2016 Annual Report

Center Faculty
David Moorhead, PhD Forestry – Co-Director – Warnell
    Extension/Outreach – Silviculture, Invasive Plants, Herbicides, Prescribed Fire
Michael Toews, PhD Entomology – Co-Director – CAES, Dept of Entomology
    Research, Teaching, and Extension – Insect Ecology and Pest Management
Chuck Bargeron, MS Computer Science – Associate Director – 75% Warnell / 25% CAES, Dept of Entomology
    Information Technology and Invasive Species
Joe LaForest, MS Entomology/Plant Pathology – Associate Director – CAES, Dept of Entomology
    Integrated Pest Management and Forest Health

Center Staff
Karan Rawlins, MS Biology – Invasive Species Coordinator – CAES, Dept of Entomology
Rebekah Wallace, MS Weed Science – EDDMapS Data Coordinator – CAES, Dept of Entomology
Liz Moss, MS Forestry – Forest Health Technician – Warnell
Sarah Jean Swain, BS Ag Communication – Web and Publication Specialist – Warnell
Jordan Daniel, BS Computer Science – Smart Phone Application Developer – Warnell
Bilal Bush, BS Computer Science – Web Application Developer – CAES, Dept of Entomology
Adam Branch, BS Communication, Minor in Information Technology – Web Application Developer – Warnell
Salina McAllister, AS Business Administration – Administrative Assistant II – 75% Warnell / 25% CAES, Dept of Entomology
Walt Sikora, PhD Marine Science – Insect Taxonomy – CAES, Dept of Entomology
Michaela Lubbers – Student Assistant – CAES, Dept of Entomology

Center Students
Ian Knight – PhD student – Kudzu Bug Dispersal and Overwintering – CAES, Dept of Entomology
Whitney Hadden – MS student – Dispersal and Management of the Brown Marmorated Stink Bug – CAES, Dept of Entomology
Nancy M. Bostick – MPPPM student – Management of the Sugarcane Aphid – CAES, Dept of Entomology

Program Areas
Extension/Outreach
Focused on Invasive Species, Forest Health and Integrated Pest Management
91 presentations to 6,242 participants for 169 hours of instruction and 778 CEUs in 18 states
Hosted invasive species workshops in Minnesota, Montana, Maryland and Wisconsin

Research/Teaching
Center faculty are active in conducting hypothesis-driven research and development of innovative pest management approaches to support state, regional, national and international stakeholders.
Additionally, they serve on the graduate faculty, mentor graduate students and participate in graduate level teaching programs.

Organizational Collaboration
Chuck Bargeron was reappointed to the National Invasive Species Advisory Council and elected as Vice-Chair. Chuck is also Chair of the North American Invasive Species Network and is leading the planning for the 2017 North American Invasive Species Forum.
Dave Moorhead was elected as President of the North American Invasive Species Management Association.
Michael Toews is the elected chair of the Georgia Entomological Society.

Southern IPM Center
Joe LaForest serves as a Co-Director at the Southern IPM Center, one of four USDA NIFA funded regional IPM Centers, with a mission to foster IPM. UGA leads the Facilitation of Innovation Through Technology Initiative.
Projects

Bugwood Image Database
ForestryImages.org, IPMImages.org, Invasive.org, InsectImages.org, WeedImages.org
- The database includes 252,901 images covering 23,881 species from 2,440 photographers
- In 2016:
  - 8,068 images added covering 1757 species from 66 photographers
  - 22,129 requests to use images in publications, presentations and applications
  - 81,834 direct image downloads
- Funding from USDA APHIS and USDA NIFA
- Nodes – Colorado State Univ., Cornell Univ., Penn State Univ., International Society of Arboriculture, Ohio State Univ., U.S. Forest Service Southern Research Station, USDA APHIS Identification Technology Program
- Provided identification support through images for USDA APHIS PPQ Port Identifiers
- Social sharing of images to allow for extension of images to any website

Images added to Bugwood Images by Year

Occurrence records added to EDDMapS by Year

EDDMapS
Reporting and mapping of invasive species by professionals and citizen scientists
- In 2016, EDDMapS was utilized in all 50 US states and 4 Canadian provinces, with new major initiatives launched for Minnesota Dept. of Natural Resources, Utah Dept of Agriculture and Montana Dept of Agriculture
- EDDMapS includes 3,069,313 occurrence records for 5,096 species from 11,129 users/sources
- In 2016:
  - 249,769 records added
  - 64 million occurrence records downloaded in 4,607 requests by 842 users
  - 522,347 real-time distribution maps delivered online
- Funding from U.S. Forest Service, U.S. Army Corps of Engineers, USDA NIFA as well as state and regional projects
- Expanding to include agricultural pests, urban tree health, rangeland health and pesticide resistance

