



Bee Campus USA Annual Report Pollinator Conservation & Education 2019



Auburn University Auburn, Alabama

EDUCATION & OUTREACH



Students with the AU Bee Lab conduct a honey tasting as part of their outreach efforts.



Students handle drones during a For the Bees outreach event.

A variety of pollinator-related events were held on campus since receiving our initial designation. They include the following:

- 4/2/18 - Auburn Azalea Festival
- 6/22/18 - Bee Auburn
- 8/22/18 - Sustainability Picnic
- 4/11/19 - Can Art Save the Planet? A Symposium on Art & Planetary Health
- 4/13/19 - Family Fun Day
- 4/20/19 - Auburn Azalea Festival
- 4/22/19 - Earth Day Extravaganza
- 6/29/19 - Red, White, & Blueberry Bash
- 8/21/19 - Sustainability Picnic
- Various Dates - School Field Trips & Tours to the Donald E. Davis Arboretum (x13)



For the Bees student group promotes pollinator awareness among students



Students with For the Bees Student group answer questions about bees.

In addition to these campus hosted events, university faculty and staff conducted over 65 extension presentations and outreach activities around and beyond the state of Alabama. The extension & outreach offerings mentioned above include the following:

Alabama Cooperative Extension Efforts

Wiregrass Lunch & Learn - Honey Bees - 1/15/19

Beginner's Beekeeping Course - 1/26/19 - Moulton, AL

Beginner Beekeeping Course - 2/1/19 (6 weeks) - Dadeville, AL

Native Plants: Bring on the Pollinators - 2/6/19 - Montgomery County

Northeast AL Beekeepers Meeting - Monthly - McClellan, AL

Intermediate Beekeeping Course - 2/16/19 - Moulton, AL

Beeswax Workshop - 2/16/19 - Opelika, AL

Sow A Garden - Backyard Gardening - Pollinators & Beekeeping - 3/18/19 - Evergreen, AL

Hummingbirds - 3/15/19 - Elmore County

Sow A Garden - Backyard Gardening - Pollinators & Beekeeping - 3/21/19 - Greenville, AL

Earth Day - Pollinator Meeting - 4/27/19 - Barbour County

Backyard Beekeeping Basics - 6/25/19 - Decatur, AL

Beeswax Workshop - 7/11/19 - Ashville, AL

Extension & Outreach Presentations or Demonstrations:

1. Williams, G. Best Management Practices for Apiculture. Central Alabama Beekeepers' Association, 21 November 2019.
2. Abbate, A., Williams, G., Campbell, J. The Pollination of Kiwifruit (*Actinidia chinensis*) in Alabama. 2019 Entomological Society of America, 17-20 November 2019.
3. Williams, G., Bruckner, S., Steinhauer, N., vanEngelsdorp, D. Bees & BMPs. Saughahatchee Beekeepers' Association Meeting, Auburn, USA, 8 October 2019.
4. Salem, A., Campbell, J., Tsalickis, A., Abbate, A., Baker, C., Bruckner, S., de la Fuente, K., Williams, G. The Auburn Bee Lab. Saughahatchee Beekeepers' Association Meeting, Auburn, USA, 8 October 2019.
5. Bruckner, S. & Williams, G.R. Honey Bee Health is Complex. Piedmont Beekeepers Association Meeting, Athens, USA, 7 October 2019.
6. Williams, G., Bruckner, S., Steinhauer, N., vanEngelsdorp, D. Bees & BMPs. Orange County Beekeepers' Association Meeting, Orange Co., USA, 1 October 2019.
7. Salem, A., Campbell, J., Tsalickis, A., Jacobsen, R., de la Fuente, K., Williams, G. The Auburn Bee Lab. 2019 College of Agriculture Honey Sale, Auburn, USA, 27 September 2019.

