**APPENDIX D**

**SAES-422**

**Project/Activity Number:** SERA3

**Project/Activity Title:** Southern Region Information Exchange Group for IPM

**Perion Covered:** 03/18/2021 – 02/28/2022

**Date of this Report:** 04/27/022

**Annual Meeting Date:** 02/28/2022 – 02/28/2022

**2022 SERA3 ANNUAL MEETING AGENDA – DENVER, CO**

Monday – February 28, 2022

**AGENDA:**

Joint National IPM Coordinating Committee and ERA Meeting:

*(All meeting times are based on Mountain Standard Time in Denver CO)*

8:30am Welcome and NIFA update (virtual)

9:00am Impact writing workshop with Sara Delheimer

12:00pm Lunch

Southern Regional SERA-3 Meeting:

1:00pm Welcome and Introductions (Ash Sial)

1:15pm Minutes: Read and Approve (Ash Sial)

1:30pm Updates from NIFA (Dr. Vijay Nandula)

1:45pm -National IPM Coordinating Committee – update (Ash Sial)

-SERA-3 Renewal submission (Ash Sial)

-Administrative comments/SERA-3 Renewal status update (Dave Monks and Harald Scherm)

2:00pm Updates from the Southern Region IPM Center (Joe LaForest et al.)

* + - * IPM Enhancement Grants
      * Friends of IPM Awards
      * Other SIPMC initiatives

3:00pm Break

3:15pm - State IPM Updates (All States/Territories)

* Funding for Southern Region IPM Projects

3:45pm Other discussion:

* + - Update SERA-3 IPM Priorities (already updated, just a quick revisit)
* Other issues facing IPM in the Southern Region

4:45pm Selection of the incoming Secretary

5:00pm Adjourn

**If you would like to join the meeting remotely**

Here is the connection information:

Join Zoom Meeting

<https://ncsu.zoom.us/j/98130547664?pwd=TUdhM1d1amNMSG12cWJqV2RXNU5SZz09>

Meeting ID: 981 3054 7664

Passcode: 324917

Topic: SERA-3 Annual Meeting

Time: Feb 28, 2022 at 1:00 PM MST (3 PM Eastern Standard Time)

**SERA3 2022 Annual Meeting Minutes**

**Participants**: Ash Sial, Chair (GA), Francis Reay-Jones, secretary (SC), Norm Leppla (FL), Roger Margarey (SIPMC), Joe LaForest (SIPMC), David Kerns (GA), Almo (PR), Amy Dreves (Virgin Islands), Daniel Frank (VA), Ric Bessin (KY), Tom Royer (OK), Rebecca Melanson (MS), Boyd Padgett (LA),Wanda Almodovar (PR), Martinez (PR), David Monks (NCSU and SERA3 administrative advisor), Glenn Studebaker (AR), Kayla Watson (SIPMC), Heather Kelly (TN), Tegan Walker (SIPMC)

* Welcome and Introductions: After introductions, Ash Sial indicated that written reports are needed within 60 days, as this is a renewal year for SERA3.
* Minutes of the previous meeting were approved.
* National IPM Coordinating Committee: Prior to this this meeting, report had been emailed to SERA3, which Ash summarized.
* SERA3 renewal: proposal has been submitted to initiate renewal. Dave Monks (administrative advisor and chair of SERA3 review committee) provided an update and overview of the renewal process. Justification and objectives were approved by the committee to move forward. Next step is to prepare write-up for submission, as current project expires at the end of September. Review of document will likely occur in August. Deadline for completion is June or July. Because SERA3 is active, renewal should be a fairly easy process. Dave encouraged new faculty to participate and to verify that participants are listed in NIMSS. Dave also offered help for developing final report for current project. For future meetings, SERA3 should get official approval prior to this meeting (which we did not do this year). Ash thanked David for submitting request and making this meeting official. The SERA3 webpage in NIMSS was shown – it is not up to date (need more states – requires submission of appendix E via the Dean’s office). Joe Laforest suggested an online session to educate participants on the NIMSS with David Monks. New chair Francis Reay-Jones will help set up meeting.
* NIFA update from Dr. Vijay Nandula (zoom): Dr. Nandula makes note of several deadlines: CPPM (2/28), AFRI CARE (9/15), Tactical Sciences for Agricultural Biosecurity (10/20), Pest and Beneficial Species (8/25), OREI (3/31), Organic Transitions (waiting for date), Methyl Bromide Transition Program (3/17). At closing plenary session, Dr. Nandula will make presentation on AFRI and other plant related programs.
  + Norm Leppla asked about earlier reporting date vs. grant ending for EIP. Dr. Nandula indicated that progress reports are due 6 June, but updates on EIP programs are needed before then (15 April – no need to try to project for whole year – or the opposite?).
* Updates from Southern IPM Center: Joe LaForest and Roger Margarey
  + Staff transitions: After Wendy Britton left the center, the new SERA3 contact is Kayla Watson. Natalie Hein-Farris in at the Western IPM Center was mentioned as a collaborator. Alex Belskis (who maintained grant system) is also moving on; recruiting for new position in on-going. Lauren Quevillon recently joined the center and will manage the Friends of IPM program. New IT analyst and research assistant will soon be hired.
  + Friends of IPM: reviewers from the region were thanked. List of awards winners is shown. Two graduate students received an award, as reviewers could not select a winner. As a replacement for the Lifetime Achievement Award (single award), the Hall of Fame had 5 awards this year.
  + IPM grants: 21 proposals this year, with 11 funded ($310K) (last year 37 submissions and 30 funded.
  + Joe shows list of projects from EIP. The Arkansas EIP program monitors 65 pests and diseases. Joe asked whether monitoring for Bt resistance needs to be coordinated across the region Bt resistance, and if the Center can help. Shelby Fleischer (Cornell) would like Pest Watch to continue after his retirement. SIPMC will continue this effort. Pest Watch is now part of AgPest Monitor, with the SIPMC providing data service. Penn State is making maps with nice functionality for spatial data.
  + Upcoming signature programs from the SRIPMC: these used to be technology, resistance management, and invasive species. New programs will be early detection rapid response (rolling these 3 into 1), climate change, pollinators and other beneficials, IPM identity (new from Kayla – how people think of themselves in IPM; help folks identify themselves in IPM).
  + EIP extravaganza (new idea in proposal): Kayla: PD workshop is required per RFA, and has typically been held either during another conference (Southeastern Branch ESA, Southern Division APS) or as a separate meeting. The Southern IPM Hour Webinar has in the past been a venue for EIP presentations, but may be limited to ARDP in the future, not EIP. The idea is to do more than just checking box and address what SERA3 and the Southern IPM Center need as an EIP PD meeting – the following ideas were discussed:
    - It could be a virtual standalone event, with potential for collaboration with other states.
    - Should focus on priorities of Southern Region.
    - Could include prerecorded presentations and sessions focused on questions and discussions.
    - Maybe have 3-4 states participate in a given year, so all can be covered over the 3 years of the EIP cycle.
    - Meeting could be limited to a single priority area in order to increase participation. looks at a given priority area across all states. It would be more work for IPM coordinators.
    - Among challenges, it would be more work for IPM Coordinators. There is also the challenge of convincing NIFA that this is suitable as a PD workshop, given that the EIP program emphasizes coordination across priority areas.
    - Joe will set up plan for options.
  + Prioritization process: to help in making our list of priorities, we can use a national IPM database, and search for priorities among a range of IPM documents (PM strategic plans, etc.). The Southern IPM Center will start to add priority lists into IPM database from different commodity groups.
* Updates to priorities of region:
  + Given the significant updates made last year, updates may be more limited this year.
  + Tegan will put together a survey to update our ranking of priorities using Qualtrics. Options come from full list of IPM priorities. Goal is to make list better organized. One issue with current list of priorities is that it is based on our expertise (biased by strong presence of entomologists). Purpose is to help with grant submissions to justify topic, with both top pests and list of pests. Need procedures in place for timely edits and posting of updated list, as we should aim to time updates to RFA of CPPM. Updates from IPM Coordinators are needed by the end of March 25, with a meeting in week of 28th March. Need updated priorities first, then Tegan makes survey by the end of April.
  + State reports:
    - UGA: EIP proposal had outstanding ranking. Includes new podcast series (IPM on the Fly), IPM Academy, IPM Newsletters (which include 1 pest highlighted in each issue), Interactive peanut resource, GA Pest management handbook. 4 to 6,000 diagnostics per year.
    - Puerto Rico and the Virgin Islands: EIP proposal addressed 4 primary and one 1 secondary (diagnostics) priorities. Specialist crops. Training agents. Farmers receive certification after training. Whitefly IPM in vegetables – pesticide rotation plan. IPM communities: database. IPM forage crops for livestock: weeds, invasive insects, resistance to insecticides. Evaluations: to determine impact (innovative pest management), BMPs, user attitudes. Help to ID priorities. Scorecard and other methods will help to quantify impacts.
    - Virginia: 3 primary and 1 secondary. Main is agronomic crops. Spec. and pollinator. Sec is diag. Agronomic: PM guides, work with us on MyIPM. Red imported fire ants becoming big issues – in the past, just 3 counties, now moving west and north. On-farm demonstrations. Patholo: nematodes. Insects: neonic seed trts. Weeds: cover crops. Creation of digital library to compile IPM information. Spec: nursery crops mainly. Transition to IPM for plants that need to look perfect. Emerging pests also. Poll: VA bee cooperators = agents interested in Extension work with beekeepers. Varroa mites course. Diag: 4 facilities supported.
    - Kentucky: EIP coordination manages annual meeting, surveillance of lep species for row crops. 6 working groups within grant. 2 with agronomic priority area: grains IPM working group (surveillance of invasive and changing pest populations [weeds, diseases, insects], educational p) and KY agricultural training school: intensive (10-20 folks). COVID made it go virtual. Spec: 3 WG: vegetable (research and demo plots), fruit (same), nursery (use of social media, podcast, Instagram, tictok). Diag.: 2 labs, one was destroyed by tornado.
    - Texas: 92% funded. Audio newsletter by region. Audio updates on pests in field during season and management. Over 100 updates. 300 producers signed up. Community: bugs by the yard program. Over 2,700 downloads. Structural: Unwanted guests (612). 15 online courses, most with pollinators and structural pests. 591 face to face or virtual presentations. Scouting program: in cotton. New emphasis on Thryvon. Scouting school for cotton, online programs to be done on Bt tech and insecticides. CEW resistance monitoring. Online courses for corn and sorghum. IPM and communities: updates to pubs on ants, butterfly garden. Spec. crop. Diag. 650 insect pest IDs. Pesticide applicators in residential areas.
    - Oklahoma: EIP program and IPM efforts at OSU are in transition due to loss of personnel. Among topics addressed, education programs needed to address the prohibition of Enlist herbicide in half of counties in the east where a lot of soybean is grown. An alfalfa weevil egg laying survey is conducted. A winter crop school is conducted for agents and CCAs, with 120 participants. Entomology and plant pathology courses are used for new educators in particular. Home owner issues ask any questions. Row crops: transition; PP have retired (2); have new PP. Cotton entomol retired. Spec crops: lost entomol. Livestock also. Poll. Not funded. Apps for sampling: one for SCA. Diag.: lots of samples. 10 episodes of TV program by Coop Ext. on insect or diseases.
    - Mississippi: program is in transition, Rebecca Melancon took over from Blake Layton. New EIP grant has 10 PIs. Stakeholders included master gardeners and pest control professionals. EIP grant was placed in medium priority. Secondary priority support included diagnostics lab support.
    - Louisiana: budget was cut for new cycle. Efforts in Agronomic Crops priority area included Mexican rice borer monitoring, training programs on root-knot nematodes, resistance to insecticides and herbicides for key pests, participation in MyIPM for Row Crops app, pesticide training and workshops. An example of demonstrations trials to address automatic fungicide applications being made in soybean, side by side plots of treated and untreated soybean were used to show stakeholders that automatic applications are not needed. Secondary priority area included diagnostics. Loss of personnel is a concern.
    - South Carolina: EIP grant has 17 co-PIs, with 20% budget cut despite being placed in high priority. EIP program addresses Agronomic Crops, Specialty Crops, and Pollinator Health. Over past year, efforts were made to develop online presence of IPM program (new website, use of social media, IPM videos), in addition to numerous virtual training program. MyIPM for Row Crops app was launched in collaboration with the Southern IPM Center and 8 land-grant universities.
    - Arkansas: EIP program has 5 priority areas (Agronomic Crops, Specialty Crops, Pollinator Health, Animal, Diagnostics). EIP program offered mini-grants for IPM demonstrations. Over 100 IPM demonstrations were made in Agronomic Crops, in addition to online courses for scouting row crop pests. For pollinator health, efforts included classes, training programs, pocket guide to ID pests in beehives – very popular. Educational programs were also used to address the Enlist ban in 11 counties.
    - Tennessee: Specialty crops (cucurbits and tomato) and pollinator health as expansions for new EIP grant. For row crops, efforts involved monitoring for resistance in insects (including to Bt) and weeds. Urban IPM training programs. Pesticide applicator IPM training + more virtual training modules.
* New secretary: Heather Kelly.

