



So What are these Acronyms I've Never Heard of Before?

# ABRC at AAPA 2018

**Elina L. Niño AAPA Past President**

Extension Specialist, University of California  
ANR Cooperative Extension, Davis, CA

**Michael Simone-Finstrom AAPA President**

Honey Bee Breeding, Genetics and Physiology Laboratory  
USDA-ARS, Baton Rouge, LA

While many of you are busy enjoying much celebrated national beekeeping conferences, chances are you might not have even been aware that another beneficial and thought-provoking conference is taking place at the same time and most likely in the same place. The American Association of Professional Apiculturists (AAPA) has organized the American Beekeeping Research Conference (ABRC) for the past several decades with January 2018 marking the 31<sup>st</sup> gathering. Over the two-day conference, a total of 55 oral presentations and 12 poster presentations were given, representing work done from over 30 different research groups located throughout the United States and Canada. This year, AAPA members met in conjunction with the American Beekeeping Federation Conference and Tradeshow, while in 2019 AAPA will be partnering with the American Honey Producers Convention and Tradeshow in Phoenix, AZ.

So what is AAPA and what do we do? AAPA was established by Malcolm Sanford, Eric Mussen and John Harbo following the founding of the Canadian Association of Professional Apiculturists (CAPA). AAPA has three main goals:

- 1) Promote communication within and between industry, academia and the beekeeping community.
- 2) Develop and foster research on fundamental and applied questions to gain a greater understanding of bee biology in an aim to assist and improve the beekeeping industry.

- 3) Create a venue to rapidly share new techniques and current research to advance the field.

But perhaps one of the most noble endeavors of the association is promoting the junior and early career researchers through awards and scholarships and by providing a friendly platform for scientific discussion. This year's winner of the AAPA Student Scholarship was Elizabeth Walsh from Juliana Rangel's Laboratory at Texas A&M University. In 2018 we established additional awards: Postdoctoral travel award won by Kaira Wagoner from University of North Carolina Greensboro (UNCG) and an extension award won by Rachael Bonoan from Tufts University. In addition, there were three student presentation winners. Please make sure you pass the word of these opportunities to the deserving young researchers you know. You can learn more from our website <http://aapa.cyberbee.net/awards/>.

Many great contemporary apiculturists have served the association by providing insights on important beekeeping topics ranging from input on neonicotinoid effects on bees to putting forth a White Paper on Colony Collapse Disorder and Bee Health.<sup>1</sup> The professional members strive to report on the most up-to-date research findings and their possible application for the industry (see *Bee World* volume 94, Issue 3).<sup>2</sup> The next time when you are attending the ABF or AHPA conference consider stopping by ABRC; your registration for those conferences automatically grants you free access to ABRC. And just in case you were not able to join us this year,

we bring you a brief synopsis of the research presented.

We kicked off the conference with a bit of a look into the future with Dr. Marla Spivak (University of Minnesota). Dr. Spivak asked the question: What would happen if we were to flip our perspective on bee health and consider the "super" to be half full instead of half empty? For example, instead of considering that there is 30-40% annual colony mortality we could look at it as having a 60-70% survival which would mean lots of stock with good breeding potential. Our wide ranging differences in treatment or no treatment approaches for colony management both have pluses and minuses that could be harnessed for improving honey bee health. For instance, while treatments for various maladies can help with herd immunity and ensure there is a sufficient supply for pollination, it might lead to propagation of susceptible bee stock. Dr. Spivak also discussed the idea and the need to revisit certain standards established in the industry such as the varroa mite thresholds. She spoke about the need for refining those to apply to different types of situations and particularly in light of our lack of understanding how viral infections may influence these thresholds. For example, more remote locations or smaller apiaries might be able to withstand higher mite pressure.

Dr. Spivak continued by discussing the need for furthering our understanding of the mechanisms of infested brood and varroa removal, including more general hygienic behavior in addition to varroa sensitive hygiene, as well as other traits, like grooming where bees remove

varroa mites from other adult bees. This understanding would allow us to improve our breeding efforts to include multiple traits of resistance against pathogens and other maladies. She suggested we rethink what we know about microbiota of honey bees including pathogens and the way we deal with them. For example, why does treating a bacterial infection with antibiotics help control a Black queen cell virus (BQCV) infection? Dr. Spivak's self-proclaimed wild speculation was dysbiosis where antibiotics kill off an opportunistic bacterium, allowing beneficial microbiota to control the virus. Lastly, Dr. Spivak reminded us that we should be working towards helping honey bees help themselves by providing them what they naturally utilize such as propolis and other naturally occurring phytochemicals in nectar and pollen. It would be wise of us to keep moving forward by looking for novel ways to be better researchers and better beekeepers and improve bee health by promoting these natural defenses.

