

# Wolfpack's Waggle

## NC State Apiculture Program Newsletter

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

Issue 2 | Apr 2020

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### What have we been up to?

To say that this coronavirus health crisis has thrown us all for a loop is indeed an understatement. Compared to many of colleagues, we are extremely lucky that our program is not nearly as negatively impacted by these trying times. Jennifer has been granted special status to continue working (alone) at the bee lab to keep our colonies healthy and thriving. Luckily, our two graduate students are in the final stages of their degrees, and thus they are mostly in analysis and writing mode, which can be done while sequestered since it doesn't depend on additional field work. Brad is pretty much in the same situation, working on turning datasets into publishable manuscripts. Erin's work in the genetics facility can be easily put on hold since all of the samples are in the freezer, although it's hard to make progress while banned from campus. Our undergrads April, Gaven, Danyelle, and Rachael are probably the most affected, as while their spring research projects have been curtailed they have transitioned to mostly literature research rather than empirical data collection. Our hearts go out to everyone who is much more significantly impacted by this situation, and it is our most fervent hope that this will soon end with a whimper so that we may resume at least some semblance of normalcy once again.



### New bi-weekly live Zoom discussion with NC State Apiculture Program

Because we are prohibited from interacting normally face-to-face, we are launching a new online webinar every week for everyone to connect about bees and beekeeping. Join us!





**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

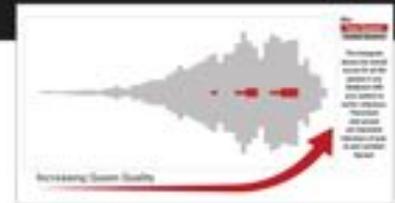
**Pathogen Screening:** identification of presence and relative levels of ABPV, BQCV, DWV(A&B), IAPV, LSV, Trypanosomes, and both Nosema species. Additional and custom pathogen targets available upon request.

**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 SAMPLES		
Mitotyping (Africanization)	\$35.00	✓	✓	✓
Genotyping (Mating Number)	\$120.00			✓

### 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: Alison McAfee

Dr. McAfee joined our collaborative group about 2 years ago as a postdoc, although not physically since she is working remotely from Vancouver. She has already gained a strong reputation in the field of honey bee proteomics. For her thesis at University of British Columbia under Leonard Foster, Ali studied the molecular underpinnings of hygienic behavior.

Ali's project with us here at NC State is to investigate a different aspect of honey bee productivity—the ability of honey bee queens to maintain viable stored sperm throughout her multi-year lifespan. She has already secured a highly coveted NSERC Postdoctoral Fellowship and published three papers in this new line of research while at NC State, including a recent paper in *Nature Sustainability* that is making a big splash in the field.



## Apiculture Online—Hive Chat with NC State

Just because everyone sheltering in place doesn't have to mean that we lose our connections to other beekeepers. To take advantage of this moment, the NC State Apiculture Program will be hosting live online webinars every other week.

Necessity, as they say, is the mother of invention. To be more precise in our current home-bound predicament, necessity provides the opportunity for adaptation...

County Extension Director Seth Nagy and I put together a joint presentation at the recent spring NCSBA conference, where we talked about distance education (DE) and remote learning platforms, especially as they apply to extension in general and beekeeping in particular. Turns out that the very first video conferencing technology was introduced to the world at the 1964 World Fair in NYC. Ever since, it has gained an increased foothold in many business and educational platforms, ranging from Skype to FaceTime to Google HangOuts to Zoom.

Well, as it turns out, a mere week later and the coronavirus fiasco hit our shores with a vengeance. Many bee schools were still going on, and all monthly meetings of the local chapters were up in the air. Many clubs reached out to me, having seen or heard of Seth's and my presentation, asking to implement an online alternative. Many had done so, and kudos to them for rising to that opportunity to adapt.