**Accomplishments**

**ALABAMA**

**The Alabama IPM program** is a mature, interdisciplinary producer training and education program conducted in collaboration with the AL Cooperative Extension System (ACES). The goal is to facilitate implementation and adoption of economically and environmentally sound IPM practices in these five program area priorities:

IPM in Agronomic Crops. Four objectives were established: 1) Improve current IPM recommendations based on new trials and new data to effectively manage current spectrum of common pests, 2) Monitor the progress of new pests and pesticide resistances throughout the state of Alabama, 3) Test new methods to provide early pest detection in agronomic crops with drone based remote sensors, 4) Disseminate IPM recommendations to stakeholders, and conduct result-oriented field demonstrations on-farm and during field days. The scope is to improve IPM adoption and pest control effectiveness in all six major agronomic crops (cotton, corn, soybean, peanut, wheat, and forage) in AL and serve stakeholders in the southern US. This priority area supports 7 statewide Extension specialists (representing weed science, entomology, plant pathology, and nematology), undergraduate assistants, and travel for those state specialists and collaborating REAs. Accomplishments were: 1) disseminated IPM recommendations to stakeholders at 89 Extension events, 2) Conducted a total of 109 different IPM projects with agronomic crops, 3) Reach stakeholders through newsletters and podcasts. The Alabama Crops Report Podcast (rated 4.75/5) produces regular episodes highlighting interdisciplinary topics related to IPM.

IPM in Specialty Crops. We will address the following Objectives for Fruit Crop IPM: 1) Development and implementation of IPM strategies for peachtree borers; 2) Extension and outreach to stone fruit farmers with 2-year follow-up surveys.  IPM in Vegetable Crops has the following goals: 1) Critical insect monitoring and pest alert service to specialty crop producers as a team project; 2) Integration of low-cost temporary pest exclusion with bioinsecticides for sustainable small farm sustainable IPM strategy; 3) Bio-intensive management of cowpea curculio in southern peas; 4) Development and/or revision of IPM digital media and print publications; 5) COVID-19 Special Programs via social media networks and other platforms.  The objective for Nursery Crop IPM is to implement an IPM program for Chilli thrips in outdoor ornamental production to reduce losses and use of insecticides. This priority area supports 1 statewide Extension specialist, 1 co-PI (entomology), 1 support staff member, a partial graduate assistant, undergraduate assistants, and travel for state specialists, co-PI, and collaborating REAs. Accomplishments were: 1) Mating disruption demonstrations delayed and weakened emergence peaks. These results from were presented to 70 Alabama peach growers and 3 REA were trained in these methods; 2) On-site trapping demonstrations for Chili thrips are established at 3 cooperating nurseries.

IPM for Pollinator Heath. Obj. 1) Identifying effective instructional approaches for Alabama beekeepers, and Obj. 2) Demonstrating beekeeping BMPs, with a focus on V. destructor IPM and other timely management activities. Accomplishments were: 1) Conducted six At Home Beekeeping Webinar Series lectures alongside our regional team of partners (U. Florida, U. Georgia, Mississippi State U., Louisiana State U., Texas A&M U., U. Tennessee, NC State U., Kentucky State U.), 2) Recruited 4 regional beekeeping clubs, plus 2 Alabama Extension / Auburn University groups to participate in our Alabama Demonstration Bee Yards Program, 3) 51 Alabama Extension Coordinators or Regional Agents were trained, 4) Redesign of Online Alabama Extension Beekeeping Certificate Programs alongside Alabama Extension Information Technology Specialists using Canvas.

IPM in Housing has the following objectives 1) establish a statewide IPM educating program to disseminate knowledge and attitude on cost-effective and sustainable IPM practices for public housing in AL, and 2) empower residents to practice the best DIY strategies through education and demonstrations for a comfortable life. Accomplishments were: 1) Developed pilot studies programs in underserved public communities to teach IPM and deliver materials directly to the community residents and managers, and 2) worked with AAHA (Alabama Affordable Housing Association) and AAHRA (Alabama Association of Housing & Redevelopment) to educate them on this program and to add participation in the program.

IPM Support for Pest Diagnostic Facilities. The Extension-led Objective is to provide timely and accurate pest diagnoses and recommendations to stakeholders and the general public in Alabama. Accomplishments were: 1) Provided timely diagnosis of plant disease, nematode, and insect pest problems for >3,200 routine samples, 2) Processed >8,700 survey samples (including CLRDV, citrus and grapes), 3) Twelve first reports identified in Alabama through samples submitted to the Plant Diagnostic Lab (PDL) including six resulted in regulatory action by Alabama Department of Agriculture and Industries.

**ARKANSAS**

**Arkansas IPM**is a multi-disciplinary program providing education and information to producers and pest managers in five priority areas:

**IPM Implementation in Agronomic Crops (Cotton, Soybean, Rice, Corn, Grain Sorghum and Peanut):**

* Mini grants were distributed to 31 counties to support IPM education and demonstrations.
* Over 120 on-farm IPM demonstrations were conducted.
* Pest monitoring with over 150 pheromone traps.
* Resistant weed monitoring by county agents.
* Weekly pest reports/updates on the Arkansas Row Crops Blog.
* Six on-line educational modules were produced on monitoring pests in row crop agriculture. Modules qualify as continuing education credits for licensed crop advisors.
* IPM demonstration booklets were produced in each of the 31 counties participating in the min-grants program and were distributed to clientele at winter crop production meetings.
* Monitoring for southwestern corn borer in conventional corn resulted in a savings of $29/acre on approximately 60,000 acres through educational efforts discouraging growers from making automatic applications for this pest.

**IPM Implementation in Animal Agriculture (Beef Cattle and Forage):**

* Horn fly control, tick collections for anaplasmosis testing and black fly abatement in SW Arkansas. The final evaluation and analysis of the multicounty horn fly management demonstration identified three non-pyrethroid (OP, ML and pyrazole classes) insecticidal ear tags that maintained populations below the treatment threshold for a six week period. Three other treatments (pyrethroid ear tag, pyrethroid dust and OP ear tag) did not maintain horn fly populations below the treatment threshold for the entire six week period. Environmental and on-animal tick collections included collections from the environment, hunter-killed deer, slaughter houses and a cattle operation with previously confirmed anaplasmosis cases. These ticks are currently being processed to determine the presence of Anaplasma and Ehrlichia.
* Black fly abatement. In early 2022, members of the Miller/Bowie County Black Fly Abatement Committee met and surveyed the Sulfur River for presence of black fly larvae. Based upon the surveillance, treatment of the Sulfur River was not recommended. We are now past the traditional date when buffalo gnat appear in that region and very few buffalo gnats emerged.
* Mini grants were distributed to 11 counties to support animal IPM education and demonstrations.
* Priority forage IPM projects included a bermudagrass stem maggot (BSM) control study and a sugarcane aphid (SCA) tolerant sorghum-sudangrass hybrid study. Although sugarcane aphid populations were low, it appeared that two hybrids supported lower sugarcane aphid populations. Several fall armyworm updates were provided to relay information concerning multiple control failures, demonstration research results, proper application timing and the sheer abundance of FAW. Specific FAW presentations were provided to Yell Co. Cattlemen, Arkansas NRCS personnel and the Arkansas Association of Conservation Districts Annual Meeting attendees. In addition a FAW Questions and Answers article was published in the trade magazine “Arkansas Cattle Business”.

**IPM Implementation in Specialty Crops:**

* + A webpage has been developed for monitoring and reporting on fruit and vegetable pests. GIS was utilized to build an interactive map and information for a large number of common pests is currently being added.
  + Decision making tools are under development for pecan scab as well as grape berry moth.
  + A statewide demonstration is underway at 30 sites with County Extension Agents, key mentor growers, and experiment stations across Arkansas focusing on insect resistance in sweet corn.
  + Field days in Hope, AR, Kibler, AR, and Clarksville, AR are scheduled for 2022 with demonstration plots established to showcase IPM tactics.
  + An IPM Demonstration video has been posted to our YouTube with 268 views (Proper fungicide use in flowering strawberries - <https://www.youtube.com/watch?v=X056zfLnimk> )
  + Pecan IPM demonstrations were conducted in 5 counties.
  + 11 newsletters on fruit and nut IPM posted on the Arkansas Vegetable, Fruit and Nut Update Blog.

**IPM for Pollinator Health:**

* Eight classes and meetings were conducted educating beekeepers on best practices regarding honey bee colony management and pest/disease control emphasizing IPM techniques. There were 564 participants.
* Three training sessions were conducted educating pest professionals and Extension agents on the importance of IPM for pollinator conservation with 214 participating.
* Four classes were conducted with the general public on the importance of pollinators and pollinator conservation with 193 participating.
* Pollinator content was updated on the Extension website ([www.uaes.uada.edu/bees](http://www.uaes.uada.edu/bees))

**IPM Support for Plant Diagnostic Facilities:**

* Over 3,000 plant samples were processed. Disease reports were generated for clientele along with appropriate control recommendations.
* A Portable diagnostic lab was used during field days and gardening events, including three Flower and Garden Shows.
* 31 newsletters on pests and management were produced and distributed to clientele.
* Over 36,000 clientele were reached through various means including electronic newsletters, one-on-one consultations, phone calls, social media as well as in-person events (field days, shows).

**FLORIDA**

Norman C. Leppla

University of Florida IPM Coordinator

*IPM Implementation in Specialty Crops*

Brian Bahder

1. Training for stakeholders to identify the vector will be through annual in-service trainings (ISTs) in each of the four counties where cooperators are located. 50% completed. Accomplishments: day long IST (Palm School) held in Broward Co. (Oct. 2021) and in Orange Co. (Jan. 2022) with 80 and 76 attendees, respectively. Outcomes: at these ISTs, stakeholders were trained to take samples of insect vectors of phytoplasmas, samples from palms, and how to inject appropriate chemicals for management. Impacts: pre and post test scores at these events showed a 20% and 90% knowledge gain, respectively. Objectives for the second year: Two additional events are planned for Tampa and Ft. Lauderdale and the process of planning events for the fall.
2. Workshops held at field sites to provide hands-on experience for stakeholders in sampling, collecting and maintaining adults and nymphs of *H. crudus*. 50% completed. Accomplishments and Outcomes: monthly training events on site in Miami-Dade for vector sampling and identification have taken place with an increase in accuracy in ID from approximately 40% to 97% over the duration of the project. Objectives for the second year: Monthly trainings will continue with new personnel.

Sriyanka Lahiri

1. Develop educational materials for workshops by Extension agents. 50% completed. Accomplishments: Four UF/IFAS Extension agents working with small fruit crops each were provided with a large screen stereoscope, for the hands-on pest ID component. Outcomes: equipment now is available for on-farm workshops for small scale growers in Hillsborough, Manatee, and Hardee counties Impacts: The equipment has enabled county faculty to develop educational materials and set-up arthropod collections for grower training. Objectives for the second year: Continue team meetings with the four participating Extension agents to develop educational materials and a hands-on farm workshop.
2. Hold 2-3 on-farm workshops per year to increase confidence in IPM adoption by small-scale growers. 5% completed. Accomplishments: One small-scale small fruit crop grower has been contacted to host our first on-farm workshop. Outcomes and Impacts: the workshop has not taken place. Objectives for the second year: Contact 1-2 other small-scale growers who are willing to host a workshop.

Norm Leppla

1. Support implementation of augmentation biological control of invasive arthropod pests by improving colonization and rearing, especially quality control, and delivering the information. 100% completed. Accomplishments: grower recommendations were developed for managing wireworms in Florida sweet potato. Outcomes: alternative biological control methods for managing wireworms in sweet potato were evaluated and described in a management guide. General thresholds were established and IPM tactics recommended for sweet potato in the region. Impacts: sweet potato growers in Suwannee County, Madison County, and adjacent counties directly benefited from the project by increasing profitability of these crops. Objectives for the second year: The work on wireworms in sweetpotato is completed and published. Stink bug colonization and rearing will be the priority for Year 2.
2. Advance adoption of IPM, especially augmentation biological control and cultural practices, to reduce the impact of invasive arthropod pests of specialty crops. 50% completed. Accomplishments: border rows of grain sorghum were planted along two sides of an organic tomato crop in North Florida to reduce fruit injury caused by invasive stink bugs. A total of 13 stink bug species were encountered, *Nezara viridula* being the most abundant. About 60% of the stink bugs were captured in the sorghum but this did not reduce injury to the tomato fruit. Outcomes: sampling techniques were improved and stink bug species abundance quantified. Impacts: Additional interventions will be required to prevent stink bugs from exceeding the economic threshold. Objectives for the second year: We will analyze the data and prepare a manuscript for Year 1 and further develop methods to efficiently rear *Trichopoda pennipes* for augmentative biological control in Year 2.

*IPM for Pollinator Health*

Jaret Daniels

1. Conduct a Southeast regional ornamental industry pollinator health network analysis and needs assessment. 70% completed. Accomplishments: leveraged resources from a related project to complete a consumer (868 respondents) and an industry grower (75 respondents) survey. Currently developing similar survey for landscape maintenance professionals. Outcomes: initial consumer and landscape industry insights were gained to help identify needs, problems, knowledge gaps, and industry disconnects. Preliminary list of key stakeholders was identified for a Southeast Stakeholder Advisory Group. Impacts: broad consumer and grower support for the development of best integrated pest and pollinator management (IPPM) practices and delivery of corresponding training and educational resource content. Objectives for the second year: Finalize pollinator health network analysis and needs assessment and facilitate Southeast Stakeholder Advisory Group engagement.
2. Develop dynamic training tools and educational resources tailored to stakeholders in the ornamental industry via diverse delivery modalities. 50% completed. Accomplishments: a comprehensive Pollinator Health Certificate Program course outline and initial module development. Outcomes: insights and survey results from Objective 1 were used to inform/direct specific course module content and learning tool development. Impacts: new educational resource content being developed. Objective for the second year: complete course module and training materials t and finalize recording for online delivery.
3. Launch certificate program marketing efforts and implement regional stakeholder training and education. 10% completed. Accomplishments: basic program marketing delivered at four stakeholder events. Training delivered at one Extension event and one green industry/botanical garden event. Outcomes: knowledge of program and IPPM best practices were expanded to appropriate stakeholders. Impact: 136 stakeholders were informed of the program; 165 stakeholders were trained on best IPPM practices. Objectives for the second year: further develop and disseminate program marketing and training materials. Launch pollinator Health Certificate Program course outline.