This was a nice segue into the remainder of the session where speakers discussed a range of topics including varroa mite physiology and behavior, viral resistance and even how ants can be involved in viral transmission to honey bees. Shilpi Bahtia (University of North Carolina at Greensboro, Rueppell Lab) presented her efforts in identifying colonies with resistance to specifically Israeli Acute Paralysis Virus (IAPV), once thought to be correlated with CCD. She was able to identify some colonies exhibiting desirable viral resistance characteristics. However, these are only the first steps in starting a breeding program and additional efforts will be discussed.

A real crowd pleaser was the presentation by Samuel Ramsey (Univer-

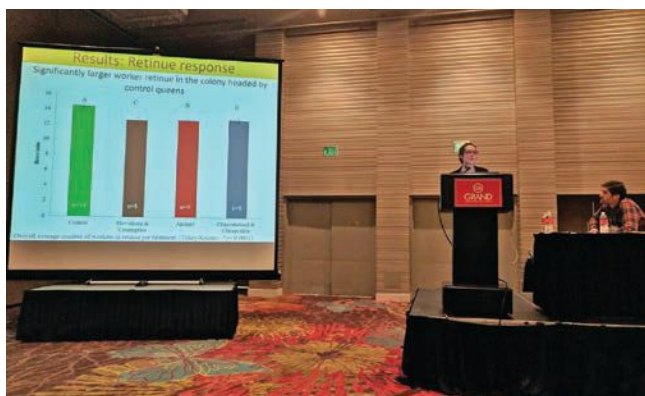
sity of MD, vanEnglesdorp Lab). You might have heard about his very cool and ground breaking research challenging a long-standing idea that varroa mites feed on hemolymph of the bees and further questioned the assumption of whether the mites actually feed on adults. Well, as it turns out the female mites are indeed going after the fat of the honey bees (Burnham, 2018),<sup>3</sup> which means that varroa mites are not actually "phoretic" when on adults because a phoretic phase would mean the mites are just waiting around on the adult bees until they find another suitable larval cell to infest. Because the mites are actually feeding on adult honey bees too, this prompted Ramsey and the team to propose a change in terminology from phoretic to dispersal phase. These findings can prove to be a game changer in the combat against varroa and may likely influence the way we think about and develop new miticides.

The following session discussed nutritional needs of the honey bees. Topics ranged from evaluating pollinator communities in different habitats such as turfgrass and prairies to determining honey bee pollen foraging preferences. While not directly related to honey bee nutrition, the most curious talk of the session was certainly a discussion of how we could harness the drone brood removal not only for varroa mite management but also for human consumption. Bridget Gross (Ohio State University, Reed Johnson Lab) gave a compelling argument for using this highly protenaceous snack as a part of our every-day diet while potentially making some additional income. Hey, no need to be grossed out – I hear drones taste like almonds.

AAPA often meets with our counterparts to the North – CAPA, but on the years we don't organize joint

meetings we are very grateful to have CAPA members share their research updates. This year Dr. Stephen Pernal shared with us the results of the Canadian Honey Bee Health Survey. From 2014-2017, 944 samples were included with most coming from Alberta. Data provided insight into *Nosema* species composition with the majority of the positive samples across the board presenting with primarily *Nosema ceranae* infection while a small portion of samples presented with a mixed infection of *N. ceranae* and *N. apis*. In terms of bacterial infections, more specifically American Foulbrood (AFB), approximately 12% national samples tested positive for AFB, with all of the samples testing sensitive to Tylosin (meaning Tylosin should still be an effective treatment of choice for Canadian infections). Interestingly, there was a high prevalence of BQCV, SBV (Sacbrood virus), and LSV 1-4 (Lake Sinai virus), with over 80% of national 2014-2017 samples testing positive. It is still not quite clear what the presence of these viruses means for colony health, but Daughenbaugh et al (2015)<sup>4</sup> did find a negative correlation between LSV variants and colony survival. You can learn more about the Canadian Honey Bee Health Survey here.<sup>5</sup> The final talks of the session included discussion of the impact of various pesticides on honey bee physiology and health.

