NC STATE UNIVERSITY

Wolfpack's Waggle

NC State Apiculture Program Newsletter

Dedicated to the dissemination of information and understanding of honey bee biology and management

Issue 4 | Oct 2019

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What have we been up to?

The end of summer and the beginning of the fall semester has brought about an intense time for everyone in the lab. Jennifer, Lauren, Hannah, and Joe all participated in the hands-on activities in the BEES Academies this fall, the logistics of which behind the scenes were deftly handled by Sharon and Kirsten. Joe, Lauren, Ali, and David all presented at the international Apimondia conference in Montreal in September, which was an amazing meeting for honey bee science and beekeeping. Joe visited Ali in Vancouver to learn some new molecular techniques. Erin has been cranking through genetic analyses from our summer projects, and Brad has been keeping busy writing manuscripts and processing queen samples through the clinic. Esmaeil and Ali have been incredibly busy writing up their many projects at UNCG and UBC, respectively, and Lauren will soon be wrapping up her MS thesis by the end of the semester.

·B·E·E·S·
BEEKEEPERS EDUCATION AND ENGAGEMENT SYSTEM
ACADEMY

BEES Academy: new intermediate short courses

We successfully launched a major new extension initiative this year, holding three separate beekeeping short courses across the state, serving as a "booster shot" to beginner and intermediate beekeepers.

HONEY BEE QUEEN AND DISEASE CLINIC | BETTER DATA BETTER BEES

Quality Assurance

Morphometric Analyses: multiple measures of queen or drone, body and reproductive tract (rearing quality)

Semen Quality: total sperm count, and sperm viability in queens (mating success), or drones (mating potential)

Quality Report: a "grade" report of a queen or drone's reproductive quality for your quick interpretation

Troubleshooting

Mitotyping for Africanization: genetic analyses of maternal ancestry as African or European using population genetic techniques and markers

Pathogen Screening: identification of presence and relative levels of ABPV, BQCV, DWV(A&B), IAPV, LSV, Trypanosomes, and both Nosema species. Additional and custom pathogen targets available upon request.

Genotyping Analyses: full assessment of paternity for up to 48 workers and an estimate of queen mating frequency

Custom Collaboration

This highly-tailored collaboration involves custom experimental design, analyses, and interpretation. This unique partnership between science and industry has been utilized to:

- Test the impact of various agrochemicals
- Assess the effects of banking on queen quality measures
- Evaluate novel management practices' improvements in queen mating quality
- Observe the effects of shipping on queen health and sperm quality

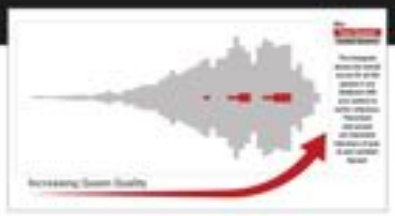
Strong Research Foundations

Established as a natural extension service leveraging basic and field honey bee research at NC State, the clinic has worked to improve colony health for over 10 years.

Queen and Disease Clinic Pricing

Five Sample Minimum • Bulk Pricing Available

ANALYSIS	PRICING	SAMPLES TESTED		
		QUEENS	DRONES	COLONIES
Reproductive Quality	$24.00	✓	✓	
Standard Pathogen Screen	$55.00	✓	✓	✓
Apiary Pathogen Screen	*$220.00			
Mitotyping (Africanization)	$25.00	✓	✓	✓
Genotyping (Mating Number)	$320.00			✓



Custom Disease Screening

Additional and custom pathogen targets available upon request.

Your Bees • Your Data

Any results or interpretations from our work is held in the strictest confidentiality and anonymity

Lab Spotlight: Kirsten Benson

After her graduation with a Masters of Design (MDes) degree from NC State last year, we were fortunate to recruit **Kirsten Benson** as the first-ever 'Design Coordinator' for our NC State Apiculture Program. In that capacity, she has truly revolutionized the look, branding, and delivery of our research and extension efforts. These include—but not limited to—the development of new logos, updating our lab website, improving scientific presentations, designing scientific figures for publication, developing posters and other educational materials, editing videos for online courses, and coordinating a comprehensive series of beekeeping trainings complete with printed handouts, slide sets, and display materials. In short, she has completely transformed the image of our lab, the science we generate, and our outreach profile. Thanks and keep up the great work, Kirsten!

BEES Academy: new intermediate short courses

We successfully launched a major new extension initiative this year, holding three separate beekeeping short courses across the state, serving as a "booster shot" to beginner and intermediate beekeepers.

The three BEES Academies in the fall of 2019 were well attended, well received, and filled with 2 days of beekeeping education.

This fall, we initiated an exciting new extension initiative for intermediate beekeeper training. We hope that our '**BEES Academy**' will be offered on a regular basis going forward, as it aims to fill a niche for existing beekeepers who are seeking to improve their knowledge and experience.