*IPM Implementation in Agronomic Crops*

Pratrap Devkota

1. Conduct agronomic (and forage/pasture) weed surveys at commercial fields throughout the Panhandle, north central, and central regions of Florida. 50% completed. Accomplishments: The graduate student is conducting the weed survey in peanut and cotton in western panhandle. Outcomes and Impacts: Nothing to report. Objectives for the second year: Conduct the weed survey of grower fields in central and eastern panhandle region. Collect high resolution images of weeds from the commercial fields for websites and training. Continue meeting with project collaborators and stakeholder groups to identify commercial fields for weed surveys.
2. Compile available management information/strategies on these weeds and disseminate information on weed identification, control strategies, and integrated management to the stakeholders. 50% completed. Accomplishments: The images of 42 weed species at different growth stages have been compiled from cotton and peanut fields and will be used for ID. Outcomes and Impacts: developing Extension materials for dissemination. Objectives for the second year: Compile weed control information and integrated management strategy guides for dissemination. Continue planning with project team meetings for disseminating weed identification and management information.
3. Develop a website and update MyIPM app with information on weed identification and management. 50% completed. Accomplishments: the weed images have been incorporated into a website: <https://wfrec.ifas.ufl.edu/weed-science-lab/weed-id-gallery/row-crop-weeds/>. Outcomes and Impacts: developing website and updating APP. Objectives for the second year: further enhance the website and its content, update MyIPM.

Silvana Paula-Moraes

1. Support IPM decision-making in agronomic crops for Ag professionals in the Florida Panhandle by establishing annual sentinel plots of selected agronomic crops at the WFREC to be monitored for the presence Lepidoptera and other pests targeted by Bt cotton and corn, and conventional insecticides. 50% completed. Accomplishments: collaborative work with University of Maryland, sweet corn seeds with Bt and non-Bt cultivars have been planted in a sentinel plot at WFREC. Participated in one farm meeting, two Extension symposiums, and biweekly visits to commercial fields in six farms around WFREC. Contacted two “groundbreaking” farmers for collaboration. Outcomes: knowledge of seasonal polyphagous lepidopteran pest occurrence, performance of Bt traits in corn and cotton. Impacts: promotion of close interaction with farmers in the region and decreasing risk of pest outbreak impacts with timely IPM information. Objectives for the second year: continue documenting the phenology of occurrence of lepidopteran pests in corn, documenting the performance of IPM methods in agronomic crops, and disseminating the results to farmers and Extension agents.
2. Perform year-round pheromone trapping of lepidopteran pests to document moth flight phenology in their overwintering and migratory intersection in the U.S. 100% completed. Accomplishments: Pheromone trapping conducted for fall armyworm, corn earworm, southern armyworm, and lesser corn stalk borer. Outcomes: A manuscript documenting the pattern of flight of lesser corn stalk borer has been submitted and an EDIS (Extension publication) has been accepted on flight of soybean looper in the region and how to differentiate this species from *Ctenoplusia* *oxygramma*. Impacts: decreasing risk of pest outbreak impacts with timely IPM information. Objectives for the second year: continuation of year-round pheromone trapping.
3. Improve IRM recommendations for Ag professionals by performing diagnostic insecticide bioassays to document the current susceptibility of economically important lepidopteran pests to commonly used insecticides. 100% completed. Accomplishments and Outcomes: documentation of fall armyworm susceptibility to Novaluron (Diamond). Impacts: insecticide susceptibility of pests in the region. Empowering ag professionals with IPM/IRM recommendations for agronomic crops. Objectives for the second year: diagnostic insecticide bioassays to document the susceptibility of target lepidopteran pests.

*IPM Implementation in Communities*

Lauren Diepenbrock

1. To train MGV and MGV coordinators in IPM techniques, have MGV apply IPM concepts and record the success of these techniques in home landscapes with specific fruit crops, and produce new IPM factsheets for home landscape fruit production. 50% completed. Accomplishments and Outcomes: From mid-2021 to early 2022, we used a Qualtrics survey to determine educational needs of Florida residents wishing to grow fruits in their yards. With over 1,500 responses, we have a large list of fruit crops of interest to begin our work. In summer 2022, we have a student in the Doctor of Plant Medicine program that will be working with researchers at the Tropical Research and Education Center to update Extension documents and develop IPM training sessions to educate Master Gardener Volunteers and their coordinators on proper care of target crops including banana, avocado, papaya, guava, dragonfruit, carambola, and mango. Objectives for the second year: Continue educational programming on crops of interest that are grown primarily in Central Florida for residents including citrus, peach, blueberries, loquat, fig, strawberry, and persimmon. From our survey, we have identified additional crops of interest that will need educational materials beyond the scope of our current funding.

Estelle Martin

1. To identify socio-demographic and socio-economic factors that influence mosquito abundance. 20% completed. Accomplishments: recruited personnel to work on the project and established contact with the Southwest Gainesville Advocacy Group (SWAG), a nonprofit organization to provide low income families in Southwest Gainesville with dental and medical care as well as food and education. We also developed a KAP questionnaire. Outcomes and Impacts: Now that we established contact with SWAG, we were able to identify the low income sites and sites in the high income neighborhoods bordering SWAG that will be used for the surveillance this upcoming mosquito season. The KAP questionnaire will allow us to learn more about the specific knowledge, attitudes and practices of homeowners towards mosquitoes and mosquito-borne diseases. Objectives for the second year: start the surveillance in June of 2022 and work to get IRB approval for the KAP survey.
2. To educate local communities regarding the repercussions of IPM on their backyard mosquitoes. 20% completed. Accomplishments: established contact with the City of Gainesville Mosquito Control District and Extension specialist Dr. Eva Buckner. Outcomes and Impacts: City of Gainesville and Dr. Buckner have extensive expertise conducting outreach in communities. Objectives for the second year: develop the Extension materials to be distributed in the communities.

Xavier Martini

1. Develop Extension resources for pests specific to cold hardy citrus. 33% completed. Accomplishments: February 24, 2022, we organized the Citrus Health Forum in Quincy, FL. This workshop and field day attracted 120 growers and stakeholder from three states: Florida, Georgia and Alabama. Outcomes: published an abstract for the FACAA Professional Development Conference: Sprague, D., Martini X. (2022) the citrus health forum: expanding citrus programming in north Florida. *Florida Association of County Agricultural Agents.* Impacts: The Citrus Health Forum was highly praised with 99% of growers satisfied, 97% reporting gain of knowledge, and most importantly 59% indicating that they will change their production practices following this forum. Behavioral changes included sampling more frequently for citrus pests, or the use of non-insecticide methods to control insect pests. Objectives for the second year: develop Extension documents for citrus scales found in North Florida, Georgia and Alabama. Organize a new session of the Citrus Health Forum and an In-Service training for Extension Agents.
2. Promote non-insecticidal methods to control citrus leafminer in North Florida. 20% completed. Accomplishments: provided guidance to Georgia citrus growers for the implementation of citrus leafminer (CLM) pheromone disruption. Collaboration on a study of the phenology of CLM in Georgia. Objectives for the second year: Develop Extension publications for the use of CLM pheromone disruption and attract and kill against CLM.
3. Develop an IPM program against ACP and citrus greening for residential areas. 33% completed. Accomplishments: student developed a survey (#IRB202200230) in direction to citrus homeowners. This survey aims to determine current knowledge of homeowners on Asian citrus psyllid (ACP) and Huanglongbing (HLB), and most importantly the control methods for homeowners to control ACP and HLB in their property. The goal is to identify tools and techniques to prioritize for Extension to implement IPM in homeowner community. This 40-question survey in Qualtrics will be sent to homeowners across the state via our network of Extension agents and actively promoted on social networks. Objectives for the second year: distribute the survey and analyze the results. Organize a workshop on citrus for homeowners and produce an Extension publication on citrus IPM techniques.

Hannah Wooten

1. Expand opportunities for landscape IPM training to more diverse audiences representative of the community of landscape professionals. 60% completed. Accomplishments: A student is assisting with the development of bilingual landscape training materials. The outline is complete and being transferred into a template. Supporting documents are being translated to Spanish. Outcomes: Basic landscape training content is developed and evaluated for ease of understanding concepts by diverse clientele. Objectives for second year: Complete and publish bilingual landscape training materials supporting Objective 1. Begin to evaluate increase in knowledge and implementation of best practices.
2. Increase knowledge of diverse landscape professionals about the fundamentals of IPM and landscape best practices in their communities. 0% complete. Objectives for second year: Administer trainings incorporating new bilingual landscape training materials resulting in an increase of knowledge of best landscaping practices.
3. Evaluate the intent of landscape professionals to implement cultural best practices and preventative techniques in landscapes they manage. 0% complete. Objectives for second year: Evaluate intent to implement best practices because of trainings and materials.
4. Show implementation of cultural best practices and preventative techniques in landscapes managed by professionals that attended the training. 0% complete. Objective 4 will evaluate actual implementation of best practices by bilingual landscape teams. This will be done in year 3.

**GEORGIA**

**Ashfaq A. Sial, IPM Coordinator, University of Georgia**

**UGA IPM Program Activities Summary (2021)**

In 2021, the University of Georgia Integrated Pest Management Program helped forge safe and effective methods for continuing research, education and outreach through exemplary Extension programming. Our current IPM program draws from a multidisciplinary team of specialists in cotton, corn, peanut, pecan, small fruits, vegetables, turfgrass, animal agriculture, precision agriculture, pollinator/beneficials, plant pest & disease diagnostics, and program evaluation. The program was ranked in the “outstanding” category and received the maximum funding amount for the next three years from the USDA NIFA Crop Protection & Pest Management Program.

In 2021, program evaluation specialists modified the existing IPM evaluation instrument for each commodity area represented on the grant. Simplified questions and response options target economic impact of programming and take into account survey fatigue. A QR code was added for sharing via presentation slides, taking participants directly to a Qualtrics survey for automated data collection.

The 3rd Annual Great Georgia Pollinator Census has 5,946 participants, a 58% increase from 2020. Participants documented over 108,000 insects and 436 new pollinator spaces were developed. Nine countries outside of the U.S. are interested in replicating the Census.

Education and outreach efforts were diversified in 2021 with the launch of a new podcast series, IPM on the Fly, which already has 185 monthly listeners. The UGA IPM Academy was developed as a training series for Extension agents throughout the southeast. Due to the pandemic, the first two trainings were solely delivered via Zoom, which allowed for increased regional participation. Individual sessions were recorded and posted online for the general public. The success of the MyIPM app lead way for the release of the new Row Crop App. The web-based, interactive Peanut Rx resource was fully refined and is now available throughout the southeast for agents, growers and industry professionals. Diagnostic methods were optimized for fungicide resistance evaluation to include strawberries.

2021 Outputs:

1. Extension trainings: 127
2. Professional conferences: 42
3. Grower meetings: 35
4. Journal articles: 32
5. New UGA IPM Academy series: Blackberry (113 registrants), Blueberry (123 registrants)
6. GA Pest Management Handbooks (Commercial and Home & Garden): distributed copies to all 159 county Extension offices. Sold over 400 copies of each edition. Had 28,283 website views.
7. Additional commodity production guides: Peanut, Blueberry, Peach, Cotton, Turf
8. IPM on the Fly Podcast: 5 episodes
9. Monthly Feature Creature series: 12 fact sheets
10. UGA IPM blog: over 6,000 page views
11. Additional IPM specialist blogs: 18
12. Monthly UGA IPM newsletter: 477 subscribers
13. Additional IPM specialist newsletters: 5
14. Diagnostics: 554 samples for fungicide resistance
15. MyIPM App: 5,000 downloads, New Row Crop App, Peanut Rx
16. Major popular press exposure: 4 articles reached 1.4 billion
17. Great Georgia Pollinator Census: 5,946 participants

**ACCOMPLISHMENTS FOR THE REPORTING PERIOD**

The overall goal of this project is to develop transdisciplinary IPM programs utilizing the most updated scienctific information and help stakeholders to implement those programs in order to minimize environmental and economic risks associated with insects, pathogens, and weed pests and their management at the state, regional and national level. During this reporting period, IPM specialists have worked with stakeholder to implement IPM programs to address pest problems in many commodities across the state. The most significant accomplishments are briefly described in the text below:

**IPM Implementation in Agronomic Crops: (Peanut and Cotton): Objectives: 1)** Develop and refine effective management programs for rootworm complex (Peanut) (30% complete); **2)** assess effectiveness of TSWV resistant genotypes (30% complete); **3)** survey commercial farms and processing facilities for incidence of fungal diseases and aflatoxin, and update Peanut Rx (Peanut) (30% complete); **4)** Evaluate chemical as well as cultural strategies based on pest (aphid) and crop phenology and use that develop sustainable IPM programs (Cotton) (30% complete); and **5)** Disseminate the new information to stakeholders (Peanut and Cotton) (30% complete).

