

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 2021

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What have we been up to?

This past year is one for the record books, to say the least. We were highly fortunate that most of our projects were not negatively affected because they were in the analysis- or writing-phase rather than the data-collection phase, and we are thankful that nobody in the program contracted COVID. Nonetheless, Brad and Erin have been never more busy in our Queen & Disease Clinic, and Sharon has kept our BEES network growing despite not being able to hold BEES Academies. 2020 also saw records in our productivity as well, with an all-time high number of scientific publications (13), extension presentations (collectively 74), and individual contacts (8,348). We also had near-record numbers of extension publications (26) and research grant funding (\$775,000 from our current \$2.85M in awards). We also had Lauren Rusert (MS) and Joe Milone (PhD) graduate from their respective degree programs and move onto greener pastures. Ali and Esmaeil had personal records in their own publications, and Jennifer stayed busy this season practicing instrumental insemination and harvesting a record honey crop. We hope 2021 will be even better!



Two 2021 online 'Beginner' BEES schools

This spring, we're continuing our online BEES school for wanna-bee 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

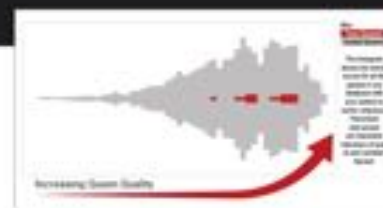
This highly-tailored collaboration involves custom experimental design, analyses, and interpretation. This unique partnership between science and industry has been utilized to:

- 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		
		QUEEN	DRONE	COLONY
Reproductive Quality	\$24.00	✓	✓	
Standard Pathogen Screen	\$55.00	✓	✓	✓
Aplary Pathogen Screen	*\$220.00	*UP TO 48 COLONY INDIV.		
Mitotyping (Africanization)	\$35.00	✓	✓	✓
Genotyping (Mating Number)	\$220.00			✓



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: Brad Metz

As the self-described jack-of-all-trades in the NC State Apiculture Program, **Brad Metz** is a newly promoted Research Associate in the lab. Currently his research interests involve male life history patterns in the social and solitary bees, namely relationships among fitness parameters, reproductive and behavioral ontogeny, mating behaviors, and environmental stressors, nutrition, disease, and pesticides. Additionally, he spearheads the Honey Bee Queen & Disease Clinic, our client-driven, fee-based research and analytical service that partners with extension agencies, master beekeeper programs, honey bee breeders and beekeepers, and research labs throughout the country. Brad has become an indispensable member of the program and a true team player, and we look forward to working with him for the long term.



2021 online ‘Beginner’ BEES schools

PLEASE PASS ALONG to those who couldn’t make the weekly meetings for their 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 one of our two virtual bee schools and learn what to do from us!



Basic Honey Bee Biology and Life Cycle	Introduction to Beekeeping and Hive Management	Importance of Bees and Beekeeping to Society
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Our online BEES school will allow students to view the ‘Beginner’ BEES content but still interact online with each other and NCSU instructors. In two separate offerings (one week-long “self-paced” course and one all-day course), we will learn about honey bee biology, management, and industry including live Q&A using Zoom.

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, none available, 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. These online bee schools, however, will provide the best of both world.

There are TWO opportunities this year:

OPTION #1: Week-long “self-paced” course

WHEN: February 10-17th

WHERE: Online Beekeeper Education & Engagement System (BEES) & Zoom

COST: \$84 registration (20% discount)

HOW: Students will enroll in the ‘Beginner’ level BEES courses and learn the online content on their own time and at their own pace. Afterwards, on Wednesday Feb. 17th at 7:00 pm, we will hold virtual “office hours” with Dr. David Tarpy to discuss what you have learned and answer any lingering questions. Attendees will then have a total of 30 days access to the course content, have the opportunity to take the comprehensive online quiz, and download their personalized eCertificate of Completion if they pass at 80% or better.

OPTION #2: Day-long “live” course

WHEN: Saturday, March 13th

WHERE: Zoom (live webinar)

COST: \$75 registration (29% discount)

HOW: Students will register and be sent instructions on how to attend a Zoom session. Registered attendees will watch each recorded BEES lecture (15 in total), each followed by a short live Q&A through Zoom.



'Beginner' BEES School (Continued)

Attendees will receive copies of lecture notes and a personalized eCertificate of Completion.