8. Bruckner, S. Bees and Cheese. How the Swiss do it. 2019 Georgia Beekeepers Association Fall Meeting, Cummings, USA, 26-28 September 2019.
9. Bruckner, S. & Williams, G.R. The collision of bees, pesticides and parasites. 2019 Georgia Beekeepers Association Fall Meeting, Cummings, USA, 26-28 September 2019.
10. Salem, A., de la Fuente, K., Williams, G. The Auburn Bee Lab. 2019 Alabama Beekeepers' Association Meeting, Clanton, USA, 20 September 2019.
11. Williams, G. Honey Bee Reproductive Toxicology: impact of neonics??? 2019 Apimondia International Apicultural Congress, Montreal, Canada, 8-12 September 2019.
12. Williams, G. Round Table: Pesticides & Bees: Understudied & complicated??? 2019 Apimondia International Apicultural Congress, Montreal, Canada, 8-12 September 2019.
13. Salem, A., Bruckner, C., Baker, C., Tatum, S., de la Fuente, K., Williams, G. The Auburn Bee Lab. 2019 College of Agriculture Welcome Picnic, Auburn, USA, 22 August 2019.
14. Bruckner, S. & Williams, G.R. Queens and Neonicotinoids – The royal pesticide battle. 2019 North Alabama Beekeeper Symposium, Athens, USA, 17 August 2019.
15. Williams, G., Bruckner, S., Steinhauer, N., vanEngelsdorp, D. Bees & BMPs. 2019 North Alabama Beekeeper Symposium, Athens, USA, 17 August 2019.
16. Salem, A., Baker, C., de la Fuente, K., Williams, G. The Auburn Bee Lab. Huazhong Agricultural University visit to Auburn University, Auburn, USA, 6 August 2019.
17. Salem, A., Bruckner, B., Campbell, J., van Eijk, M., de la Fuente, K., Williams, G. Honey bees! 2019 Alabama Forestry Commission Meeting, Auburn, USA, 16 July 2019.
18. Williams, G., Bruckner, S., Steinhauer, N., vanEngelsdorp, D. Bees & BMPs. 2019 Eastern Apiculture Society of North American Meeting, Greenville, USA, 15-19 July 2019.
19. Williams, G. When stressors collide. 2019 Eastern Apiculture Society of North American Meeting, Greenville, USA, 15-19 July 2019.
20. Williams, G., Bruckner, S., Steinhauer, N., vanEngelsdorp, D. Bees & BMPs. 2019 Heartland Apiculture Society Meeting, Bowling Green, USA, 8-10 July 2019.
21. Williams, G. Honey bee parasites - the good, the bad, and the ugly. 2019 Heartland Apiculture Society Meeting, Bowling Green, USA, 8-10 July 2019.
22. Williams, G., Bruckner, S., Steinhauer, N., vanEngelsdorp, D. Bees & BMPs. Jefferson County Beekeeper Meeting, Birmingham, USA, 16 May 2019.
23. Salem, A., Ware, A., Bruckner, S., Baker, C., Alparslan, S., de la Fuente, K., Williams, G. The Auburn Bee Lab. 2019 Collegiate Hotel Fundraiser, Auburn, USA, 1 May 2019.
24. Bruckner, S. & Williams, G.R. Geoff Williams/Selina Bruckner: Bee Informed Partnership Annual Colony Loss Survey. Beekeeping Today Podcast, 26 April 2019.
25. Bruckner, S. AU-Bee Lab Update. 2019 Beekeeping in the Panhandle, Workshop and Tradeshow, Chipley (FL), USA, 30 March 2019.
26. Bruckner, S. Getting started - A smooth and successful start-up. 2019 Beekeeping in the Panhandle, Workshop and Tradeshow, Chipley (FL), USA, 30 March 2019.
27. Williams, G. The Auburn Bee Lab. 2019 Tiger Giving Day Faculty & Staff Campaign Kickoff Breakfast, Auburn, USA, 19 February 2019.
28. Salem, A., Ware, A., Bruckner, S., Baker, C., Alparslan, A., de la Fuente, K., Williams, G. Honey bees! Jules Collins Family Day, Auburn University, Auburn, USA, 13 February 2019.
29. Williams, G., Abbate, A., Baker, C., Bruckner, S., Campbell, J. The Buzz at the

