beauveria bassiana*

PD: Nancy Hinkle, University of Georgia

As the number one broiler pest worldwide, the darkling beetle (*Alphitobius diaperinus*) is nearly impossible to control. It has developed resistance to all chemical classes of insecticides registered for their control. As a pest, not only does it destroy insulation in buildings, but it also harbors pathogens such as *Salmonella* and *Campylobacter*.



Darkling beetle
Credit: John Meyer, NCSU

Control recommendations include *Beauveria bassiana* in place of insecticides, enhanced with diatomaceous earth (DE). However, no data has been published to support these recommendations.

Dr. Nancy Hinkle, at the University of Georgia, led a research project to determine if the recommended combination of *B. bassiana* and DE actually worked. Labora-

tory tests have shown *B. bassiana* to be effective against *Alphitobius*, but no tests have been conducted to prove its efficacy when paired with DE.

Two University of Georgia students conducted laboratory tests to determine if *B. bassiana*, with or without DE, would be effective at killing *Alphitobius* larvae (called lesser mealworm) or adult darkling beetles. Tests were done in petri dishes with a slice of carrot.

After a week, *B. bassiana* killed some of the larvae but none of the adult beetles. Tests showed that to kill 95 percent of the larvae, about 6,125 pounds of *B. bassiana* would have to be used in a broiler house. The addition of DE lowered the amount to 4,125 pounds. *B. bassiana*, with or without DE, was ineffective against adult beetles.

Even though the study proved that *B. bassiana* has some effectiveness at killing larvae, the amount that would be needed is unrealistic.

As a result of the study, Dr. Hinkle said, inquiries about using DE in broiler houses have ceased.



Lesser mealworm
Credit: John Meyer, NCSU

Document Impacts

Project Spotlight: Quantifying the Financial Costs and Benefits of School IPM: A Collaborative Workgroup Project

PDs: Janet Hurley, Blake Bennett, Thomas Green and Michael Merchant, Texas A&M AgriLife University

Those of us familiar with the concept of integrated pest management know that preventing pests from entering a structure will, over time, be cheaper than continuously paying a professional to treat. However, data to back up that belief is nonexistent, so Texas A&M AgriLife IPM Specialist Janet Hurley and other IPM and economics specialists from around the country embarked on a project to collect data on IPM practices in several schools.

Using questions from several past surveys, including those for IPM Star certification, the working group created two surveys: an IPM Continuum Survey that assessed the level of IPM practices in a school district, and an IPM Cost Survey that collected cost data associated with any pest management practice conducted in a school.



Belinda Messenger, Child Care IPM Specialist, California Department of Pesticide Regulation inspecting outdoor drains for Oriental cockroaches.

Credit: Janet Hurley, Texas A&M AgriLife

IPM specialists from Alabama, Arizona, California, Maine, North Carolina and Texas agreed to find at least one school system to participate in the study. Participating schools were required to share two years' worth of pest management cost data.

Altogether, 10 school systems participated.

Although all of the schools were implementing IPM, each school district—even within the same state—achieved IPM at different levels and practiced IPM in different ways. In some cases, costs for pest prevention or low risk pest

control was not documented, so records seemed to indicate that the school staff used only spray treatments to handle pests. Other districts relied on the contracted pest management professional to look at the traps for insects.

Only a couple of school districts trained school staff, and participation was voluntary. In many instances, school staff was a hindrance rather than an asset to IPM implementation; some school maintenance directors said that they spent so much time responding to reports of dead insects that they had no time to do prevention.

Nearly all schools that participated in the IPM Continuum Survey had scores that were very close to one another. Schools in one state received different scores because there is no state law for written records for school IPM, so there is no requirement for the policy paperwork required by other states.

The project revealed that schools needed better systems to identify building weaknesses to track the effectiveness of both IPM and their Indoor Air Quality program. Every state struggles with IPM recordkeeping. Although the forms and software available allows school maintenance staff to track pest control in general, adding IPM tactics to those forms is not easy. Even in one case where the district attempted to add information to a form, the state inspector required specific information on a different form that the maintenance supervisor could not modify.

During the process of interviewing and asking schools for information, the working group decided to nominate each participating school for IPM Star certification. More information on the results of those nominations will be coming later in the fall. For now, the group is continuing to decipher the data they have collected, and the project also allowed them to validate the cost survey.