**Accomplishments, outcomes, impacts:** **Objectives:** **1**) Research conducted in 2021 focused on determining the abundance and spatial and temporal distribution of rootworm in Georgia peanut fields and on evaluating the efficacy of selected insecticide modes of action and use patterns. Data are being analyzed to update recommendations. **2)** Several trials were conducted in multiple locations. Results revealed that the newly released field resistant cultivars were often not effective as standalone options and integrating them with various chemical and cultural practices could reduce the risks posed by thrips and TSWV. Our research continuously helps to fine tune the risk management index developed by UGA extension scientists, and directly assists growers to make the optimal risk reduction choices associated with planting peanuts year after year. In addition, there is concern if the continuous use of resistant cultivars could impart selection pressure on the virus itself and transform them into resistant breaking or highly virulent isolates/strains. Recent research completed in 2020 does not indicate that there is immense selection pressure imparted on the virus. Research is ongoing on this aspect. **3)** Based on results of multiple field trials, Peanut Rx was fully refined for 2021 and 2022 seasons. The Peanut Rx Team met “in-person” in December 2021 at George T. Bagby State Park. The Index was made available to growers in Georgia, Mississippi, Alabama, Florida, and South Carolina though a new web-based interactive tool, through production guides, and through Industry fact sheets. **4)** We evaluated 7 active ingredients for control of cotton aphid; top performers provided 86 to 92 percent control and no significant response in yield was observed among treatments. The cotton aphid pheno trial included aggressive aphid control programs initiated at different timings. The most aggressive treatment was treated weekly beginning at 14 days after planting and continuing until populations crashed due to a fungal epizootic. Aphid populations were generally low in this trial and no significant differences were observed in yield nor the incidence of CLRDV positive plants. Trials completed in the fall of 2021 are consistent with previous years in that aphid management does not significantly affect cotton yield nor incidence of CLRDV. **5)** The findings were synthesized to update pest management recommendation in Pest Management Handbook and other extension publications and were disseminated to growers via presentations at the county extension meetings, field days, and other research and extension meetings. Growers who implemented UGA pest management recommendations saved millions of dollars in crop losses.

**IPM Implementation in Animal Agriculture: (Poultry and Beef Cattle)**

**Objectives: 1)** Evaluate new chemicals and other alternative strategies to control insect pests of poultry (broiler and caged layers) and beef cattle and develop effective IPM programs (30% complete); **2)** Develop monitoring programs to tack ALT (30% complete); and **3)** disseminate this information to poultry and beef cattle producers (30% complete).

**Accomplishments, outcomes, impacts:** **Objectives: 1)** Horn flies continue to be a major concern for cattlemen. In a survey, cattlemen wanted us to continue to focus on developing more sustainable IPM strategies to control horn flies. New products, treatment methodologies, and suppression strategies were evaluated under field conditions throughout the state. Based on our findings, IPM recommendations were developed relevant to the geographical location and seasonal fly pressure. **2)** We have developed and standardized sampling methodologies for surveying cattle ticks under field conditions. Having established these baseline data, we are better prepared to monitor for arrival of ALT as it spreads through the Southeast. We are working in collaboration other researchers in the southeastern US to initiate environmental monitoring while checking for the invasive tick on alternative hosts such as wildlife and domestic pets. and **3)** These findings were shared with poultry and beef cattle producers through extension presentations, publications, websites, and broadcast media interviews, and used to update IPM recommendations in the Georgia Pest Management Handbook.

**IPM Implementation in Specialty Crops: (Blueberries, Peaches, and Vegetables)**

**Objectives: 1)** Develop more sustainable IPM programs based on recent research findings to effectively manage SWD (Blueberry) (30% complete); **2)** Evaluate new and alternative fungicidal spray programs for managing QoI-resistant anthracnose fruit rot (Blueberry) (30% complete); **3)** evaluate effectiveness of new herbicides and orchard floor coverings to manage weeds in young blueberry orchards(Blueberry) (30% complete); **4)** Evaluate effectiveness of pheromone-based mating disruption as a strategy to control SJS (Peach) (30% complete); **5)** Evaluate the efficacy of plant defense inducers, growth regulators, and systemic chemical applications on PPD trees (Peach) (30% complete); **6)** Develop and implement resistance monitoring and management plans for sweet potato whitefly and DBM (Vegetables) (30% complete); **7)** demonstrate and help farmers implement effective IPM programs for center rot of onion (Vegetables) (30% complete); **8)** Evaluate host plant resistance and cultural strategies to control FAW (Turf) (30% complete); **9)** Conduct dollar spot surveillance in the field and develop management strategies (Turf) (30% complete); and **10)** disseminate this information to blueberry growers(Blueberry, Peach, Vegetables and Turf) (30% complete).

**Accomplishments, outcomes, impacts:** **Objectives 1**) Field trials were conducted to evaluate effectiveness of new reduced-risk insecticides and behavioral control tactics to develop more sustainable season-long programs to control SWD. Findings were used to update season-long SWD management programs. **2)** Trials to evaluate new and alternative fungicide programs for QoI-resistant anthracnose fruit rot are under way. Once data are collected and analyzed, findings will be used to update management recommendations. **3)** Trials were conducted to evaluate safety and efficacy of Dual Magnum (S-metolachlor) in blueberries. Findings were disseminated to blueberry growers via presentations at the extension meetings. **4)** Trials were conducted to evaluate efficacy of two different pheromone formulations (provided by Shit-Etsu and CBC America and Trécé, Inc.) in mating disruption of San Jose Scale (SJS). Results showed that trees under the mating disruption treatments had an average of four to five times fewer SJS crawlers than the control trees. While the mating disruption did not completely eliminate SJS crawlers from the disrupted blocks, the significant reduction in scale numbers is an encouraging first step in developing an alternative management approach for SJS in Southeastern peaches. **5)** Trials were conducted on PPD trees to evaluate efficacy of Actigard 50WG (acibenzolar – S – methyl), K – phite 7LP (phosophorous acid), Maximizer (cytokinin, auxins, humic/organic acids, gibberellins), ProGibb40SG (gibberellic acid), and RIO (gibberellic acid, indole acetic acid, cytokinin). Bacterial titer was measured in the roots to compare treatment effects and to differentiate the response of healthy vs. diseased trees. Initial results were shared with stakeholders and the trials will be repeated in 2022. **6)** A total of 21 LC50-based trials have been completed to screen whitefly populations for resistance so far using cotton as the standard host for all trials. Four field sites across southern Georgia have also been established in Camilla, Plains, Reidsville, and Tifton. The four vegetable crops are being cultivated at these sites to serve as hosts for establishing whitefly field populations. Weekly scouting and monitoring are underway to identify the current timeframe for the whitefly invasion in the cotton belt region. **7)** Integrated approach with copper-bactericide, insecticide (thrips control) and herbicide program considerably reduced center rot incidence in bulb compared to the onion grower’s standard. Based on the economic analysis, growers can achieve a profit of $880 per acre using integrated approach identified in this project compared to the grower’s standard control. If the improved management strategy is utilized over the entire onion acreage in Georgia (10,000 acres), a total profit of $8.8 million can potentially be achieved. **8)** The host plant resistance characteristics of several cultivars and advanced lines of tall fescue grass were compared with the zoysiagrass cultivar ‘Zeon’ and the bermudagrass cultivar ‘TifTuf’as positive and negative controls, respectively. The results showed that all the tall fescue cultivars/lines performed better than zoysiagrass ‘Zeon’. **9)** In the disease survey, 33 isolates were collected in the state of Georgia from 19 counties (including, Clarke, Fulton, Henry, Tift and Walton counties) and on six different turfgrass hosts. The samples were from golf courses (4), homeowners (8), landscapes (20) sod farms (1). All the isolates were genetically identified based on their sequence of the Internal Transcribed Spacer (ITS) region. **10)** Findings were shared with specialty crop growers through extension presentations, publications, websites, and broadcast media interviews, and used to update IPM recommendations in the Georgia Pest Management Handbook.

**IPM for Pollinator Health:**

**Objectives: 1)** To increase the amount of sustainable pollinator habitat across the state (30% complete); **2)** to increase the entomological literacy of our citizens in regards to beneficial insects (30% complete); and **3)** to generate data of Georgia’s pollinator populations (30% complete).

**Accomplishments, outcomes, impacts:** **Objective. 1), 2), & 3)**: Maps of the pollinator gardens created as part of this project were generated by Hamilton Gardens intern, Emma Harris, showing the locations of the new gardens across the state. These are posted on the website (https://GGaPC.org). Data from all three Censuses were finalized and placed on the website as well. This data is being used by researchers as well as educators who are using it for the STEM curriculum. 2022 GA Annual Pollinator Census has been scheduled to be held on April 21-22, 2022. The educational materials have been updated for the 2022 Census and social media outlets are being used for educational purposes.

**IPM Support for Pest Diagnostic Facilities:**

**Objectives:** **1)** Develop, optimize and provide fungicide resistance testing services for multiple crop-pathogen combinations to enable timely and effective disease management (30% complete); **2)** Conduct regional monitoring for citrus greening to safeguard Georgia’s commercial citrus industry (30% complete); and **3)** empowering county agents through on-site diagnostics (30% complete).

**Accomplishments, outcomes, impacts:** **Objectives: 1)** Rapid, lab-based fungicide resistance assays for blueberry, peanut, strawberry, and turfgrass pathogens have been developed and validated this past year. **2)** In total, 212 citrus samples were tested from 9/1/2021 through the present, with 2 of 212 samples (0.9%) testing positive for HLB during this time period. One of the positive tests was the first report in Grady County and came from a commercial citrus tree. This is only the third HLB-positive tree from a commercial planting in Georgia. **3)** Agdia lateral flow tests for *Xylella fastidiosa* were distributed to Extension agents in two Georgia wine grape-growing counties to aid in the diagnosis of Pierce’s disease. 11 tests were conducted this past fall resulting in 6 positives for Pierce’s disease. Diagnoses were shared with growers to make decisions about vine removal. Similarly, immunostrips for *Phytophthora* spp. (causal agent of Phytophthora blight and fruit rot) and *Acidovorax citrulli* (Ac; causal agent of bacterial fruit blotch in cucurbits) were distributed to county Extension agents in Tift, Cook, Berrien. and Crisp counties. A total of 48 Ac immunostrips were used to detect/confirm suspect seedlings in the greenhouse that aided in exclusion prior to field-transplanting. Agents also utilized *Phytophthora* spp. immunotrips (*n* = 93) to detect the pathogen from suspect leaves, stem and fruits of cucurbits and pepper in field and also in storage.

**Evaluation:** A series of evaluation instruments were created by commodity: cotton, peanuts, corn, blueberry, peach, vegetables, and pollinators, as well as a general instrument for other areas such as turfgrass or urban programs. Furthermore, the evaluation specialists on this grant collaborated with the pollinator health specialist to explore the literature for appropriate and defensible measures on the value of pollination to the economy. Stakeholder surveys will be conducted at the end of this project to evaluate impact.

**Coordination:** The UGA IPM Program hosted the second training of the newly created UGA IPM Academy, focusing on blueberry production in the southeast. The program recorded and published several episodes of the newly created IPM on the Fly Podcast, and continued to develop monthly IPM content for agents and growers to use in their counties. Coordination included an overhaul of the current IPM website. We also updated and published 2022 Commercial Edition (Volume I and Volume II) and 2022 Home & Garden Edition of Georgia Pest Management Handbook which is the most widely used IPM resources within the state of Georgia and across the southeastern US.

**KENTUCKY**

Ric Bessin, IPM Coordinator, University of Kentucky

This is our 2022 IPM report for Kentucky. This past year we successfully completed our previous EIP 3-year grant with a fourth-year extension and received a new competitive award to continue the IPM program for the next three-year period. This past year we experienced an epic outbreak of fall armyworms in soybean, alfalfa, pastures, turf, and some specialty crops. The outbreak was preceded by noticeable increases in moth captures and earliness of captures in traps maintained by our IPM program in Princeton. The duration of the outbreak extended from late June through September and resulted in shortages of some insecticides across the state.

A picture containing grass, outdoor, nature, land

Description automatically generated**December 10, 2021 Tornado**

On the evening of December 10, 2021, a EF 4 tornado virtually destroyed the University of Kentucky Research and Education Center (UKREC) in Princeton, Kentucky. This facility justr completed a $17 million renovation that was finished just 2 years ago. Currently there are no offices, labs, or necessary field equipment for the extension and research personnel at the station. The UK Grain and Forage Center of Excellence located here received 78.5% of the resources in the EIP grant to implement IPM programs within the center. While the damage from the tornado does not reduce our capacity to get the work done, it does create extreme challenges to overcome for the next several years.

Our IPM program is divided in six somewhat antonymous working groups; coordination, KATS, grain crops, vegetable crops, fruit crops, nursery crops, and Plant Disease Diagnostic Lab in Princeton. Our progress reflects this structure.

***IPM Coordination:***

Our annual IPM Training School was held on Mar 9, participation was reduced as this was a new venue due to tornado damage. There were 63 in person and virtual attendees in the grain crops session, while in the horticulture session there were 41. The Insect field crop trapping network using pheromone trapping for field crop pests has begun in Lexington and at the UK REC in Princeton and is reported through Kentucky Pest News newsletter and IPM webpage.

***KATS (Kentucky Agricultural Training School):***

The EIP grant supports an extension associate to coordinate multiple in-depth hands-on, field trainings to educate agricultural practitioners on IPM approaches for best management options associated with the production of grain, oilseed crops, forages and other activities. We had scheduled seven training events for the current year. Due to tornado destruction of UKREC in Princeton, some trainings were cancelled. We were able increase trainings in other areas that we had not planned and plan to offer eight trainings for this year. The meetings cancelled were due to difficulties in establishing crops due to field equipment destruction. First drone training Conducted Dec 20-21, 10 days after the total loss of UKREC facilities at a different venue. There were a total of 75 program participants at field trainings. The tornado shifted our focus from in-field hands-on trainings to electronic versions of educational training. Recording, editing and posting both in-depth and brief videos for posting to the KATS website associated with the production of grain, oilseed crops, forages and other activities (4,100 indirect video views).

***Agronomic Crops IPM:***

1)This working group situated entirely in Princeton was severely impacted by the tornado. Our hope is that we can begin progress on the deliverables, as soon as temporary facilities are in place at the UKREC. The recovery effort and lack of infrastructure available to complete objectives have led to a delay in hiring this individual to initiate any of the objectives. However, temporary office structures are scheduled to arrive on site in June of 2022, and a position description for an individual to work toward the objectives outlined in the grant has been approved by UK, and will be advertised soon.