Many of the NCSBA county chapters offer annual bee schools, usually over the winter months, with the aim of starting new hives in the spring. These efforts have done an excellent job at turning novices into practicing beekeepers. With the increased number of beginner beekeepers, however, there is an increasing need for continued advancement and education about honey bee biology, their management, and the overall industry. Our goal has been to fill this need by providing an intermediate short course that greatly compliments the county beginner schools; we cover many of the same topics as what is taught in most beekeeping short courses, but we go into greater depth and breadth to help underscore those lessons. Our goal is to make these academies a one-stop-shop for MBP Certified Beekeepers wanting to prepare for the Journeyman level.

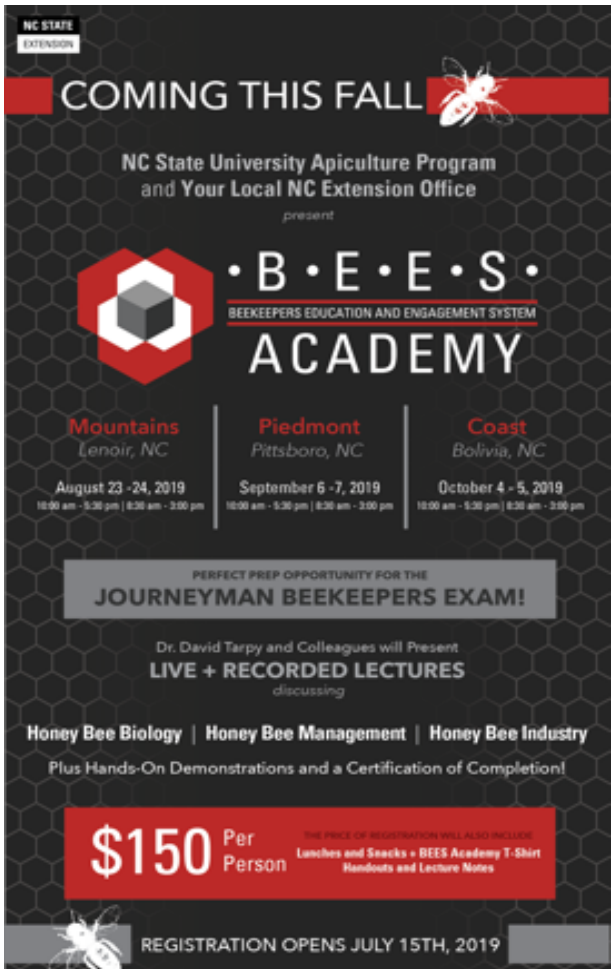
Our **BEES Academy** uses a novel delivery format of apiculture training by seamlessly incorporating online content from our Beekeeper Education & Engagement System (BEES) (see our website or **go.ncsu.edu/BEES**), traditional in-person lectures, live Q&A with instructors, and hands-on activities. This unique approach was extremely well received by the initial students, where many commented that they could not tell the difference in the recorded versus live lectures in their post-training surveys.

We collaborated with various extension field faculty across the state who hosted the first three, 2-day BEES Academies, all held this past late summer or early fall: August 23-24: Caldwell County, September 6-7: Chatham County, and October 4-5: Brunswick County. Many thanks to Seth Nagy, Debbie Roos, and Mark Blevins, the extension agents in each state who hosted, coordinated, and participated in each event, respectively. Also many thanks to members of the NCDA&CS Apiary Inspection Program—particularly Lewis Cauble, Don Hopkins, Nancy Ruppert, and Glenn Hackney—for assisting with several of the hands-on activities on mite monitoring and diseases.

BEES Academy (Continued)

If you're interested in participating in a future **BEES Academy**, please stay tuned on our website:

https://www.ncsuapiculture.net/bees-academy-home



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Esmaeil Amiri - NRC Postdoctoral Fellow *(UNCG)*
Brad Metz - Postdoctoral Researcher
Alison McAfee - Postdoctoral Researcher *(UBC)*

Joe Milone - PhD Student *(Entomology)*
Hannan Levenson - PhD Student *(Entomology and Evolution & Ecology)*
Lauren Rusert - MS Student *(Entomology)*

Undergraduate Researchers
Tess Wiegmann *(artist-in-residence)*, Gaven Bell, Austin Acree, Danyelle Reiskind, April Sharp, Colby Purvis, Rachel Laminack

Support the NC State Apiculture Program!

The Apiculture Science fund-raising efforts operate under the auspices of the North Carolina Agricultural Foundation, Inc. a 501(c)3 organization. You will receive an official receipt for your donation.

A Gift Toward Emerging Needs

Consider supporting the program with a gift that would go toward the current area of greatest importance. Flexible funding enables the Apiculture Program to address critical needs as they emerge, often enhancing the program beyond what would be possible through restricted grant funding. Funding of any amount, from $10 to $10,000, will be extremely helpful.

Gift-In-Kind

The Apiculture program is always seeking creative solutions to its material needs. If you have surplus equipment or other non-monetary assets to give (e.g., gently used honey extractors, microscopes, even vehicles), please consider donating them to the program. You will receive credit for the monetary value of the gift and the gratitude of our faculty and students.