As things have continued to unfold, it seems clear that we won't be going back to the "old normal" anytime soon, and at the very least we need to at least prepare to consider alternative means of keeping bees, interacting and communicating with each other, and learning about bees and beekeeping. As such, we in the NC State Apiculture Program will start hosting bi-weekly online webinars to continue such efforts in a virtual format.

# zoom



Currently, we are envisioning these webinars to last about an hour and consist of four segments:

- (1) *Bees in Season*. We will start off with what your bees are doing right now, and what you need to do as a beekeeper.
- (2) *Program presentation*. This will be a short (10-15 minute) talk from someone in our program on research or other topics pertinent to bees and beekeeping.
- (3) *Interview*. Every two weeks, we will invite someone in the beekeeping world to discuss pertinent issues germane to all of us.
- (4) *Q&A*. For the final 15 minutes, we will solicit questions from the audience (using the Zoom chat function) and answer them to the best of our abilities.

We were planning to hold these **every other Wednesday evening starting at 7:00, beginning April 22nd**.



## Apiculture Online (Continued)

Our first guest will be the NCSBA President, Paul Newbold, so that we can have a discussion about the “new normal,” logistical challenges and opportunities afforded by the health crisis, and other pertinent subjects of the immediate present.

Stay on the lookout for emails and announcements concerning these live webinars, both through the NCSBA and our Wolfpack Waggle email listserv, including direct links to the Zoom webinars. If you haven't already, subscribe to our social media (@NCSUApiculture on Twitter and FaceBook) and email us to sign up for our email listerv ([NCSUApiculture@gmail.com](mailto:NCSUApiculture@gmail.com)).

The necessity of physical distancing only introduces the opportunity of remaining socially interactive as a beekeeping community, so we hope to see you online!



NORTH CAROLINA STATE UNIVERSITY  
**APICULTURE PROGRAM**

## Current Lab Members

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**Esmail Amiri** - NRC Postdoctoral Fellow (UNCG)  
**Brad Metz** – NC State Research Associate  
**Alison McAfee** – NCERC Postdoctoral Fellow (UNC)

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

**Undergraduate Researchers**  
Gaven Bell, 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

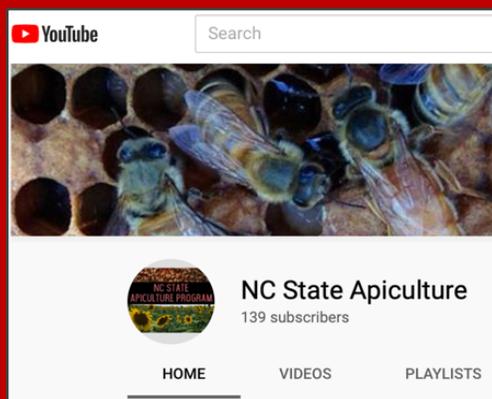
The Apiculture program is always seeking creative solutions to its material needs. If you have surplus equipment or other non-monetary assets to give (e.g., gently used honey extractors, microscopes, even vehicles), please consider donating them to the program. You will receive credit for the monetary 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](http://www.ncsuapiculture.net)

[go.ncsu.edu/apiculture](http://go.ncsu.edu/apiculture)





## Try us on YouTube!

For several years now, we've been adding video content onto our very own YouTube channel. From beekeeping advice to some of our latest research, this *free* resource is perfect to plug into your monthly beekeeper meetings or to watch during your downtime. Subscribe and view us today!



## Congratulations Joe!

Even before his anticipated graduation this summer, **Joe Milone** has landed what he calls his "dream job" with the EPA in Washington DC. As our resident toxicologist, Joe will be putting his expertise to work by crunching the numbers behind how pesticides are registered to minimize their off-target effects on honey bees and other pollinators. Congrats Joe, well done!