- Auburn Bee Lab. 2019 ALFA Commodity Group Meeting, 5 February 2019.
30. Williams, G.R., *Bruckner, S., Neglected honey bee stressors: Neonics & Varroa??? 2018 California State Beekeepers' Association Conference, Valley Center, USA, 13-15 November 2018.
 31. *Abbate, A., Honey Bees and Pollinators, Coose County Field Course, 23 October 2018.
 32. Williams, G.R., Bees, wasps & other things, 2018 Alabama Cooperative Extension Service Pesticide Applicators University, Opelika, USA, 29-30 October 2018.
 33. Bruckner, S., *Salem, A., Campbell, J., Auburn University Bee Lab, Alabama Ag. Round-up, Auburn, USA, 29 September 2018.
 34. Williams, G.R., When parasites & pesticides collide, 2018 Georgia Beekeepers' Association Meeting, Cumming, USA, 27-29 September 2018.
 35. Williams, G.R., *Bruckner, S., Steinhauer, N., vanEngelsdorp, D., Bees & BMPs, 2018 Georgia Beekeepers' Association Meeting, Cumming, USA, 27-29 September 2018.
 36. Williams, G.R., *Bruckner, S., Steinhauer, N., vanEngelsdorp, D., Bees & BMPs, 2018 Alabama Beekeepers' Association Conference, Clanton, USA, 21-22 September 2018.
 37. Bruckner, S., Beekeeping: Getting Started, 2018 Alabama Beekeepers' Association Conference, Clanton, USA, 21-22 September 2018.
 38. Williams, G.R., *Salem, A., The Auburn Honey Bee Lab, Auburn Ag. Ambassadors, Auburn, USA, 16 August 2018.
 39. Baker, C, *Bruckner, S., Oliver, R., Berry, J., Williams, G.R., Effects of oxalic acid on honey bees & varroa mites, 2018 Alabama Farm and Agriculture Expo, Montgomery, USA, 4 August 2018.
 40. Williams, G.R., Alabama Bee Research & Extension, Jackson County Beekeepers' Association Monthly Meeting, Scottsboro, USA, 7 June 2018.
 41. Williams, G.R., When parasites & pesticides collide, 2018 University of Georgia & Young Harris Beekeeping Institute, Young Harris, USA, 9-11 May 2018.
 42. Williams, G.R., Bee and Beekeeper Defenses, 2018 University of Georgia & Young Harris Beekeeping Institute, Young Harris, USA, 9-11 May 2018.
 43. Williams, G.R., Bee and Beekeeper Defenses, 2018 University of Georgia & Young Harris Beekeeping Institute, Young Harris, USA, 9-11 May 2018.
 44. Williams, G.R., Honey Bee Parasites, 2018 University of Georgia & Young Harris Beekeeping Institute, Young Harris, USA, 9-11 May 2018.
 45. Williams, G.R., Honey Bee Toxicology, 2018 University of Georgia & Young Harris Beekeeping Institute, Young Harris, USA, 9-11 May 2018.
 46. Williams, G.R., Queen Health, 2018 Rockhurst Queen Rearing Workshop, Westover, USA, 28-29 April 2018.
 47. Campbell, J., Williams, G.R., AU-BEES at Auburn University- Laboratory of Insect Pollination and Apiculture, Golf Course Superintendents, Birmingham, USA, 24 April 2018.



AU Bee Lab display of live bees

POLLINATOR HEALTH & HABITAT



The Donald E. Davis Arboretum mimics the landscapes of Alabama, including featuring native plants beneficial to pollinators



Spring brings the blooming of Trout Lily on the grounds of the Donald E. Davis Arboretum



Pollinators frequent the flowers grown at the Auburn University Community Garden



Asters can be found blooming at the Donald E. Davis Arboretum

A variety of habitat enhancement projects took place across campus last year. Facilities Management improved over 20,000 square feet of flower beds with pollinator-friendly plantings. The Donald E. Davis Arboretum conducted enhancements around the 13-acre arboretum that included flower gardens with milkweed, natural areas, meadows, native tree and shrub plantings, and invasive species removal. Approximately 15 volunteers serving over 100 hours assisted with these projects, along with student and arboretum staff. Finally, students and staff associated with the Auburn University (AU) Community Garden and the AU Bee Lab also grew various plots of wildflowers suitable for pollinators for both aesthetic and research purposes.