***Fruit Crops IPM:***

Expanded outreach to small and limited resource fruit growers through in person and virtual trainings, with recordings available online, digital resources through social media, county newsletters, commodity groups, and other special interests. We are partnering with the Kentucky Horticulture Council to help distribute materials and promote resources. Two orchard IPM field days addressed wildlife management, emerging and chronic insect pests, and brown rot fungus.

Annual Kentucky Fruit and Vegetable Conference presented 11 grower talks; these presentations were recorded and are available online. Grower survey was initiated to help determine priorities for apple and peach extension programming. Extended outreach information through county agents through newly revised publications “Fire Blight,” “Blueberry Canker Diseases,” and “Peach Cankers,” and six new video resources on YouTube and weekly email update so that agents are alerted to the most up-to-date resources and alerts; this help supplement the in-person trainings offered. Maintaining an alert system for chronic and emerging pest issues using a grower alert system for chronic and emerging pest issues in conjunction with our county agent network, extension specialist and associate cooperators, and university diagnostic labs to monitor grower problems and concerns.

***Vegetable Crops IPM:***

Expanded outreach to new and limited-experience growers and limited resource growers with high tunnels and low acreages through a high tunnel tomato webinar which had 158 attendees and YouTube views and the commercial vegetable webinar had 83 attendees and YouTube views. New damping off and new root-knot nematode extension publications have been created.

Provided trainings and outreach to county extension agents on soil health and fertility including IPM Specialists presentint at the Annual Fruit and Vegetable Conference and the IPM field school. A commercial vegetable grower listserv has been established to provide timely updates to growers. The first demonstration high-tunnel trial has been set up and is underway addressing on irrigation, nitrogen, and *Sclerotinia* management. We have begun planning the trainings and outreach for county agents as well as creating videos of our demonstration trial to use for later trainings. We plan to have a virtual field day this summer to showcase all of demonstration work.

***Nursery Crops IPM:***

Empowered county Extension professionals with up to date, environmentally and economically sustainable IPM practices that they will then pass on to homeowner clients. A 6-part Zoom series for Extension agents focused on ornamental plant pests and pathogens initiated. 80% of horticulture agents have attended at least one session and several Ag and Natural Resource agents have as well. anticipated date of completion of April 29, 2022. To increase the frequency of scouting for pests in Kentucky nurseries and reliance upon integrated pest management approaches to pest populations before they reach outbreak levels we are building the Kentucky Pest Alert System, a text message-based service to mass text message to registered growers that they need to go out and look for specific pests. We have identified 15 different nurseries and growers that are willing to volunteer as sites for a temperature data logger to track growing degree days in nurseries.

***Enhancing Princeton PDDL***:

While our objective was to expand staffing in Princeton PDDL to increase awareness of and surveillance for new and emerging threats to plant health, develop social media engagement programs, apply accreditation standards of the National Plant Diagnostic Network, and conduct conducting surveys and providing outreach on the importance of diagnostics in disease surveillance and monitoring. With the destruction of the lab, temporary facilities will hopefully become available soon. Plans were underway to hire this person, who would be located at the UKREC in Princeton, KY. The F4 tornado destroyed over 40 of the 48 buildings. The recovery effort and lack of infrastructure to complete objectives have led to a delay in hiring and completing these objectives. However, temporary office structures are scheduled to arrive on site in June, and a position description for an individual to work toward the objectives outlined in the grant has been approved by UK. Our hope is to begin on the deliverables as soon as temporary facilities are in place.

**LOUISIANA**

**Integrated Pest Management Extension Implementation for Louisiana**

In the Fall of 2021, infestations of MRB were detected in pheromone traps on the LSU AgCenter Dean Lee Research Station for the second consecutive year (Rapides parish) and for the first time in St. Mary Parish. This is the furthest north in Louisiana where this invasive pest has been detected in Louisiana (Rapides Parish). This pest has also been observed in neighboring Avoylelles Parish this year. This also is the 2nd year of MRB discovery in Bayou Tech Sugarcane since 2018. Continued range expansion into areas North and East, already established in Point Coupee parish is expected. Mitigation measures have already been published as MRB has been infesting Sugarcane in Western Louisiana since 2012, economically damaging infestations in Louisiana sugarcane and rice since 2019 (See Appendix 1).

Based on LSU Ag Center efforts, the old world corn ear worm *Heliothis (Heliocoverpa) armigeura* was found in three north Louisiana parishes.

Research with other universities indicates resistance on triazoles and MBC (benzimidiazoles) maybe occurring in *Cercospora sojina* and other *Corynespora* populations. Information on resistance management was disseminated at parish producer meetings, pesticide recertification meetings, and the Louisiana Agricultural Technology and Management Conference. Field trials (soybean, cotton, corn, grain sorghum, and small grains) were conducted to evaluate fungicide efficacy and genetic resistance on five experiment stations and several on-farm sites. This information is used to develop effective disease management programs for stakeholders. Information was disseminated to stakeholders at parish production meetings, Louisiana Agricultural Consultants Conference, field days, newsletters, Plant Disease Management Guide, Variety/Hybrid production guides, and pesticide trainings and workshops.

Studies on weed dynamics in Louisiana soybean were discussed at the national meeting of the Weed Science Society of America in 2021 and published particularly for narrow row burning in the refereed Journal Frontiers in Agronomy

Information was presented at the producer meeting and information on weed management recommendations for herbicides is published in the Weed Management Guide with efforts to monitor weeds resistant to pesticides.

The LSU AgCenter Pesticide Safety Education Program has updated three publications including a chapter in the general standards COREMANUEL that is utilized nationally as a preparation tool for prospective commercial and private pesticide applicators. The pesticide safety education program provides numerous commercial applicator recertification programs (Appendix 1). This program involves Private Applicator Certifications 758 still processing and 328 certified. Two Train the Trainer meetings were held, each precertification training involved Moodle online to develop a CORE MANUEL. The importance of proper conventional and organic pesticide use in integrated pest management programs (emphasis on safety procedures, reducing pesticide drift and correct application for resistance mitigation) is essential.

Activities at the LSU AgCenter Plant Diagnostic Center: 98 digital samples and 311 physical samples have been processed since 9/1/21.

Collectively 23 Bug Biz Pest Management and Insect Identification series 1-2 page publications and disease papers were published. This is in addition to 7 refereed papers, 37 non-refereed and presentation of 24 seminars with collective participation of 1832 attendees at our meetings.

Several plant pathologists are collaborating with Dr. Francis Reay-Jones on MyIPM app.

### Appendix 1 Presentations, Talks, and Publications

**Refereed Publications**

Patterson, K.M., L.M. Schwartz-Lazaro, G. LaBiche, and D.O. Stephenson, IV. 2021. Effects of narrow- windrow burning on weed dynamics in soybean in Louisiana. Frontiers in Agronomy 3:730280. DOI: 10.3389/fagro.2021.730280

Kaur, H., Singh, R., Doyle, V. P., 2021. A Diagnostic TaqMan Real-Time PCR Assay for Detection and Quantification of Colletotrichum theobromicola, Causal Agent of Boxwood Dieback. Plant Dis. https://doi.org/10.1094/PDIS-11-20-2439-RE

Mondal, S., Jenkins, L., Melanson, R., Singh, R., Sikora, E., and Wintermantel, W. 2022. First report of cucurbit yellow stunting disorder virus and cucurbit chlorotic yellows virus in cucurbit crops in Alabama. Plant Dis. https://doi.org/10.1094/PDIS-05-21-0922-PDN

Mulcahy, Megan M., Blake E. Wilson, and Thomas E. Reagan. "Spatial distribution of Lissorhoptrus oryzophilus (Coleoptera: Curculionidae) in rice." Environmental Entomology 51.1 (2022): 108-117.

Mulcahy, Megan M., Blake E. Wilson, and Thomas E. Reagan. "Spatial Distribution of Lepidopteran Stem Borers in Louisiana Rice Fields." Environmental Entomology (2022).

Mulcahy, Megan M., Blake E. Wilson, and Thomas E. Reagan. "Spatial distribution of Lissorhoptrus oryzophilus (Coleoptera: Curculionidae) in rice." Environmental Entomology 51.1 (2022): 108-117.

Yang, Yubin, et al. "Sugarcane Aphid (Hemiptera: Aphididae) on Sorghum. I. Population Characteristics and Dispersion Patterns in Relation to Different Sample Unit Sizes." *Environmental Entomology* 50.2 (2021): 489- 503.

### Non-refereed Publications

Fellows, C.J., Huval, Forest, Reagan, Thomas E., Carlton, Christopher E. "Bug Biz Pest Management and Identification Series: Bombus impatiens, Common Eastern Bumblebee (Hymenoptera: Apidae)". 2021, Publication No. 3780

Salgado, Leonardo, Carlton, Christopher E., Huval, Forest, Reagan, Thomas E. "Bug Biz Pest Management and Identification Series: Diaphania nitidalis and Diaphania hyalinata, Pickleworm and Melonworm Moths (Lepidoptera: Crambidae)". 2021, Publication No. 3781

Christopher Carlton, Huval, Forest, Reagan, Thomas E. Bug Biz Pest Management and Identification Series: Latrodectus mactans and L. various, Southern and Northern Black Widow Spiders (Araneae: Theridiidae) LSU Ag Center Pub 3796 (2021)

Christopher Carlton, Huval, Forest, Reagan, Thomas E. Bug Biz Pest Management and Identification Series: Latrodectus geometricus, Brown Widow Spider (Araneae: Theridiidae) LSU Ag Center Pub 3797 (2021)

Leonardo D. Salgado, Huval, Forest, Rodriguez, Kensy D, Carlton, Christopher E. Bug Biz Pest Management and Identification Series: Bemisia tabaci Middle East Asia Minor 1 (MEAM1) species Silverleaf whitefly (Hemiptera: Aleyrodidae) LSU Ag Center 2021 Pub 3806

Forest Huval, Reagan, Thomas E. Bug Biz Pest Management and Identification Series: Solenopsis invicta, Red Imported Fire Ant (Hymenoptera: Formicidae). 2021 LSU Ag Center Pub 3805

Leonardo D. Salgado, Galo, David, Huval, Forest, Reagan, Thomas E, Carlton, Christopher E. Bug Biz Pest Management and Identification Series: Frankliniella occidentalis, Western Flower Thrips (Thysanoptera: Thripidae). 2021 LSU Ag Center Pub 3814

Sam des Bordes, Kaylee Deynzer,Forest Huval, Reagan, Thomas E. Bug Biz Pest Management and Identification Series: Spodoptera ornithogalli, Yellow-striped Armyworm (Lepidoptera: Noctuidae). 2021 LSU Ag Center Pub 3815

Deynzer Kaylee, Richardson Steven Forest Huval, Reagan, Thomas E. Bug Biz Pest Management and Identification Series: Helicoverpa zea, Corn Earworm (Lepidoptera: Noctuidae). 2021, LSU Ag Center Pub 3809

Forest Huval, Carlton Christopher, Reagan, Thomas E. Bug Biz Pest Management and Identification Series: Steatoda triangulosa, Triangulate Cobweb Spider (Araneae: Theridiidae). 2021, LSU Ag Center Pub 3812

Brown, Sebe, Fitzpatrick, Bentley J., Huang, Fangneng, Stout, Michael J., Reagan, Thomas E., Smith, Tara, Wilson, Blake, Davis, Jeff A., Brown, Kimberly Pope, Healy, Kristen, Diaz, Rodrigo, Sun, Qian, Lord, Nathan, Towles, Tyler. "2022 Louisiana Insect Pest Management Guide (online store item)". 2021, Publication No.