Presentations on the first day were concluded with a "Shark Tank" style competition sponsored by the Honey Bee Health Coalition where selected researchers, beekeepers and students battled for additional funds to support further development of their original ideas for honey bee health improvement. Out of six competitors, four were awarded the funds and you can read more about their projects in the March 2018 issue of ABJ. But in



Elizabeth Walsh Student Scholarship winner presenting



Shilpi presenting

our book, the real stars were a group of students from Georgia Institute of Technology who presented their idea for a Honey Bee Ultrasound that would be used for rapid colony evaluations in the field. Make sure you watch the presentations at <https://www.facebook.com/pg/beehealth-org/videos/>. Our attendees then had an opportunity to continue their discussion at an evening social and poster session. We want to extend our sincerest thanks to our sponsor **Véto-pharma**<sup>6</sup> and particularly Phil Craft.

The second day of the conference began by honoring the winners of the Honey Bee Health Coalition challenge and the student paper winners. There were excellent student presenters and the top three ranked by the judges were (in no particular order): Morgan Carr-Markell, (University of Minnesota, Spivak Lab), Joseph Milone (North Carolina State University, Tarp Lab), and Taylor Reams, (University of North Carolina at Greensboro, Rueppell Lab). Winners received a monetary award so make sure you encourage your students to enter the ABRC student paper competition.

Research presentations continued with a discussion of chemical impacts on honey bee health as well as the newest developments for varroa management. The main message was not so surprising and that is the more stressors bees face, the more likely it is their health will suffer. For example, Dr. Christina Mogren (University of Hawaii, Manoa) pondered the negative impacts of larval dietary stress on susceptibility to clothianidin (neonicotinoids) and in turn Dr. Scott O'Neal (University of Nebraska, Lincoln) reported on the correlation between amitraz (commonly used miticide by beekeepers) and viral susceptibility leading to increased mortality. While

sometimes these data tend to throw us into a pit of despair, these studies can also be extremely valuable in modulating colony management approaches (for example, timing of specific miticide treatments) for reduced bee stress.

Keeping with the theme of the plenary talk, a presentation by Dr. Margarita López-Urbe (The Pennsylvania State University) explored the differences in immunocompetence between feral and managed honey bee populations. Dr. López-Urbe and her team identified higher expression of some genes involved in antiviral resistance in feral PA colonies as compared to managed counterparts. Interestingly, DWV levels were lower in managed colonies suggesting that the antiviral response in honey bees involves additional antiviral mechanisms. The next steps will examine the survival rates of these distinct honey bee populations and the possibility of co-opting these beneficial resistance traits found in feral populations into breeding programs focused on promoting resistance to viruses. In fact, Dr. Michael Simone-Finstrom from the Honey Bee Breeding, Genetics and Physiology Laboratory in Baton Rouge, LA has already started efforts towards breeding virus resistant/tolerant stock<sup>7</sup> with some success in identifying colonies with promising tolerance traits.

The conference ended on a fun but informative note. Dr. Jennifer Tsuruda (Clemson University) in collaboration with Dr. Olav Rueppell (UNC-G) took advantage of the last year's solar eclipse to study the effects on honey bee behavior. This behavioral plasticity allows the bees to respond to changes in their environment, as for example, with migratory movement. Interestingly, drones were seemingly

better at finding their way back home during the eclipse, while workers had the fastest return rate after the eclipse. Combined, the results suggest that both workers and drones are able to quickly adjust to new challenges. These changes do not seem to be in response to changes in light intensity or temperature considering minimal changes in these parameters, but the humidity dropped significantly during the eclipse. Unfortunately, we will have to wait for some time to explore this phenomenon further as the next total solar eclipse visible from North America will be on April 8, 2024. Luckily, you will not have to wait this long for the next ABRC to be held in January 2019 in Phoenix, AZ.

If this article peaked your interest and you want to learn more, you can find the abstracts of the talks and posters in the complete conference proceedings available on-line in April 2018 at *Bee World* volume 95, Issue 2 (<https://www.tandfonline.com/loi/tbee20>).<sup>8</sup> The link to the proceedings can be accessed through the AAPA website (<http://aapa.cyberbee.net/meeting-archive/>) as well. We once again extend sincere thanks to all of the presenters and participants and we congratulate all the award winners. Finally, we thank you for reading and we hope to see you all next year!

**Disclaimer:** Mention of any company or commercial entity does not constitute an endorsement.

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AAPA attendees congratulating the HBHC winners



Steve Pernal presenting

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