SERVICE LEARNING



Students from the AU Bee Lab harvest a batch of honey.



ENTA bee hotel created by students in the Bee Biology & Management course.

AU students participated in a variety of formal and informal service-learning opportunities throughout the year.

Students in the Environmental Interpretation class with the School of Forestry and Wildlife Sciences worked with the Bee Campus Committee to develop designs for permanent pollinator signs that may eventually be installed at various locations around campus.

In addition, students in the College of Agriculture's Bee Biology & Management course had extensive service-learning opportunities including visiting practicing apiarists, planting pollinator-friendly wildlife plots, building bee hotels and hive boxes, and learning about honey harvesting.

Extracurricular opportunities for service learning stemmed primarily from student employment at the Donald E. Davis Arboretum and the AU Bee Lab and from involvement in the For the Bees student group and the AU Community Garden. In these settings, students helped with habitat enhancement projects, conducted outreach education activities on campus and in the community, and assisted with Bee Lab and Community Garden activities.



Students inspecting colonies to assess possible effects of neonicotinoids.



Students in the Bee Biology & Management course build hive bodies

CURRICULUM & CONTINUING EDUCATION

A poster for the 24th Annual Beekeeping Symposium. The background is a light orange color with a subtle honeycomb pattern. The text is in white and black. It includes the title, date, location, and time.

24TH ANNUAL
Beekeeping Symposium
Saturday, February 2, 2019
Clanton Conference & Performing Arts Center
1850 Lay Dam Road, Clanton, AL 35045
8:00 AM - 4:30 PM

The Alabama Cooperative Extension has hosted a Beekeeping Symposium for 24 years and typically draws around 600 participants

A poster for the Online Beekeeping Course. The background is a photograph of a smiling man wearing a straw hat and a white protective suit, holding a jar of honey. The text is in yellow and white. It includes the title, dates, topics, and a website link.

Online Beekeeping Course
OCTOBER 15
Equipment Tips from an Apiarist
OCTOBER 22
Making More Money With Your Honey
OCTOBER 29
Honeybee Breeds: Choosing the Right Bee for Your Area
Learn more at aces.edu
extension
ALABAMA A&M & AUBURN UNIVERSITIES

The Alabama Cooperative Extension launched a new 3-part webinar series on Beekeeping for those in Alabama and beyond

Various courses within the College of Agriculture, including the College of Architecture, Design & Construction (CADC) and the School of Forestry and Wildlife Sciences (SFWS), touched on pollinators and/or pollinator-habitat to varying degrees. For instance, within the Environmental Interpretation course in SFWS, a group of students worked to create pollinator-related sign designs; and students in CADC's Landscape Architecture curriculum learned about pollinator habitats within some of their design courses. The most extensive coverage of pollinators happens within the College of Agriculture, where students taking courses within the department of Entomology & Plant Pathology learn about pollinators in a variety of courses, including Bee Biology & Management and Economic Entomology.

In addition to the formal student curriculum, the Alabama Cooperative Extension Service (Extension) hosted a number of educational opportunities for beekeepers. In particular, they hosted their annual Alabama Beekeeping Symposium, which had over 600 attendees, and they added a 3-part Beekeeping Webinar series to their fall offerings.

Beyond these two events, they hosted over 20 bee-specific educational offerings throughout the state of Alabama.

Beyond curriculum and extension, Auburn faculty and students also presented research findings at meetings and conferences around the world on over 20 occasions.



Students in the College of Agriculture visited the Alabama Bee Company to learn from practicing apiarists.

Auburn's Bee Lab faculty and researchers remain actively involved in the Bee Informed Partnership. They also presented their research findings at the meetings and conferences.