1838

Huval, Forest, Reagan, Thomas E., Carlton, Christopher E. "Bug Biz Pest Management and Identification Series: Phorodon cannabis, the Cannabis (Bhang) Aphids: (Hemiptera: Aphididae)". 2021, Publication No. 3778

Huval, Forest, Reagan, Thomas E., Carlton, Christopher E. "Bug Biz Pest Management and Identification Series: Diabrotica undecimpunctata, Spotted Cucumber Beetle". 2021, Publication No. 3779

Huval, Forest, Reagan, Thomas E., Carlton, Christopher E. "Bug Biz Pest Management and Identification Series: Danaus plexippus, Monarch Butterfly (Lepidoptera: Nymphalidae)". 2021, Publication No. 3782

Fellows, C.J., Huval, Forest, Reagan, Thomas E., Carlton, Christopher E. "Bug Biz Pest Management and Identification Series: Xylocopa virginica, Eastern Carpenter Bee (Hymenoptera: Apidae)". 2021, Publication No. 3783

Salgado, Leonardo, Huval, Forest, Reagan, Thomas E., Carlton, Christopher E. "Bug Biz Pest Management and Identification Series: Citrus leafminer, Phyllocnistis citrella (Lepidoptera: Gracillariidae)". 2021, Publication No. 3784

Salgado, Leonardo, Huval, Forest, Reagan, Thomas E., Carlton, Christopher E. "Bug Biz Pest Management and Identification Series: Plutella xylostella, Diamondback moth (Lepidoptera: Plutellidae)". 2021, Publication No. 3785

Salgado, Leonardo, Huval, Forest, Reagan, Thomas E., Carlton, Christopher E. "Bug Biz Pest Management and Identification Series: Spodoptera frugiperda, Fall armyworm (Lepidoptera: Noctuidae)". 2021, Publication No. 3786A-1-2

### Appendix 1 Presentations, Talks, and Publications

Chow, Able, Huval, Forest, Reagan, Thomas E., Carlton, Christopher E. "Bug Biz Pest Management and Identification Series: Necrophila americana, American Carrion Beetle (Coleoptera: Silphidae)". 2021, Publication No. 3787

Richardson, Steven, Huval, Forest, Reagan, Thomas E. "Helicoverpa zea, Corn Earworm". 2021, Publication No. 3809

Huval, Forest, Reagan, Thomas E. "Piezodorus guildinii, Red Banded Stink Bug". 2021, Publication No. 3810

Carlton, Christopher E., Huval, Forest, Reagan, Thomas E. "Steatoda triangulosa, Triangulate Cobweb Spider". 2021, Publication No. 3812

Carlton, Christopher E., Huval, Forest, Reagan, Thomas E. "Tussock Moths, Orygia spp.". 2021, Publication No. 3813

Singh, R., De Souza, M., Burks, T., and Price, T. 2021. First report of southern blight of industrial hemp caused by Athelia rolfsii in Louisiana. Plant Health Prog. https://doi.org/10.1094/PHP-05-21-0084-BR

Kaur, H., De Souza, M., and Singh, R. 2021. Screening of existing and new boxwood cultivars for disease resistance and in vitro fungicide screening to manage boxwood dieback caused by Colletotrichum theobromicola. Plant Health Prog. https://doi.org/10.1094/PHP-03-21-0070-RS

De Souza, M., Singh, R., Harms, N. E., McPhedran, J., and Smart, A. N. 2021. First report of leaf spot caused by Septoria villarsiae on Nymphoides peltata in the United States. Plant Health Prog. 22 (2): 157-158. https://doi.org/10.1094/PHP-12-20-0104-BR

### Other Extension Publications Books/Manuals (Singh)

2021 Southeastern U.S. Vegetable Crop Handbook (contributing author) (https://content.ces.ncsu.edu/southeastern-us-vegetable-crop-handbook)

2021 Strawberry IPM Guide (contributing author) (https://smallfruits.org/files/2020/12/2021-Strawberry-IPM- Guide.pdf)

2021 Blueberry IPM Guide (contributing author) (https://smallfruits.org/files/2021/01/2021-Blueberry-Spray- Guide.pdf)

2021 LSU AgCenter Plant Disease Management Guide (revised 24 chapters) (https://[www.lsuagcenter.com/portals/communications/publications/management\_guides/plant\_disease\_guide)](http://www.lsuagcenter.com/portals/communications/publications/management_guides/plant_disease_guide))

Extension Factsheets Singh, R. 2022. Sooty Molds. LSU AgCenter Publication 3832 (Sooty Molds (lsuagcenter.com).

Singh, R. 2021. Boxwood dieback ID Factsheet. LSU AgCenter Publication 3824A (Boxwood Dieback: Colletotrichum theobromicola (lsuagcenter.com).

Singh, R. 2021. Boxwood dieback ID Poster. LSU AgCenter Publication 3824B.1-3

### Appendix 1 Presentations, Talks, and Publications

Singh, R. 2021. Laurel Wilt. LSU AgCenter Publication 3819 (https://[www.lsuagcenter.com/articles/page1631653783966).](http://www.lsuagcenter.com/articles/page1631653783966))

Singh, R. 2021. Slime Molds. LSU AgCenter Publication 3817 (https://[www.lsuagcenter.com/articles/page1631134066221).](http://www.lsuagcenter.com/articles/page1631134066221))

Singh, R. 2021. Care For Freeze Damaged Palms. LSU AgCenter Publication 3748 (https://[www.lsuagcenter.com/articles/page1623341999992).](http://www.lsuagcenter.com/articles/page1623341999992))

Singh, R., and De Souza, M. 2021. Satsuma Susceptibility to Citrus Canker caused by Xanthomonas axonopodis pv. citri. LSU AgCenter Publication 3789 (https://[www.lsuagcenter.com/profiles/aiverson/articles/page1615492697112).](http://www.lsuagcenter.com/profiles/aiverson/articles/page1615492697112))

### Extension Seminars (Numbers of participants)

1. “Are you Applying Right Chemical for the Right Disease”, Landscape Pest Management Workshop, Hammond, Louisiana. 02/17/2022. (57 participants).
2. “Basics of Plant Pathology and Plant Diagnostics”, Louisiana Master Gardener Training, Bossier City, Louisiana. 02/10/2022. (22 Participants).
3. “Disease Identification and Management in Louisiana Landscape”, Southwest Louisiana Landscape Management Workshop, Lafayette, Louisiana. 01/11/2022. (54 participants).
4. “Basics of Plant Pathology and Plant Diagnostics”, Louisiana Master Gardener Training, Raceland, Louisiana. 01/20/2022. (14 Participants).
5. “Managing Diseases of Golf Greens and Other Turfgrass Areas”, Louisiana Turfgrass Association Annual Conference, Baton Rouge, Louisiana. 01/13/2022. (114 participants)
6. “Ornamental and Turfgrass Disease Identification and Management”, Ornamental and Turfgrass Recertification Program, Lafayette, Louisiana. December 9, 2021. (85 participants).
7. “Louisiana Citrus Clean Plant Network Overview” CCPN Tier II Governing Body Annual Meeting, Virtual, December 6, 2021. (24 participants).
8. “New Industrial Hemp Disease Confirmed in Louisiana” Science of Hemp II Annual Meeting, Virtual. November 19, 2021. (26 participants).
9. “Louisiana State Diagnostics Highlights”, SPDN Annual Virtual Meeting. November 3, 2021. (28 participants).
10. “Boxwood Dieback Identification” Boxwood Dieback Training, Forest Hill, Louisiana. October 19, 2021 (33 participants).
11. “Boxwood Dieback Management in Nursery and Landscapes” Boxwood Dieback Training, Forest Hill, Louisiana. October 19, 2021 (33 participants).

### Appendix 1 Presentations, Talks, and Publications

1. “Disease Identification and Management in Ornamental and Turfgrass”, Ornamental and Turfgrass Recertification Program, Lafayette, Louisiana. October 6, 2021. (59 participants).
2. “New Diseases of Industrial Hemp in Louisiana”, LSU AgCenter Virtual Industrial Hemp Day, Baton Rouge, Louisiana. September 23, 2021 (94 views).
3. “Importance of Beneficial Insects in Maintaining Healthy Gardens”, Vermilion Parish Gardening School, National Garden Clubs, Abbeville, Louisiana. September 2, 2021 (65 participants).
4. “Common Insect Pests in Garden” Vermilion Parish Gardening School, National Garden Clubs, Abbeville, Louisiana. September 2, 2021 (65 participants).
5. “Common Plant Disorders in Garden” Vermilion Parish Gardening School, National Garden Clubs, Abbeville, Louisiana. September 2, 2021 (65 participants).
6. “Common Plant Diseases in Garden” Vermilion Parish Gardening School, National Garden Clubs, Abbeville, Louisiana. September 2, 2021 (65 participants).
7. “Southern Bacterial Wilt of Solanaceous Crops in Louisiana”, LSU AgCenter Virtual Vegetable Field Day, 2021 (139 views).
8. “Diseases of Boxwood and their Management in Landscape”, LSU AgCenter Horticulture Field Day, Hammond, Louisiana., 2021. (57 participants).
9. “Industrial Hemp New Diseases in Louisiana”, LSU AgCenter Hemp working Group Meeting, Baton Rouge, Louisiana., 2021. (14 participants).
10. “Developing Effective Management Strategies for Fire blight and Rust Diseases in Mayhaw Production” US Mayhaw Growers Association Annual Meeting, Alexandria, Louisiana., 2021. (57 participants)
11. “Integrated Disease and Pest Management in Home Gardens” LSU AgCenter Fall Gardening Program, Ferriday, Louisiana., 2021. (9 participants).
12. “Palm Phytoplasma and Boxwood Dieback Update”, LDAF CAPS Annual Meeting, Online, Baton Rouge, Louisiana., 2021. (27 participants).
13. “Boxwood Dieback- Current Status and Future Research” LCAAA Annual Meeting, Natchitoches, Louisiana, 2021. (44 participants)
14. “Ornamental and Turfgrass Integrated Disease Management,” LSU AgCenter Ornamental and Turfgrass Recertification Program. Alexandria, Louisiana. Virtual. March 30, 2021. (78 participants).
15. “Boxwood dieback – Disease Identification and Management in Nurseries and Landscapes”. Landscape Pest Management Training, Hammond Research Station, Hammond, Louisiana., 2021. (29 participants).

### Appendix 1 Presentations, Talks, and Publications

1. “Extension Programming in Plant Pathology”, LSU-Zamorano Online Extension Certification Program, International Programs, LSU AgCenter. February 23, 2021. (15 participants).
2. “Boxwood Dieback Identification and Management in Landscapes”, Beauregard MG Virtual Spring Garden Forum, 2021. (22 participants).
3. “Medicinal Miracle Plant with Many Plant Health Problems”, Southern Division APS Virtual Annual Meeting Extension Symposium Virtual Talk., 2021. (40 participants).
4. “Boxwood Dieback: A New Emerging Disease of Boxwoods in the United States”, NC State Virtual Nursery Conference Webinar., 2021. (122 Participants)
5. “Turfgrass Diseases”, Louisiana Turfgrass Association Annual Conference, MS Teams PPT. (72 participants).

### Industry Newsletters:

Singh, R. 2021. Sooty Molds. Louisiana Nursery and Landscape Association Quarterly Newsletter. Volume 76: 29-30.

Singh, R. 2021. Sooty Molds. LSU AgCenter Hort. Hints. 12/23/21.

Singh, R. 2021. Laurel Wilt in Louisiana. LSU AgCenter Hort. Fall Hints. 10/29/21

Singh, R. 2021. Laurel Wilt. Louisiana Nursery and Landscape Association Quarterly Newsletter, Volume 75: 26-27.

Singh, R. 2021. Southern Blight of Industrial Hemp. Louisiana Nursery and Landscape Association Quarterly Newsletter, Volume 74: 27.

Singh, R. 2021. Care for Freeze Damaged Palms. Louisiana Nursery and Landscape Association Quarterly Newsletter, Volume 73: 31-32.

Singh, R. 2021. Satsuma Cultivar Susceptibility to Citrus Canker caused by Xanthomonas axonopodis pv. citri. LSU AgCenter Hort. Hints

Singh, R. 2021. Satsuma Cultivar Susceptibility to Citrus Canker caused by Xanthomonas axonopodis pv. citri. Louisiana Nursery and Landscape Association Quarterly Newsletter, Volume 73: 20-22.

Mass Media:

Singh, R. 2021. AgCenter Plant Diagnostic Center marks 10 years of solving plant health problems. LSU AgCenter Media News Release. November 24, 2021.

Singh, R. 2021. Crown rot detected in Louisiana strawberries. LSU AgCenter Media News Release. November 11, 2021.

### Appendix 1 Presentations, Talks, and Publications

Singh, R. 2021. Trees at LSU Lakes Turning White and Its not caused by a Plant Disease. LSU AgCenter Facebook Page. October 29, 2021.

Singh, R. 2021. ‘The Burdens of Southern Blight’, in The Perils and Pressures of Growing Outdoor Feature Article, HempGrower, September 2021 Issue. Jolene Hansen, Freelancer Writer, Hort. Industry. August 9, 2021. (Hemp Grower - September 2021).

Singh, R. 2021. Southern University Fungus Script. Dorothy Kendrick, Senior Producer, Louisiana Public Broadcasting. July 21, 2021.

Singh, R. 2021. Continuous wet weather leads to slime molds in lawns and gardens. LSU AgCenter News Release, May 6, 2021.

Singh, R. 2021. Warm, rainy weather brings vegetables plant diseases. LSU AgCenter News Release, 04/19/21.

Singh, R. 2021. Caring for Freeze-Damaged Palms. Get it Growing Media Release, LSU AgCenter, 3/4/21.

## Conferences:

Lazaro, L.M., G. LaBiche, D.O. Stephenson, J.T. Copes, D. Miller.Phenological Shifts in Flowering Due to Selection Pressures of Harvest Weed Seed Control. Annual Meeting of the Weed Science Society of America., 2021, Virtual.

Mestayer, K.M., G. LaBiche, K.L. Gage, S. Mirsky, C.G. Rubione, L.S. Shergill, M. VanGessel, L.M. Lazaro. Integration of Chaff Lining into Weed Management Programs in Soybean. Annual Meeting of the Weed Science Society of America., 2021, Virtual.

Shergill, L.S., A.D. Davis, J.A. Bond, J.K. Norsworthy, J. Lindquist, K.W. Bradley, L.M. Lazaro, M. Bish, M. VanGessel, M.L. Flessner, M.V. Bagavathiannan, N. Jordan, S. Mirky. Emergence Pattern of Economically Important Weeds in the North-Central, Mid-Atlantic, and South-Central Regions of the United States. Annual Meeting of the Weed Science Society of America., 2021, Virtual.

Hiatt, B.N., L.M. Lazaro, D.O. Stephenson, J.T. Copes. Louisiana Soybean Response to Multiple Dicamba Drift Events at Various Time Intervals. Annual Meeting of the Southern Weed Science Society, 2021, Virtual. Mestayer, K.M., L.M. Lazaro, G. LaBiche. Benefits of Chaff Lining in Soybean to Minimize Weed Populations in Louisiana. Annual Meeting of the Southern Weed Science Society, 2021, Virtual.