Estate Gift

If you are interested in planning an estate gift to benefit Apiculture, please let us know! We can provide you with the tools you and your attorney will need to ensure that your wishes are fulfilled. Please go to our website for more information: www.ncsuapiculture.net

go.ncsu.edu/apiculture

Updated Wolfpack Waggle

Like our new look? Thank Kirsten Benson (see Page 2)! Our updated newsletter has a cleaner, streamlined look while containing the same format and informational elements. Interested in joining our email listserv? Just email us at ncsu.apiculture@gmail.com and we'll be happy to add you!

Congratulations!

Hannah Levenson and **Lauren Rusert** won the PhD and MS student awards, respectively, at the NC Entomological Society annual meeting and banquet. In doing so, Hannah gave a very nice presentation of her doctoral project. Moreover, Lauren also won the NCES student travel award this year. Congratulations to you both!

Random Notes

New Publications

de Souza, D. A., D. R. Tarpy, and K. H. Hartfelder. (2019). Effect of a juvenile hormone augmentation at reproductive framework of in vitro rearing honey bee queen. *Journal of Economic Entomology*, **112**: 2030–2039.

Tarpy, D. R. (2019). Apiculture. In: *Encyclopedia of Social Insects*, C. Starr (ed.). Springer, Cham. https://doi.org/10.1007/978-3-319-90306-4_183-1.

Tarpy, D. R. and J. S. Pettis. (2019). Colony Collapse Disorder. In: *Encyclopedia of Social Insects*, C. Starr (ed.). Springer, Cham. https://doi.org/10.1007/978-3-319-90306-4_23-1.

Presentations

In addition to our annual BugFest booth this September, Hannah Levenson took part in the second annual field day for the NC Pollinator Conservation Alliance in August. Several of us (Joe, Lauren, Ali, and David) attended the Apimondia conference in September to present our respective projects. Brad presented in Halifax VA, Erin has given presentations to the Rockingham and Yadkin county clubs, Lauren attended the Wake county meeting, and Esmaeil has spoken to the Pitt and Davidson county chapers. David Tarpy was the main speaker at the 73rd annual Gormanston Beekeepers Conference just outside of Dublin, Ireland, which is the oldest beekeeping conference in the world. Along with Jennifer Berry from UGA, he also co-headlined the second 'Cabarrus County Presents' symposium in September. Finally, don't miss our next **Apiculture Webinar** on November 14th!

Welcome Aboard!

We're happy to introduce **Colby Purvis** and **Rachel Laminack**, two new undergraduate researchers in the program. Colby took ENT 203 a couple of years ago and is helping Jennifer out at the bee farm with apiculture infrastructure. Rachel is an Entomology minor and is assisting Hannah on her projects on pollinator community ecology.

Sad Farewell

We also say goodbye to three former undergraduate researchers in the program. **Ashley Rua** graduated with aims to attend vet school after a gap year, during which we will likely be writing up some exciting results on her research. **Emily Johnson**, our most recent Media Intern, is a Resident Assistant and didn't have time to devote to our social media going forward. **Austin Rose** will soon be graduating and hopes to become an entomology graduate student, so he's getting a head start by taking some grad-level ENT courses. Thanks to you all and best of luck going forward!

Teacher's Corner: Courses at NC State

We are currently teaching ENT 203, *An Introduction to the Honey Bee and Beekeeping*, as we do every fall semester. This course has been offered annually for over 40 years, initiated by Dr. John Ambrose and continuing to the present day. We teach the course in its current form for non-science majors, which fulfills one of their General Education Requirements (GER). In doing so, it uses honey bees as a vehicle to teach a wide variety of NC State majors something about the wonders of biology as well as an appreciation of science. This year, we have 180 students and two TAs from the ENT graduate program, Caleb Wilson and Kaiying Chen.

go.ncsu.edu/honeybees

Tarpy's Back Page

One of the main intents of our Wolfpack Waggle is to shamelessly showcase some of the many things that we have going on in the NC State Apiculture Program. In doing so, it's important to remember that the program is a collective—a collection of people rather than a single individual.

Similar to a honey bee colony, our "collective" has a division of labor; each person has their own specialty, area of expertise, and interest in bee biology. This enables us to go beyond what any one person can do, giving us the ability to diversify into topics that otherwise would otherwise never be broached.

While everyone in the program may have different focus, we all still have a common goal and approach in addressing the many challenges of bees and beekeeping. One great example of this is that everyone contributes to both our extension and research missions by delivering presentations to local, state, regional, and national beekeeping associations. For my part, I have given 24 extension presentations so far this year (plus another 8 scientific talks). But the other members of our program? Add another 28 extension presentations to beekeepers and at least 23 scientific presentations (I have difficulty keeping track!). That's 75+ separate events of disseminating information and knowledge, and the year's not over yet!

In certain circles there remains an antiquated notion that Extension Specialists are solo acts, working individually and in isolation. On the contrary, it seems clear that—collectively—we can do far more than any one person could do, and in doing so we're able to address a wider variety of important topics than we can individually.

NC STATE UNIVERSITY
Apiculture Program

NC COOPERATIVE EXTENSION