Research Presentations:

1. Williams, G., Steinhauer, N., Rennich, K., vanEngelsdorp, D. The Bee Informed Partnership: Providing research-based Best Management Practices. 2019 Entomological Society of America, St. Louis, USA, 17-20 November 2019.
2. Cook, S., Anderson, T., Bahreini, R., Berry, J., Evans, J., González-Cabrera, J., Johnson, J., Johnson, R. Nasr, M., Mulica, M., Williams, G. Novel controls for the honey bee parasitic mite *Varroa destructor*. 2019 Entomological Society of America, St. Louis, USA, 17-20 November 2019.
3. Bruckner, S., Baker, C., Salem, A. & Williams, G.R. Interesting Interactions? Effects of parasitic mites and neonicotinoids on honey bee food glands? 2019 Apimonda International Apicultural Congress, Montreal, Canada, 8-12 September 2019.
4. Baker, C., Bruckner, S., Evans, J., Oliver, R., Berry, J., Williams, G. Effects of an extended release oxalic acid treatment on *Varroa destructor* and *Apis mellifera* honey bee colonies in the US Southeast. 2019 Apimonda International Apicultural Congress, Montreal, Canada, 8-12 September 2019.
5. Garrido, C., Nanetti, A., Turilazzi, S., Bordoni, A., Felicioli, A., Martini, A., van der Steen, J., Ellis, J., Brodschneider, R., Williams, G., Straub, L., Jack, C., Marletto,

- V., Bortolotti, L., Sgolastra, F. The welfare of managed honey bees - a holistic approach to bee health. 2019 Apimondia International Apicultural Congress, Montreal, Canada, 8-12 September 2019.
6. Menz, J., Delaney, D., Bruckner, S., Berry, J., Borkoski, D., Bartlett, L., Williams, G., Delaplane, K. Simulating effects of hyperpolyandry with brood mixing. 2019 Apimondia International Apicultural Congress, Montreal, Canada, 8-12 September 2019.
7. Papach, A., Gonthier, J., Balusu, R., Williams, G., Neumann, P. Mating and survival of small hive beetle *Aethina tumida*. 2019 Apimondia International Apicultural Congress, Montreal, Canada, 8-12 September 2019.
8. Steinhauer, N. & Bruckner, S. Bee Informed Partnership Update. 2019 COLOSS Conference, Montreal, Canada, 7 September 2019.
9. Bruckner, S., Steinhauer, N., Wilson, M.E., Rennich, K., vanEngelsdorp, D. & Williams, G.R. The Bee Informed Partnership National Colony Loss Survey – how many died, and (maybe) why? 2019 COLOSS Conference, Montreal, Canada, 7 September 2019.
10. Papach, A., Gonthier, J., Williams, G., Neumann, P. The role of pupation in determining small hive beetle sex ratio. 2019 COLOSS Conference, Montreal, Canada, 7 September 2019.
11. Sanchez, W., Williams, G., Lawrence, K. Efficacy of entomopathogenic nematodes on small hive beetles (*Aethina tumida*) in kalmia loamy sand. 58th Annual Meeting of the Society of Nematologists, Raleigh, USA, 7-10 July 2019.
12. Bruckner, S. & Williams, G.R. How mites and neonics affect food glands - and why it matters. 2019 Young Harris Beekeeping Institute, Young Harris, USA, 22-25 May 2019.
13. Bruckner, S., Baker, C., Salem, A. & Williams, G.R. Joint forces: How do parasitic mites and neonicotinoid insecticides simultaneously affect honey bee food glands? Student Symposium, Auburn, USA, 9 April 2019.
14. Campbell, J., Abbate, A., Williams, G.R. Collecting Pollinators from Right-of-Ways: a comparison of three commonly used collecting methods. 16th Annual Stewardship Partners Meeting, Columbus, USA, 2-3 April 2019.
15. Bruckner, S. & Williams, G.R. Potential interaction effects? BASF Bee Updates, Auburn, USA, 27 March 2019.
16. Williams, G.R. Honey Bee Reproductive Toxicology: impact of neonics??? 2019 American Beekeeping Federation, Myrtle Beach, USA, 13 January 2019.
17. Bruckner, S. & Williams, G.R. Potential interaction effects? 2019 American Bee Research Conference, Phoenix, USA, 11 January 2019.
18. Williams, G.R. The Bee Informed Partnership - Next steps... 2019 Bee Informed Partnership Tech Transfer Team Summit, Myrtle Beach, USA, 8 January 2019.
19. Papach, A., Williams, G.R., Neumann, P., Solving a riddle: what drives femalebiased sex ratio in small hive beetles, 2018 Symposium of Ecology and Evolution Doctoral Students, Neuchatel, Switzerland, 15 November 2018.
20. Bruckner, S., *Baker, C., *Salem, A., Williams, G., Neglected stressor interactions: how do parasitic mites and neonicotinoid insecticides affect honey bee food glands? 2018 Entomological Society of America, Entomological Society of Canada, and Entomological Society of British Columbia Joint Annual Meeting, Vancouver, Canada, 11-14 November 2018.
21. Neumann, P., Chantawannakul, P., Williams, G.R., COLOSS: Prevention of Honey Bee Colony Losses, EURBEE 8, Ghent, Belgium, 18-20 September 2018.
22. Bruckner, S., Straub, L., *Villamar-Bouza, L., Neumann, P., Williams, G.R., Agerelated susceptibility to neonicotinoids: effects on honey bee food glands, EURBEE 8, Ghent, Belgium, 18-20 September 2018.