## Summary of 2021 and 2022. (Pesticide Education Activities)

**Commercial Pesticide Applicator Recertification 2021**

Meetings Held: 10

Commercial Applicators Recertified: 463

**Private Pesticide Applicator Recertification 2021**

Meetings Held: 107

Private Applicators Recertified: 2221 A-1-7

**Appendix 1 Presentations, Talks, and Publications**

**WPS Train the Trainer 2021**

Trainings held: 6

Individuals Certified as WPS Trainers: 19

**Drift Mitigation Trainings 2021**

Individuals trained: 39

**LSU AgCenter Agent Training 2021**

Agents Recertified: 42

**Precertification Training 2021 – overview of core manual**

Individuals: 12

Moodle ONLINE Course: 54 individuals (online – Moodle)

### Commercial Pesticide Applicator Recertification 2022

Meetings Held: 2 (assisted with 3 others)

Commercial Applicators Recertified:115

(assisted with several other events including the Louisiana Turfgrass Association recertification; 155 recertified)

### Private Pesticide Applicator Recertification 2022

Meetings Held: 86 total will be held this year (end of March) Private Applicators Recertified: 758 + (Still processing)

**Private Pesticide Applicator CERTIFICATION 2022** Meetings Held: 5 (at least 4 more planned)

Private Applicators CERTIFIED: 328

### WPS Train the Trainer 2022

Trainings held: 2

Individuals Certified as WPS Trainers: 5

### Drift Mitigation Trainings 2022

Individuals trained: 50+

### Precertification Training – Moodle – online training covering the CORE Manual

Individuals: 15

**MISSISSIPPI**

Submitted by Rebecca A. Melanson, IPM Coordinator for Mississippi

This report describes outreach and related activities occurring from September 1, 2021, through March 31, 2022, as part of the USDA CPPM EIP funded project “Mississippi State University Extension IPM implementation Program, 2021-2024” awarded to Mississippi State University and conducted by project collaborators Rebecca Melanson (PD), Blake Layton, Tom Allen, Clarissa Balbalian, Angus Catchot, Whitney Crow, Jerome Goddard, Jeffrey Gore, Alan Henn, and Brian Pieralisi. The EIP project focused on five priority areas (IPM Implementation in Agronomic Crops, IPM Implementation in Communities, IPM Implementation in Specialty Crops, IPM Implementation in Public Health, and IPM Support for Pest Diagnostic Facilities). *Note*: The reporting period reflected by this report covers only a portion of the yearly reporting period for the EIP grant (September 1, 2022 – August 31, 2023) and does not include activities to be conducted during the remainder of the project reporting year, which is the busier part of the year for many priority areas.

IPM Coordinator Activities

The IPM Coordinator attended the 10th International IPM Symposium from in Denver, CO, from February 28, 2022 – March 3, 2022, to participate in the annual National and Regional (SERA3) State IPM Coordinators Meetings and in the panel discussion “Bridging the divide: pathways to partnership for pesticide safety education and IPM.” She also led efforts within the state to distribute relevant information to specialists of various IPM programs and to obtain feedback from specialists for the 2022 Southern Region Information Exchange Group for IPM (SERA3) Priorities list.

IPM Implementation in Agronomic Crops

*Major accomplishments*:

* Specialists provided technical assistance and troubleshooting to over 3,000 stakeholders.
* Specialists conducted over 150 demonstration, product efficacy, and variety trials. Results from these trials were published in various refereed, Extension, or Mississippi Agricultural and Forestry Experiment Station (MAFES) publications and shared with stakeholders through publication distribution and presentation delivery.
* Thirty-seven episodes of the [Mississippi Crop Situation “Crop Doctors” Podcast](https://podcasts.apple.com/us/podcast/mississippi-crop-situation-podcast/id1381503383) were delivered.
* Eleven articles were posted to the [Mississippi Crop Situation Blog](https://www.mississippi-crops.com/).
* At least two MSU Extension publications, including the [2022 Insect Control Guide for Agronomic Crops](http://extension.msstate.edu/sites/default/files/publications/publications/P2471_2022_web_reduced.pdf), were published and distributed to stakeholders.
* Numerous *Arthropod Management Tests* reports, *Plant Disease Management Reports*, and MAFES variety trial reports on insect and fungicide efficacy trials and variety trials were published.
* Eighteen educational programs were delivered in various counties in Mississippi.
* Over 600 people from 16 states attended the Mississippi Row Crop Short Course.
* Specialists reached approximately 76,000 stakeholders through project activities.

IPM Implementation in Communities

*Major accomplishments*:

* Specialists provided technical assistance and troubleshooting to over 1,200 stakeholders.
* At least six MSU Extension publications on topics including, [vegetable gardening](http://extension.msstate.edu/publications/mississippi-vegetable-gardeners-guide), [damping-off in vegetables](http://extension.msstate.edu/publications/damping-vegetables), [nuisance honeybees](https://extension.msstate.edu/publications/prevention-and-treatment-nuisance-honey-bees-around-your-home), and [turfgrass diseases](http://extension.msstate.edu/publications/the-plant-doctor-take-all-disease-turfgrasses), were published and distributed to stakeholders through various methods, including posts on the [MSU Extension Diseases of Vegetables, Fruits, and Pecans Facebook](https://www.facebook.com/MSUextDiseasesVFP) (@MSUextDiseasesVFP) account.
* Two issues of the [Bug’s Eye View e-newsletter](https://extension.msstate.edu/newsletters/bugs-eye-view) were distributed to newsletter subscribers and [MSU Extension Bug’s Eye View Facebook group](https://www.facebook.com/groups/msuextbev) members.
* Three County Agent Pest Alerts were sent to Mississippi county agricultural agents.
* Over 25 presentations were delivered to various stakeholder groups, including pest control professionals, county garden clubs, Master Gardeners, and regional rose societies.
* Two sessions of the [MSU Termite University](http://extension.msstate.edu/content/termite-university) were conducted.
* Specialists reached over 30,000 stakeholders through project activities.

IPM Implementation in Specialty Crops

*Major accomplishments*:

* Specialists provided technical assistance and troubleshooting to over 250 stakeholders and conducted over 40 site visits.
* At least four MSU Extension publications on topics including, [fire ants](http://extension.msstate.edu/publications/control-fire-ants-commercial-fruits-nuts-and-vegetables), [fall armyworm](http://extension.msstate.edu/publications/fall-armyworms-hayfields-and-pastures), [greenhouse basil downy mildew](http://extension.msstate.edu/publications/plant-doctor-greenhouse-basil-downy-mildew), and [damping-off in vegetables](http://extension.msstate.edu/publications/damping-vegetables), were published (new or revisions to existing publications) and distributed to stakeholders through various methods, including posts on the [MSU Extension Diseases of Vegetables, Fruits, and Pecans Facebook](https://www.facebook.com/MSUextDiseasesVFP) (@MSUextDiseasesVFP) account.
* Regional IPM Guides with recommendations for disease, insect, and weed management in [vegetables](http://www.vegcrophandbook.com/) and fruit crops ([blueberry](https://smallfruits.org/files/2022/02/2022-Blueberry-Spray-Guide.pdf), [caneberry](https://smallfruits.org/files/2022/01/2022-Caneberry-Spray-Guide.pdf), [muscadine](https://smallfruits.org/files/2022/03/2022-Muscadine-Guide.pdf), [peach](https://secure.caes.uga.edu/extension/publications/files/pdf/B%201171_16.PDF), and [strawberry](https://smallfruits.org/files/2022/01/2022-Strawberry-IPM-Guide.pdf)) were distributed to stakeholders online, via email or social media, or in-print.
* Three training presentations on insect pests of commercial turfgrass were delivered.
* Specialists reached over 30,000 stakeholders through project activities.

IPM Implementation in Public Health

*Major accomplishments*:

* Stakeholders learned how to obtain useful technical help from an Extension “subject matter expert.”
* A system to establish vector and pest baseline data was implemented.
* Systemic statewide surveillance for mosquitoes and ticks was instituted.
* Seven presentations concerning arthropods of medical importance and various IPM methods for their management/control were delivered in Mississippi and around the country.

IPM Support for Pest Diagnostic Facilities

*Major accomplishments*:

* Diagnoses and management recommendations were provided for approximately 800 nematode, 300 plant disease, and 200 insect samples for clients in Mississippi and 12 other states.
* Information on pest identification and management was distributed to stakeholders through various social media platforms, including twitter ([MSU Extension Plant Diagnostic Lab](https://mobile.twitter.com/msuextplantlab) (@MSUextPlantLab)), Instagram ([MSU Extension Plant Diagnostic Lab Instagram](https://www.instagram.com/msuextplantlab/) (@msuextplantlab)), and Facebook ([MSU Extension](https://www.facebook.com/MSUExtService) (@MSUExtService)).
* Specialists reached approximately 3,500 stakeholders through project activities.

**NORTH CAROLINA**

**2022 SERA3 Annual Activity Report for North Carolina**

Factsheets and Extension Publications and Social Media

* Three new NCSU Disease Factsheets and two additional Extension publications focused on IPM and disease management in the landscape. These publications have had a total of over 21,200 page views according to Google Analytics.
  + Factsheets created: “Anthracnose of Pepper”, “Bacterial Spot of Pepper and Tomato”, and “Black Root Rot on Ornamental Plants”
  + Publications: Homeowner’s Guide to Managing Diseases using Fungicides, Bactericides, and Alternative Products” and “Phytophthora Rot and Crown Rot in the Landscape”.
* The N.C. State Extension Gardener Handbook was created, an exhaustive guide to environmentally responsible gardening and landscaping in the southeast. The 21-chapter handbook has at least 5 interactive elements including quiz and final exam questions, 60-min slide presentation with facilitator notes, and hands on /group activity options.
* The plant tool box has 5,490,503 unique page views since 8/1/2020 and work has been completed by 104 volunteers representing 41 N.C. counties.
  + 1,432 new plant profiles added to bring the total number to 4,494 profiles.
  + 1,881 audio files uploaded and Latin name pronunciations
  + 744 videos were uploaded to plant profiles.
* Aquatic Weeds: A Pocket Guide to the Carolinas’ has been completed and hundreds of copies have already been dissemination throughout the region.
* Creation of the soybean diagnostic tool, including a linked published fact sheet for each malady (abiotic, disease, insect, nematode, weed).
* Creation of “The Roadmap to the Worker Protection Standard”. The roadmap provides specific responsibilities that the grower must provide his or her workers and/or handlers.
  + Several thousand copies of the roadmap are being designed and printed and will be distributed by County Extension Agents and NCDA&CS staff. The content and design will be replicated on the reverse side in Spanish.
* Five video-shorts were created for the aquatic plant management workshop. All of these were posted to the NCSU Aquatic Plant Management YouTube channel.
* Published Pollinator Gardening for the South: Creating Sustainable Habitats by Danesha Seth Carley and Anne Spafford. UNC Press, Chapel Hill, NC. 152pp. March 2021.
* Billeisen, T.L., L.D. Kilpatrick, D. Seth Carley, R. L. Brandenburg. 2021. Presence of Pollinator-Friendly Habitat  on Pollinator Communities in Managed Turfgrass Systems. International Turfgrass Society Research Journal. doi: <https://doi.org/10.1002/its2.56>.
* Seth Carley, D. and Billeisen, T. 2020. Creating a pollinator-friendly habitat in your home landscape. March/April Tennessee Nursery and Landscape Association Magazine.

Presentations/Training and Outreach

* Creation of a EMGV (Extension Master Gardener Volunteer) Teacher’s Training Guide which was presented at state, regional and national conferences:
  + 6 presentations reaching over 430 attendees
* Three landscape and ornamental IPM trainings have been held virtually reaching 215 extension agents and green industry professionals.
* Six agent training (42 participants) were held focusing on soybean, grain, and cotton insect pests.
* In Spring of 2022, 65 Extension Agents participated in-person pollinator education workshop. Workshop activities were filmed to be used in one of the future online courses.
* Currently, we have developed four disease videos on late blight, gray leaf spot, bacterial spot, and Septoria leaf spot of tomato. Videos include symptoms typically observed in the field, how to differentiate each disease using basic tools, additional tools to use to help with diagnoses (e.g., stereoscopes that are accessible to county agents), and resources on how to manage the disease.
* The third iteration of Aquatic Plant Management (APM) workshop occurred on March 9-11th 2021. Due to concerns over Covid-19, this event was held virtually with three half-day sessions made up of pre-recorded and live stream sessions. This year program had 88 total attendees: Government and Non-profit: 65 attendees (20 extension agents), Private Industry (23).
* 14 Soybean trainings were held, averaging over 35 participants (mainly county agents). In additional, 16 county meetings reached another 756 participants. These events were placed across the state and participants ranged from soybean specialists, county agricultural agents, to growers.
* Teen Pollinator Ambassador Training: Trained teenagers (12) to deliver pollinator education to young adolescents in 2021.
* 85 NC Cooperative Extension Agents and 4-H Volunteer leaders participated in virtual pollinator education workshops.
* Youth Virtual Pollinator Program: 21 Extension Agents and with 248 participants ranging in age from 4 to 17. Asynchronous virtual materials were crafted to engage youth in pollinator stewardship.
* A Pollinator Grow Box program was delivered to 150 families serving 180 youth. This subscription-type box was created to deliver materials and hands-on activities to families for them to explore pollinators.
* Held an IPM Q/A for NC State University Extension. 25 participants attended.
* Presented during the IPM Hour for the Western IPM Center to 27 participants. “Let's Talk Pollinator Gardening: Plan, plant, and IPM your way to successful and beautiful pollinator gardens”.