## Random Notes

### New Publications

Amiri, E., C., M. K. Strand, D. R. Tarpy, and O. Rueppell. (2020). Egg-size plasticity in *Apis mellifera*: honey bee queens alter egg size in response to both genetic and environmental factors. *Journal of Evolutionary Biology*, **33**: 534– 543.

McAfee, A., H. Higo, L. Foster, M. M. Guarna, D. R. Tarpy, and J. S. Pettis. (2020). Honey bee queens are vulnerable to heat-induced loss of fertility. *Nature Sustainability*. <https://doi.org/10.1038/s41893-020-0493-x>.

### Presentations

Many of us attended the 14<sup>th</sup> annual student symposium of the Southern Appalachian Honeybee Research Consortium (SAHRC), which was hosted by our colleagues and collaborators at Appalachian State University. Among the presenters were **April Sharp, Gaven Bell, Rachael Lamanick, Hannah Levenson, and Joe Milone**. **Esmail Amiri** also attended from UNCG, as did **Brad Metz** and **Erin McDermott**.



Members of the NC State Apiculture program at the SAHRC student symposium (left) and entire attendees (right), Appalachian State University, February 22 2020.

On March 3-4<sup>th</sup>, the 2 days immediately prior to the spring NCSBA conference, we held our fourth BEES Academy for intermediate beekeepers. We had 45 attendees, and it was yet another very successful offering. Many thanks to Tom Glasgow and staff at the Craven County Extension Center for hosting, as well as Adolphus Leonard of the NCSBA for helping us out with the in-hive content on varroa mite monitoring.

Since the last Waggle, David Tarpy has provided presentations to the NC State Beekeeping Club, the Backyard Beekeepers Association (CT), the NCSBA Spring meeting (3), and a webinar to the BIP tech-transfer teams. We have also helped several local chapters and bee schools adapt to the transition to online learning. For example, we had a record 50 people sign up for our latest online 'Beginner' BEES school, which included all three of our online mini-courses, weekly live Q&A sessions, and a final comprehensive quiz resulting in a coveted eCertificate.



## Teacher's Corner: Courses at NC State

We weren't teaching any courses on campus this spring, so we did not have to scramble to offer our classes online like many of my other colleagues. Even if we were, our previous offerings of ENT 401 (Honey Bee Biology and Management) was *already* an online-only course with three weekend field days for hands-on activities, so it wouldn't have made much of a difference. That course is on hiatus, however, because of no dedicated TA for such an intensive course. For this upcoming fall, we hope to offer ENT 203 once again, but as yet we have not committed to courses this fall semester pending further insight on the health crisis. Guess we'll see later this summer!

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



## Tarpy's Back Page

I recently wrote an extension article on incorporating lessons from the COVID-19 crisis to beekeeping. While here is a brief summary, a link to the full article can be found at: [go.ncsu.edu/readext?672674](https://go.ncsu.edu/readext?672674)

- We're told to frequently wash our hands to reduce the spread of the coronavirus. Bees can't wash their hands, of course, but they can exhibit *hygienic behavior*, which is what handwashing is all about. So **buy queens that have been bred for hygienic behavior**, if at all possible.
- We're also told to *physically distance ourselves* from others to reduce viral transmission within the entire population. If possible, **try to space your hives well apart from each other**. The close proximity of colonies in an apiary facilitates the drifting of foragers and especially drones, which can facilitate the spread of parasites and pathogens.
- We've been asked to *quarantine* ourselves if we develop COVID-19 symptoms. If you have a colony with a high Nosema load or varroa count, then put it into quarantine. **Don't move frames, brood, honey, or bees from infested colonies to other colonies**, even if they're still strong (for the time being), because you'll just be spreading the disease.
- Finally, and perhaps most importantly, the only way that we've been able to keep track of the progression of COVID-19 is through regular *screening and testing* of the greater population for the causative disease agent, SARS-CoV-2. **Testing and monitoring for varroa mites** is something every beekeeper should know and put to practice very frequently (at least monthly, if not every time you inspect each hive).

