

Wolfpack's Waggle

NC State Apiculture Program Newsletter

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



Issue 1 | Jan 2020

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What have we been up to?

The beginning of a new year always brings reflection about the previous. We've had another successful year, with 10 peer-reviewed publications (making it four straight years of double-digit papers) and 19 presentations at scientific meetings. We had 11 active grants totaling \$2.85M, and by last count we have 48 different research projects ranging from projects at an early conception all the way to those soon to be submitted for publication. On the extension side, collectively we delivered 61 presentations, workshops, and short courses to various beekeeper groups for 5,641 individual contacts, we published seven extension articles, and we were covered by four media stories on our work. We completely revamped and updated the content of our Beekeeper Education & Engagement System (BEES), which is growing ever-more popular among beekeepers and is really starting to gain traction in becoming a self-sustaining resource for beekeepers. Overall, 2019 was a great year, and we hope the same for 2020!



2020 online 'Beginner' BEES school

This spring, we're reviving our online BEES school for wannabe beekeepers. Perfect for those who weren't able to take part in the bee school in their local chapter!





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



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.

Troubleshooting

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

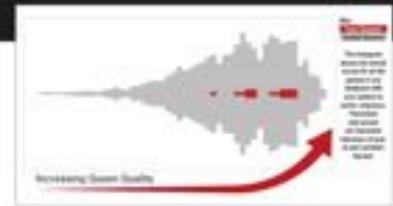
Pathogen Screening: identification of presence and relative levels of ABPV, BQCV, DWV(A&B), IAPV, LSV, Trypanosomes, and both Nosema species. Additional and custom pathogen targets available upon request.

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



Queen and Disease Clinic Pricing

Five Sample Minimum • Bulk Pricing Available

ANALYSIS	PRICING (per sample)	SAMPLES TESTED		
		QUEENS	DRONES	QUEENS
Reproductive Quality	\$24.00	✓	✓	
Standard Pathogen Screen	\$55.00	✓	✓	✓
Apiary Pathogen Screen	*\$220.00	UP TO 25 COLONIES/APIARIES		
Mitotyping (Africanization)	\$35.00	✓	✓	✓
Genotyping (Mating Number)	\$20.00			✓

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

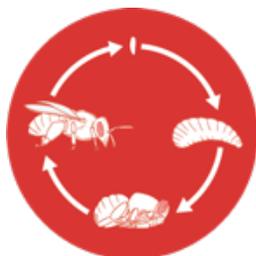
Lab Spotlight: Gaven Bell

Gaven started in our program as a high school senior at the NC School for Science and Math in Durham, which facilitates internships at local universities. She reached out to us because of her interests in bees and genetics, and she worked with Lauren on projects that genotyped workers in order to quantify the mating numbers of their queens. She enrolled in NC State this past fall, and so she has continued in our program as an undergraduate researcher. With Lauren graduating, Gaven is starting a new project using many of the same genetic tools to investigate if genetic distance is an important factor in queen rejection during introduction into new colonies. We're really lucky to be working with Gaven, so be on the lookout for much more to come!



2020 online ‘Beginner’ BEES school

Couldn’t make the weekly meetings for your local bee school, on their waiting list, or missed the deadline? Hoping to start a hive or two of bees this spring but don’t know where to begin? Join our virtual bee school and learn what to do from us!



<p>Week 1 (March 4-11): Basic Honey Bee Biology and Life Cycle</p>	<p>Week 2 (March 12-18): Introduction to Beekeeping and Hive Management</p>	<p>Week 3 (March 19-25): Importance of Bees and Beekeeping to Society</p>
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Our online BEES school will allow students to learn at their own pace but still interact online with each other and NCSU instructors. Each week for three consecutive weeks, we will learn about honey bee biology, management, and industry including live Q&A office hours” every Wednesday evening.

Getting into beekeeping can be difficult for several reasons, so it can be hard to know where to begin. There are a lot of people who are intrigued and would like to start their own hive or two of bees, but it just seems so daunting to put thousands of stinging insects into a box!

The local county chapters of the NC State Beekeepers Association—of which there are ~75 and typically meet at their local extension offices—do a fantastic job at holding annual beekeeping short courses (“bee schools”), usually during the winter months in preparation for starting in the spring. However, if you couldn’t make your local bee school for some reason (e.g., the timing was bad, you missed the deadline, etc...), we have the perfect opportunity for you so that you don’t have to wait another year!

The online learning environment affords a lot of flexibility, but it can also be missing that social interaction with the instructor and other students. This online bee school, however, will include in-course chat rooms, bulletin boards, and weekly like

“office hours” so that everyone can interact and learn from each other.

WHEN: March 4-25th

WHERE: Online Beekeeper Education & Engagement System (BEES)

HOW: Students will enroll in the ‘Beginner’ level BEES courses and learn the online content on their own time and at their own pace. Each Wednesday evening, we will hold virtual “office hours” with Dr. David Tarpy to discuss what you have learned and answer any lingering questions.

An optional in-hive field day will be offered at the NCSU Lake Wheeler Honey Bee Research Facility in Raleigh on March 28th (rain date April 4). This is only open to those who participate in the full online bee school.