# PUERTO RICO & US VIRGIN ISLANDS

***Wanda Almodóvar – PR Extension Plant Pathologist and IPM Coordinator Amy Dreves – US Virgin Islands IPM & PSEP Coordinator***

***Ada Alvarado – PR Extension IPM Specialist***

***Edda Martínez – PR Extension Entomology Specialist Dania Rivera – PR Extension Ornamental Specialist Jaime Curbelo – PR Extension Dairyman***

***Martha Giraldo – PR Plant Pathologist & Root Crops/Plantain and Banana Scientist Wilfredo Robles – PR Weed Scientist & IR4 Coordinator***

We are working in collaboration to address four primary priorities: IPM Implementation in Specialty Crops emphasizing root crops, ornamentals, and vegetables; IPM in Communities emphasizing public gardens and landscape; IPM for Pollinator Health emphasizing seasonal flowering plants and resources that support cropping systems and the wildland, and IPM implementation in Animal Agriculture emphasizing forages destined to sustainable livestock production. Our secondary priority is IPM Support for Pest Diagnostic Facilities, emphasizing early pest and disease detection. Dr. Jaime Curbelo, Assistant Director of the UPRM Extension Planification and Evaluation Office and Extension Dairyman, CoPD of the project will provide a workshop to project’s personnel about interactive educational tools to encourage trainer-trainee interactions and enhance the education and learning experience. These workshops will include online and real-time evaluation tools.

# Specialty Crops: Root Crops, Ornamentals and Vegetables

We are targeting growers of 2 vegetable families (Cucurbitaceae-cucumber, squash, watermelon, and Solanaceae-tomato, pepper, and eggplant); and root crops primarily in PR. Key pests have included the whitefly, aphids, thrips, armyworms, leaf miners, fungal and bacterial diseases. We are photographing pests and beneficials, and have begun a soft-bodied pest and other pest bulletin and 4x5” pocket guides for each of the 2 vegetable families that include identification, life cycle, monitoring and management of each pest. In root crops we aim to promote the application of IPM practices to improve the yield and marketable quality of sweet potato produced on the Island and increase youth and adults’ consumption. The compilation of the sweet potato cultivation and IPM practices in Puerto Rico is in process. A cartoon booklet with a superhero will be prepared in collaboration with Extension Family and Consumer professionals to portrait sweet potato as the Caribbean Super Food. The booklet will include all the main facts and IPM practices.

# IPM for Pollinators

A Curricular Guide on Pollinators was finished and Extension educators will be trained on March 18, 2022. Fact sheets, digital presentations and posters were prepared as resources for the guide. Personnel from PR and VI are collecting information about pollinators, factors that affect them, and practices that must be carried out on farms to mitigate risk from pesticides. Ten agricultural agents will train farmers in benefits of having areas for pollinators in their farms, recommended plants and trees, and proper use of pesticides and IPM. The farmers will receive at the end of the first year a "Pollinator Friendly Farm" certification and a sign that identifies the participating farm as a pollinator preservation area. We are identifying and photographing local, environment- adapted seasonal native and non-native flowering plants such as non-competitive weeds, ornamentals, and annual/biennial/perennial flowering plants for cropping systems, community gardens, and their adjacent boundaries and the wildland; other resources that support pollinators throughout the year; and garden design ideas to assist users of plants. Two pollinator posters are underway in the first year. An Extension Bulletin will be produced as well.

# Whitefly IPM in Poinsettias and Vegetables

During January and February 2022, nine poinsettia and vegetable producers were visited to take whitefly samples for identification of species and biotypes. A pesticide rotation plan was developed to control whiteflies in poinsettias and vegetables to be used by producers in their Integrated Whitefly Management plan. The importance of early detection, correct identification of the pest, and pesticide rotation was emphasized. Two workshops were coordinated for producers and agricultural workers of two nurseries that will be established as model nurseries.

# IPM for Communities

The list of ornamental growers in the island was updated as well as a list of ornamental plants that are grown in Puerto Rico. A database of the ornamental plants available in Puerto Rico and the US Virgin Islands is in progress with their common and scientific names, flowering period and pollinators that attract. This work is being developed by the PR Extension Ornamental Specialist, and the USVI IPM Specialist. We are selecting common and important potted and field flowering landscape plants found at local community gardens, small nurseries, and backyard gardens. A template is being developed to collect information on best production practices and plant health (soil, fertilizer, water, space and light needs, factors that affect them), pest prevention measures, BMP’s; and significance to pollinators, natural enemies, other beneficial organisms, and a plant’s ability to resist pests. Field Guides will be prepared in spanish and english. Best Management Practices information for ornamental plants is going to be part of publications, field guides and presentations.

# IPM for Forage Crops destined to Feed Livestock

During the first 6 months of the project, we have hired a graduate student that will be in charge of data collection and publication of results. We will work on the assessment of common weeds, their pesticide resistance status, and dispersion, and invasive insects and their pesticide resistance status. A digital survey will be developed and distributed. Data related to management practices to control pest that affect forages (weeds and insects), botanical composition of pastures, forage availability and weed abundance will be evaluated. Collaboration with Researchers and Stake holders from UVI and St. Croix to identify relevant related issues in participant farms.

# Evaluation of the EIP Project Areas

To measure program impact and adoption of the IPM approach-prevention measures, conserve the land and resources, and adopt BMP’s for the priorities IPM in Pollinator Health, in the Community, for Specialty Crops, and Animal Production, a unique evaluation plan is being designed (See poster). The iPM Score Card (an acronym standing for innovative Pest Management) for the the Stairway to Sustainability and Land Stewardship is being fine-tuned and will be implemented in spring for program participants including farmers, gardeners, landscape flowering plant nurseries and animal producers.

The iPM score card will help measure a user’s baseline level of current IPM practices used, introduce them to other practices, and will ultimately rate adopted practices and tools to increase production, minimize pests, reduce pesticides, honor the environment and protect resources. The following are PR-USVI program evaluation objectives: Educate IPM users about practical, available, economical and innovative management practices for the region to help fight pests, withstand adverse environmental conditions, and strengthen plant health. Introduce support references for each IPM tactic to build user confidence. Familiarize users about the significance of seasonal IPM elements in advancing a user forward with IPM thinking. Identify research, extension and other needs and priorities by comprehensively assessing IPM practices. Provide an assessment tool (iPM Score Card) to help determine a user’s level of IPM along a continuum of practices through time. Measure IPM adoption and reduction in pesticide use. Gain a means to quantify program impacts.

# Priorities not in the EIP Project in Puerto Rico

# Sweet potato IPM

As part of a subaward with North Carolina IPM Center we are developing an IPM plan for the sweet potato weevil in PR. Three producers are collaborating in implementing the IPM practices for the prevention of this pest in their farms. Agricultural Extension Agents and undergraduate students with assistantship in the project were trained in the use of pheromone traps and application of biological and botanical insecticides to manage the sweet potato weevil. Extension Agents trained farmers in the use of traps to monitor the weevil, in order to make decisions on the number of traps or applications needed. A workshop about IPM practices for the control and management of diseases and pests on sweet potato, with emphasis on Sweet Potato Weevil highlighted the identification of common sweet potato cultivars in the Island and IPM practices. The farmers, students and Agricultural Extension Agents are capable of monitoring the weevil, in order to make decisions on the number of traps or applications needed. Part of these work was presented at the Annual National Sweet Potato Collaborative Group (NSCG) in New Orleans during February 11- 12, 2022. A questionnaire was developed to see knowledge of farmers about IPM and practices used in their farms for sweet potato weevil management. Extension Agents are in the process of administering the questionnaire. It will be completed and data analyzed on May 2022.

# IPM in Schools

A Project was funded by the Extension Foundation in coordination with the Department of Agriculture of Puerto Rico. A School IPM manual and a course for pesticide applicators was developed by the PR IPM Specialist to be offered as a continuing education course (3 hours). This course is required for commercial license renewal.

# Forest IPM

A project funded by Forest Service is in progress to evaluate phytosanitary conditions of tree nurseries, detection of bark beetles and woodborers in state forests and education of the general public, 4hYouth, Extension faculty and forest personnel in the protection of pollinators in forests and in the urban landscape. Two pollinator gardens were established in the Alzamora Farm, located at the UPR Mayaguez Campus and in the Agricultural Experimental Station at Corozal, to educate the public. A subpage was developed inside the Official Extension webpage that includes all existent and future information of forest health including IPM and pollinator protection.

# Coffee IPM

An educational campaign was initiated on October 2021 to address anthracnose disease in coffee that is affecting this crop severely due to recent weather conditions of high humidity and the effect of hurricanes in the coffee producing region. Also, the effect of the Coffee Berry Borer and lack of control by farmers worsen the disease in coffee farms. A multidisciplinary group was created and field days celebrated in the coffee producing region to train farmers in the disease and its management, Coffee Berry borer management and give results of ongoing research.

**SOUTH CAROLINA**

The goal of the Clemson University IPM Program (<https://www.clemson.edu/extension/ipm/>) is to empower South Carolina producers and pest managers with appropriate knowledge and competencies enabling them to implement cost-effective and environmentally sound integrated pest management practices that will provide long-term solutions to critical pest management challenges. The program addresses economically important IPM priority areas for South Carolina in Specialty Crops, Agronomic Crops, and Pollinator Health.

From April 2021-2022, examples of accomplishments for specialty crops include: (1) the MyIPM working group met in October 2021 to update the smartphone app, including for labeled chemistries, rates, and recommendations; (2) fungicide sensitivity bioassays continued with *Pseudoperonospora cubensis* with a goal of developing effective resistance management strategies; (3) training programs were conducted for growers and agents with travelling weed garden on weed identification, herbicide injury identification, and adjuvant demonstrations; (4) development continued of website and smartphone applications with information and training on turf and ornamental crop pest management (writing of factsheets on key insects/diseases is on-going; process to develop the website has been initiated with Clemson Computing and Information Technology).

For agronomic crops, accomplishments included: 1) updated pest management recommendations for row crops and developed articles for Land-Grant Press (peer-reviewed Extension publication; <https://lgpress.clemson.edu/>); (2) launched the MyIPM for Row Crops smartphone app, with collaborators from 8 land-grant universities in the eastern/southern U.S.; (3) peanut leaf samples were collected from 6 counties in 2021 to determine fungicide phenotypic resistance levels from a variety of fungicide programs and production environments; (4) photographs were taken from plots with peanut cultivars with varying amounts of defoliation caused by late leaf spot, and then organized in a visual aid diagram and incorporated into the Peanut Production Guide; (5) conducted numerous training programs with growers, extension agents, and CCAs on insect, disease, and weed pests of row crops.

Accomplishments for pollinator health included: 1) in addition to numerous presentations to local beekeeper associations, the Master Beekeeper Program certified (beginner) level training was overhauled, with new training having a greater focus on safe use of pesticides in and around honey bee operations; (2) as well as presentations on pollinator conservation at conferences and meetings, pollinator plots were planted at Pee Dee REC as a training tool.

**VIRGINIA**

Virginia’s interdisciplinary IPM team provides statewide education and information to a diversity of clientele in four priority areas: 1) IPM Implementation in Agronomic Crops, 2) IPM Implementation in Specialty Crops, 3) IPM for Pollinator Health, and 4) IPM Support for Pest Diagnostic Facilities. Accomplishments during 2021-2022 in each priority area include:

**PRIORITY AREA: IPM IMPLEMENTATION IN AGRONOMIC CROPS**

* Cooperated with Virginia Tech, University Libraries to create an open repository platform within VTechWorks to house an Extension digital media library. Currently, over 90 digital images and 20 videos (including appropriate metadata) on various IPM and pesticide safety topics have been uploaded.
* Collaboration with Clemson University and the Southern IPM Center resulted in development of a MyIPM app for field crops. App is available for free download for Apple and Android platforms. Entomology sections are largely completed except for insecticide efficacy ratings and pollinator safety information. Weed section has identified new app design requirements and prioritized a weed list.
* Twenty-seven red imported fire ant (RIFA) public education activities were conducted, which reached over 1,200 stakeholders. Three Extension publications/checklists on RIFA were developed for various audiences.
* On-farm and on-station demonstrations currently underway for control of insect, weed, and plant parasitic nematodes. One field day showcasing cover crops for weeds plots was presented to over 60 farmers. For harvest weed seed control demonstrations, a seed impact mill was tested on-farm during soybean harvest, a second seed impact mill was delivered and installed, and a chaff deck (chaff tramlining) was delivered for a total of 3 on-farm demonstrations.

**PRIORITY AREA: IPM IMPLEMENTATION IN SPECIALTY CROPS**

* Eight presentations and one webinar focusing on management of insects and weeds in nursery crops were presented to a total of 610 stakeholders.
* Seven videos were prepared on the biology and identification of key weed species in nurseries.
* On-farm and on-station demonstrations currently underway for control of insect and weeds in nursery crops.

**PRIORITY AREA: IPM FOR POLLINATOR HEALTH**

* A network of Virginia Cooperative Extension (VCE) agents interested in learning more and working closely with honey bees and pollinator health were recruited to become “Virginia Bee Cooperators (VBC)”. Members of the VBC network will be listed as local resources on the VCE apiculture webpage, and will assist in the development and dissemination of appropriate VCE publications.
* Extension teaching apiary programs that support regional training of VCE agents, Virginia 4-H participants, and beekeepers currently underway.
* Initial scouting and data collection of pollinator attractive plants in Virginia ornamental plants and row crops currently underway.
* The “protecting honey bees” section of VCE Pest Management Guides currently being updated. Toxicity data of registered pest management compounds is being reorganized to more clearly communicate risk in pollinator exposure situations.

**PRIORITY AREA: IPM SUPPORT FOR PEST DIAGNOSTIC FACILITIES**

* Total of 25 weed, 198 plant pathogen, and 371 arthropod diagnoses and IPM-based recommendations delivered to commercial and non-commercial growers and landscape professionals.
* Twenty-nine emerging pest presentations delivered (79 VCE agent participants).
* Virginia Extension working group for Spotted Lanternfly initiated.
* Over 70 plant problems and 300 plant disease digital images added to the Plant Problem Image Gallery (PPIG). Recent analytics showed 120 new users, 46 returning users, 2000 views and 95 images downloaded.