If you're interested in participating in either one of our 'Beginner' BEES schools, please find more information and registration on our website:

<https://www.ncsuapiculture.net>

NC STATE EXTENSION 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

BIOLOGY
Basic Honey Bee Biology and Life History
Subtopics: The Bees, The Colony, Development, Division of Labor, Foraging

MANAGEMENT
Intro to Beekeeping and Hive Management
Subtopics: The Hive, Equipment, Sting Safety, Colony Establishment, Working a Hive, Troubleshooting

INDUSTRY
Importance of Bees and Beekeeping to Society
Subtopics: Being a Good Neighbor, Honey and Hive Products, Pollination, Join the Beekeeping Community

Live Q&A on Zoom with Dr. David Tarpy
Go at Your Own Pace Each Week
Family discount available
No Prior Experience Necessary

REGISTRATION STARTS January 22nd, 2021
Registration and More Information go to www.ncsuapiculture.net/online-classes

NC STATE EXTENSION

Current Lab Members

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

Hannan Levenson - PhD Candidate
(Entomology and Evolution & Ecology)

Undergraduate Researchers
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



Random Notes

New Publications

Rusert, L. M., J. S. Pettis, and D. R. Tarpy. (2021). Introduction of *Varroa destructor* has not altered honey bee queen mating success in the Hawaiian archipelago. *Scientific Reports*, **11**: 1366.

Milone, J. P. and D. R. Tarpy. (2021). Effects of developmental exposure to pesticides in wax and pollen on honey bee (*Apis mellifera*) queen reproductive phenotypes. *Scientific Reports*, **11**: 1020.

Tarpy, D. R., E. Talley, and B. N. Metz. (2021). Influence of brood pheromone on honey bee colony establishment and queen replacement. *Journal of Apicultural Research*, <https://doi.org/10.1080/00218839.2020.1867336>.

McAfee, A., A. Chapman, L. J. Foster, J. S. Pettis, and D. R. Tarpy. (2021). Trade-offs between sperm viability and immune protein expression in honey bee queens (*Apis mellifera*). *Communication Biology*, **4**: 48.

Milone, J. P.*, P. Chakrabarti Basu*, R. Sagili, and D. R. Tarpy. (2021). Honey bee (*Apis mellifera*) royal jelly is qualitatively and quantitatively affected by colony level pesticide exposure. *Chemosphere*, **128183**.

Presentations

Because of COVID, we aren't holding any face-to-face extension events. Instead, we've moved everything online through Zoom and other platforms. Importantly, we're holding bi-weekly webinars called Apiculture Online—Hive Chat with NC State and posting their recordings on our YouTube channel. Between the live-stream and recordings, we've been averaging ~650 people and over 1,000 in some weeks.

Hannah Levenson gave two workshops via Zoom to the Conservation Association and the NC Vegetation Management Association. In addition, **David Tarpy** was also a co-headliner to the Texas State and Colorado State beekeeper associations, as well as provided talks to the Warren County Extension, the Federation of Irish Beekeepers, the Capital Area Beekeepers association (NH), and the Midstate (SC) Bee Club, all via Zoom.



Dr. David Tarpy at the new UNC Greensboro Plant and Pollinator Center, 2019.

2021 Calendar

January 2021	February 2021	March 2021	April 2021
W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 01: New Year's Day 18: Martin Luther King Day	W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 13: Presidents Day	W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 04: Independence Day	W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 25: Christmas Day
May 2021	June 2021	July 2021	August 2021
W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 31: Memorial Day	W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 11: Columbus Day	W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 25: Thanksgiving	W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
September 2021	October 2021	November 2021	December 2021
W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 06: Labor Day	W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 11: Columbus Day	W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 11: Veterans' Day 25: Thanksgiving	W S M T W T F S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

2021 speakers schedule

If your state or local club is interested in booking a presentation by one of the members of the NC State Apiculture Program, submit a request using our online form! If we cannot make a live webinar, we have many free recordings available on our YouTube channel.

<https://ncsupiculture.net/speaking-engagements>



Congratulations Lauren!

Lauren Rusert, a former MS student in the program, recently published her first paper in *Scientific Reports* titled "Introduction of *Varroa destructor* has not altered honey bee queen mating success in the Hawaiian archipelago." Lauren is now a PhD student at the University of California at Davis studying queen acceptance in honey bee colonies.



Teacher's Corner: Courses at NC State

We do not have any formal courses for the Spring 2021 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, however, we moved the entire course to the Distance Education (DE) environment because of COVID. The course went very smoothly and we received very positive feedback from the students. We hope to continue offering a DE section of ENT 203 going forward!

go.ncsu.edu/honeybees



Tarpy's Back Page



The end of 2020 came with some unwelcomed news, where our field lab (the Lake Wheeler Honey Bee Research Facility) was officially condemned by the state inspector. At issue were foundation problems and a leaking roof that resulted in significant mold growth posing potential health concerns. The sections of the building that were condemned have now been evacuated, but we have been given permission to work out of the useable portion of the structure for the time being. Nonetheless, we are scrambling to adapt our program to the changing scenario, including a likely move to another building on the other side of the Lake Wheeler experimental research farm (the "Dix Facility") within the next year. It is yet unclear how this will impact our plans for research and extension going forward, but it certainly is causing us to be cautious and conservative in our experimental logistics and future strategic planning.