EDUCATIONAL & INTERPRETIVE SIGNAGE

Auburn University maintains strict standards for campus signage, so no permanent signs have been installed to date. At least 5 different temporary signs have been utilized at different locations and outreach events throughout the year. They include:

- Posters on Auburn's Bee Campus USA designation and what it means
- A sign on how to connect with the Auburn University Bee Lab for more information on research and outreach efforts
- A graphic depicting the "Flower to Fruit" process, including the critical role of pollinators
- A graphic covering the Southeastern Blueberry Bee and the role it plays in fruit cultivation
- Various signage at outreach tables of both the AU Bee Lab and the For the Bees student group that covers information on honeybees
- Social media posts on pollinators from units like the AU Bee Lab, Donald E. Davis Arboretum, Office of Sustainability, and AU Community Garden

While only four unique temporary signs have been created, they have been utilized repeatedly throughout the year.



Auburn University Bee Lab table sign encouraging the public to follow them on social media for more information



Sign promoting Auburn's Bee Campus designation displayed at the annual Sustainability Picnic.

POLICIES & PRACTICES

Pest management strategies include education, exclusion, sanitation, maintenance, biological and mechanical controls, and pre-approved, site-appropriate pesticides.

An Integrated Pest Management decision at Auburn University Landscape Services consists of the following steps:

1. Identify pest species.
2. Estimate pest populations and compare to established action thresholds.
3. Select the appropriate management tactics based on current on-site information.
4. Assess the effectiveness of pest management.
5. Keep appropriate records.

Decisions concerning whether or not pesticides should be applied in a given situation are based on a review of all available options. Efforts are made to avoid the use of pesticides by adequate pest-proofing of facilities, good sanitation practices, selection of pest-resistant plant materials, and appropriate horticultural practices.

When it is determined that a pesticide must be used in order to meet pest management objectives, the least-hazardous material, adequate for the job, is chosen.

All pesticide applicators are trained in the principles and practices of IPM and the use of pesticides approved for use by Auburn University Landscape Services. All applicators must comply with the IPM policy and follow appropriate regulations and label precautions when using pesticides in or around Auburn University facilities.

The IPM Policy and Practices apply to approximately 45% of the landscape actively managed by Auburn University's Facilities Management.

Recommended Locally Native Plant Species List —
<http://wp.auburn.edu/sustainability/practices/bee-campus-usa/>

Regional Native Plant Supplier List — same as above

Pollinator Friendly Integrated Pest Management Plan — same as above

CONTACT US!

Committee — Bee Campus USA Committee, Amy Strickland

Website — <http://wp.auburn.edu/sustainability/practices/bee-campus-usa/>

Social Media — @AUsustain; @auburnbees; @audavisarboretum; @communitygarden_au