Document Impacts

Project Spotlight: Organize and Set Priorities for a Southern Region Tawny Crazy Ant Working Group

PD: Fudd Graham, Auburn University



Credit: Joe MacGown, Mississippi State University, Bugwood.org

In 2002 a new ant species was discovered around Houston, TX, and spread throughout the Gulf coast mainly through human assistance. After the species received several different names depending on where it was found and who found it, scientists confirmed that the species was *Nylanderia fulva*.

In 2012, the Entomological Society of America formally named it the “tawny crazy ant.”

In the U.S., the tawny crazy ant has primarily been a pest of urban importance. Its spastic running behavior when disturbed earned it the descriptor “crazy,” and it has been known to damage outdoor electrical fixtures and swarm around building structures. In Columbia, South America, the ant attacked farm animals and smothered chickens to death. In the U.S. it is one of the only insect species to outcompete the red imported fire ant.

Currently the ant has been discovered in states in the Gulf Coast, including Texas, Alabama, Louisiana, Mississippi, and Florida. Traditional insecticide treatments for ants have not been effective at controlling the ant. In fact, when large numbers of ants die from an application, live ants use the pile of dead ants as a bridge to enter a structure. Some states have received a special use label for Termidor SC, which contains fipronil, for use with tawny crazy ants, but the chemical has been proven to contaminate surface water and must be used carefully.

Dr. Lawrence “Fudd” Graham of Auburn University convened a working group of 14 experts from states affected by tawny crazy ant in addition to USDA professionals. Each member of the working group brought a set of baseline data for the ant from their state and a list of resources. At the meeting in April 2015, working group members established priorities for research and extension.

The working group’s goal was to evaluate the current pest status of tawny crazy ant and establish IPM priorities for research, extension and regulatory issues.

Creating a set of educational materials for stakeholders topped the list of extension priorities. Using technology to create interactive tracking maps for the pest was the second priority, followed by determining homeowner pesticide use.

The group listed even more priorities for research. The first priority was bait development and clear instructions on how to use current baits. The second priority was determining economic impacts, followed by examining the use of quarantines in nurseries.

The next step for the working group is to use SIPMC’s technical abilities to establish a website in EDDMaps with real-time tracking data for TCA. Participants of the meeting have since been examining existing data to determine when the pest was discovered in counties within each state. They are in the process of loading data to a datasheet and hope to launch the website by the end of the year.

The group’s long-term goal is to stop the spread of the tawny crazy ant. To move toward that goal, the group is continuing to document locations of ant populations, examining the biology of the ant, testing products that may aid in controlling it and presenting information to the public to educate people about how to identify it and slow the spread.

Friends of IPM Awards

This year was a boon for the Friends of Southern IPM award program. We received 44 nominations in total; 19 for the graduate student awards and 25 for the professional awards. It was the largest pool of nominations we've ever had.



Luis Aristizabal

The Masters student award winner, Luis Aristizabal, was one of seven nominees in that category. Originally from Colombia, Aristizabal moved to the US in 2009 to escape the violence in Colombia. With 10 years of experience as an extension specialist with a national coffee research organization, he landed a job with the University of Florida as a lab technician. After mastering English, he entered the University of Florida in 2014

as a masters student and began research on biological-based management of chilli thrips. His research resulted in a rapid sampling plan to correlate visual damage and population size estimates, along with an aesthetic damage threshold.



Christopher Werle (center), with Henry Fadamiro and Joe LaForest

Louisiana State University Ph.D student Christopher Werle was one of 11 nominees for the Ph.D. student award. Like Aristizabal, Werle works with ornamentals and has done research that has had considerable impact in areas outside of

his home state. He has worked on several grants, including four in which he was either Principal Investigator or co-Principal Investigator. His research has resulted in five peer-reviewed publications about ambrosia beetles and was funded with three major USDA Agricultural Research Service grants and agreements. Werle also developed a portable trapping station for nocturnal pest species, saving one nursery 50 percent in insecticide costs.

The first of six awards for IPM professionals, the Bright Idea award, went to Dr. Oscar Liburd from the University of Florida. Liburd, a specialist in berries, developed monitoring protocols for two major blueberry pests and one major strawberry pest that have resulted in a significant reduction in the amount of pesticides used and an increase in growers monitoring for those pests. Dr. Liburd refined and developed monitoring protocols for SWD by evaluating commercially available traps and baits and providing growers with quality devices. He also developed monitoring tools for early detection of thrips in blueberries and identification of feeding areas on the plant.