'Beginner' BEES School (Continued)

If you're interested in participating in this year's 'Beginner' BEES school, please find more information and registration on our website:

<https://www.ncsuapiculture.net/online-beginner-bees-school>

NC STATE EXTENSION
NC State Apiculture Program
presents
• B • E • E • S •
BEEKEEPERS EDUCATION AND ENGAGEMENT SYSTEM
Online Beginner Beekeeping Courses
NOW AVAILABLE!

ORIGINALLY **\$105** SAVE **\$15** BUNDLED DISCOUNT **\$90** FOR ALL THREE BEGINNER CLASSES

WEEK 01: MARCH 4TH - MARCH 11TH
BIOLOGY
Basic Honey Bee Biology and Life History
Subtopics:
The Bees, The Colony, Development, Division of Labor, Foraging

WEEK 02: MARCH 12TH - MARCH 18TH
MANAGEMENT
Intro to Beekeeping and Hive Management
Subtopics:
The Hive, Equipment, Sting Safety, Colony Establishment, Working a Hive, Troubleshooting

WEEK 03: MARCH 19TH - MARCH 25TH
INDUSTRY
Importance of Bees and Beekeeping to Society
Subtopics:
Being a Good Neighbor, Honey and Hive Products, Pollination, Join the Beekeeping Community

Weekly Live Online Discussions with Dr. David Tarpy
Wednesday Evenings
March 11TH | March 18TH | March 25TH

Go at Your Own Pace Each Week

Optional Field Day at NC State Bee Lab
March 28TH, 2020
Additional \$50 (Sun Day, April 4TH 2020)

No Prior Experience Necessary

REGISTRATION STARTS JANUARY 27TH 2020
Registration and More Information go to www.ncsuapiculture.net/online-classes

NC COOPERATIVE EXTENSION

Current Lab Members

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Kirsten Benson - Design Coordinator
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Esmael Amiri - NRC Postdoctoral Fellow (UNCG)
Brad Metz – NC State Research Associate
Alison McAfee – NCERC Postdoctoral Fellow (UBC)

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

Undergraduate Researchers
Gaven Bell, Austin Acree, Danyelle Reiskind,
April Sharp, 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 (our design coordinator)! 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 Lauren!

Lauren Rusert successfully defended her Masters thesis and has graduated pending some final revisions. She's tying up some loose ends with her second chapter on population genetics, and she will be starting a PhD at the University of California at Davis in March 2020. Congratulations, Lauren, although we will miss you!

Random Notes

New Publications

- Amiri, E., J. Herman, M. Strand, D. R. Tarpy, and O. Rueppell (2019). Vertical Virus Transmission in Honey Bees: What is in the Egg? *Insects*, **88**: 11.
- Metz, B. and D. R. Tarpy. (2019). Variation in the ontogeny of drone morphological and reproductive quality. *Insects*, **88**: 4-5.
- Rusert, L. M., J. S. Pettis, and D. R. Tarpy. (2019). Varroa mite impacts on queen bee quality in the Hawai'ian Islands. *Insects*, **88**: 15.
- Milone, J. P. and D. R. Tarpy. (2019). Larval toxicity to a field-relevant pesticide mixture compared across honey bee (*Apis mellifera*) stocks. *Insects*, **88**: 22-23.

Presentations

David provided presentations at the ground-breaking of the exciting new UNC Greensboro (Plant and Pollinator Center), the Emerging Research Showcase at the NCSU Alumni Center, and a departmental seminar at the University of Georgia (Entomology). **Erin McDermott**, **Brad Metz**, **Joe Milone**, **Hannah Levenson**, and **Lauren Rusert** were all authors on paper presentations at the Entomological Society of America (ESA) conference in November, where Joe was runner-up in the student competition. Brad, Joe, and **Ali McAfee** all attended the American Bee Research Conference (ABRC) at the American Beekeeper Federation (ABF) conference earlier this month as well.



Dr. David Tarpy at the new UNC Greensboro Plant and Pollinator Center.

Teacher's Corner: Courses at NC State

We do not have any formal courses for the Spring 2020 semester. Last fall, we had another successful offering of ENT 203, *An Introduction to the Honey Bee and Beekeeping*, as we do every fall semester. This year, ENT 203 honors student **Victoria Patterson**, an Agricultural Business Management major, created a website that explore the growing interested of "Api-tourism" in North Carolina. Check out the link to her wonderful project on our NCSU Apiculture FaceBook page!

<https://www.facebook.com/ncstateapiculture/>

[go.ncsu.edu/honeybees](https://www.ncsu.edu/honeybees)



Tarpy's Back Page

With the demise of the latest NC state budget, the proposed bill to help fund a new research facility on our Lake Wheeler Research complex is no longer. Nonetheless, we are incredibly thankful to all of the beekeepers (particularly former NCSBA Presidents **Charles Heatherly** and **Rick Coor**) for their hard work and efforts that went into making this possibility a potential reality. We are confident that their efforts have helped move the needle about the importance of honey bees and other pollinators!



Option B