Bugwood Video and Bugwood Presents
Bugwood Presents was adopted by National Plant Diagnostic Network First Detector Training and Education for delivery of presentations on new invasives and National School IPM Working Group

Bugwood Wiki
Collaborative publishing environment featuring forest health, IPM and invasive species information from partners across US and fully integrated with the other systems to deliver images, video, presentations, and maps
Projects include High Plains IPM, Diagnostician's Cookbook, National Plant Diagnostic Network, First Detector Training and Urban Forest Inventory Pest Evaluation and Detection (IPED)

Bugwood Smartphone Apps
Apps integrate content from Bugwood Images, Bugwood Video, and Bugwood Wiki
- Developed for Apple iOS (iPhone and iPad) and Google Android devices
- 68 smartphone apps downloaded 66,179 times in 2016 for a total of 187,349 downloads
- Current users updated the apps 65,089 times in 2016 for a total of 220,516 updates
- 4 new apps were developed and 27 were significantly updated in 2016.
2016 Highlights

For every dollar of state supported salary, the Center generated $1.96 in extramural salary funds

Active Grants
64 active grants, cooperative agreements and service contracts totaling $2,100,706

Staff Updates
The Center added one new salaried staff position and filled one programmer position

Publications
38 extension and research publications

Websites
53 websites that received 42,891,856 page requests in 2016

2016 Active Funding Portfolio

39 presentations to 2,024 participants for 100 hours of instruction and 313 CEUs
Hosted 3 First Detector Workshops for Master Gardeners and trained 42 Citizen Scientists to identify and map invasive species
Launched EDDMapS IPM program
Center Graduate Students

Whitney T. Hadden completed her MS under the direction of Dr. Toews in December 2016. A Tifton native, Whitney graduated from Emory University with a BS in environmental science in 2014. Her MS project showed that the brown marmorated stink bug, an invasive insect from China that is rapidly moving into north and central Georgia, is a competent vector of boll rot pathogens and causes significant yield losses in cotton production. Further, she demonstrated that this stink bug prefers to inhabit the edges of southeastern row crops such as corn, cotton and soybean. Whitney is currently pursuing a PhD in the Dept of Entomology at Virginia Tech.

Ian A. Knight is writing his PhD dissertation with plans to graduate in May. A Virginia native, Ian previously earned a BS in environmental science from Christopher Newport University and an MS in entomology from UGA. Ian is researching the spatial distribution and dispersal of the kudzu bug, a recently arrived invasive species from Japan. Further, Ian has worked out the distribution of a parasitoid wasp that parasitizes kudzu bug egg masses found in soybean fields. He plans to take a post-doctoral research position after graduating.

Nancy M. Bostick started the MPPPM program at the UGA-Tifton Campus last spring with plans to work for industry in Georgia. A native of Tifton, Nancy completed a BS in biology from Abraham Baldwin Agricultural College in 2015. She is conducting research on management of sugarcane aphid, a new invasive insect of sorghum production. Nancy is working with Cooperative Extension County Agents to report pest conditions in their county on a smartphone application that she can compare with observed pest populations in research plots located throughout the state.

EDDMapS IPM

In 2015, Bugwood faculty were funded by USDA NIFA on a multiyear project to build and demonstrate a qualitative based pest monitoring network. We chose to work on several invasive species including sugarcane aphid, a recently arrived insect pest of sorghum production, white mold, an annually occurring fungal disease of peanut production, and peanut rust, a tropical storm dispersed pathogen of peanuts. After building the IT infrastructure and a new smart phone app called EDDMapS IPM, Dr. Toews worked with Georgia County Agents in spring 2016 to learn to report observations in their counties weekly during the growing season.

In the research component, graduate students managed field plots in a north-south transect across Georgia using standard agronomic practices vs. Extension recommendations based on known pest or pathogen presence in that county. After one year, the data show that county agents generally reported low levels of each pest approximately one to 2 weeks before the pests were detected in the research plots.

We were able to mitigate economic losses to both sugarcane aphid and white mold by making well-timed insecticide or fungicide applications. The project will be replicated again in 2017 and the programmers at Bugwood will be working on methods to provide real-time push alerts to app users and stakeholders warning them of pest detections in their area. We are hoping that this type of reporting infrastructure can help maximize dollars spent on crop inputs for Georgia growers, while preserving crop yield and quality.