Oscar Liburd (center)

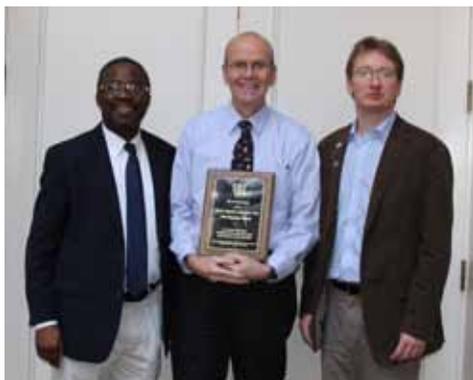
Dr. Edward Sikora of The Alabama Cooperative Extension System won this year's IPM Implementer award. Dr. Sikora coordinates a program focused on monitoring and management of soybean rust, the Soybean Rust Pest Information Platform for Extension and Education (SBR-PIPE). Soybean is a \$40 billion crop in the U.S., bringing in about \$100 million to Alabama alone. In particular, the system saved one county in Alabama from losing 95 percent of its acreage with savings of approximately \$5 million.



Ed Sikora and Henry Fadamiro

Dr. Mike Waldvogel, this year's IPM Educator, runs the Urban Entomology extension program at NC State University. To give practical education to pest control professionals, Dr. Waldvogel runs a Structural Pest Management Education and Demonstration Facility, where he shows

Friends of IPM Awards



Mike Waldvogel (center)

participants how to practice proper inspection and treatment for subterranean termites. He has also developed extension fact sheets and bulletins, along with presentations and publications for pest control professionals, homeowners and regulators.



Ash Sial (center)

This year's Future Leader is Dr. Ashfaq Sial, IPM Coordinator in Georgia. Dr. Sial stepped into the role of IPM Coordinator in July 2013 and took off running. Sial started at the University of Georgia balancing responsibilities for the statewide IPM coordinator program as well as his own programs for major pests of small fruit crops. Shortly after arriving at the University of Georgia, Dr. Sial started a laboratory to begin work on the spotted wing drosophila. He has developed good relationships with the blueberry industry, so good that industry leaders gave him his own research farm in Georgia centrally located in the principal blueberry producing area of the state.

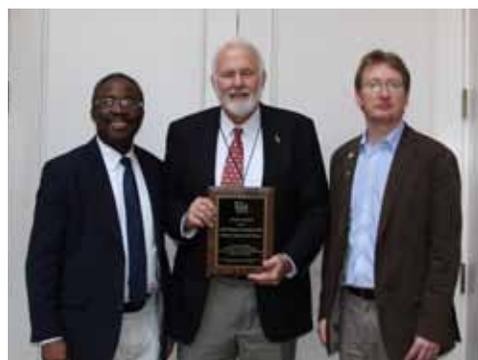
In the summer of 2013, Dr. Mo Way at Texas A&M AgriLife detected a new aphid on grain sorghum. This year's Pulling Together award winner, the Sugarcane Aphid Team, was formed to find management solutions for a new sugarcane aphid. After performing insecticide trials, experts determined that the only insecticide that would work was one that was not labeled for sugarcane aphid. The team successfully requested EPA to grant the addition of

sugarcane aphid on the Transform label. The team also developed new resistant breeds and researched the biology and ecology of the pest to find natural enemies and develop action thresholds. According to the Texas Sorghum Association, the work of the team prevented an estimated \$165 million in losses in 2014 and another \$100 million in losses in 2015.

Dr. Norman Leppla, this year's IPM Lifetime Achievement Award winner, has been a true leader in IPM during his more than 40-year career. His experience spans from the land grant university to USDA Animal and Plant Health Inspection Service, where he established the Biological Control Institute to provide leadership for biological control. After retiring from USDA, he returned to the university system at the University of Florida, establishing a new plant doctor degree and incorporating biological control into the Florida IPM program. Dr. Leppla's state IPM program has been one of the leading IPM programs in the country. He has introduced some innovative IPM solutions to many of Florida's pest problems, including a biological control solution—complete with a mechanical planter—for invasive mole crickets. His finding of a specific nematode that would control the crickets led to the commercialization of a biological control product, which has saved cattlemen \$13.6 million annually.



Henry Fadamiro with the Sugarcane Aphid Team



Norm Leppla (center)

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Front cover photo:

High tunnel at Florida Small Farms Program
Credit: Lei Lani Davis

Back cover photo:

Soybean seeding at the University of Kentucky Extension Center in Princeton, KY