



FLORIDA MELITTO FILES

NEWS FOR BEE LOVERS

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Become a Citizen Scientist With New *MorphoMetric* Software

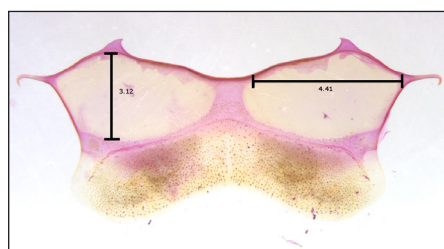
Tomas Bustamante — University of Florida Honey Bee Research and Extension Laboratory



I WAS RECENTLY working on a morphometrics project where we needed to take measurements of several honey bee body parts from two subspecies to compare the differences between them. I had some experience programming, so I made a software application that would help us do that.

I put the software in the hands of a volunteer, and he was collecting data within minutes. A few days later he had finished measuring 73 different variables across 2,550 specimens, resulting in a sea of 186,150 different data points. As impressive as that number is, that is not the most surprising part of this story. There is a twist: This volunteer was my younger brother, a high school student.

Perhaps a short explanation is necessary for the uninitiated. Morphometrics is the analysis of form. This includes techniques that analyze length, size, shape, angles, and so forth. These techniques have historically been integral in developing our understanding of phylogeny and speciation. They are also important in monitoring for pest species and identification. Today they offer relatively inexpensive, practical methods for analyzing large, dynamic populations.



TOP: A honey bee ready for measurement.

BOTTOM: Honey bee sternite with measurements.

Collecting data for morphometric analysis can be tedious, especially when working with small organisms such as honey bees. What the story above illustrates is how, with the right tools, this difficulty can be overcome so that anyone who is interested in the science can be involved in it.

This is why our lab is stepping out of our normal pursuits to work on our latest project, a computer program called *MorphoMetric*. We are pulling together the best parts of that custom software

and turning it into a tool that can be used to collect and organize this kind of data quickly and easily. It will be perfect for teams that consist of mostly volunteers or students. It can be used by citizen scientists or hobbyists that want to build projects of their own, such as many of our Master Beekeepers. It can even be used by more experienced scientists who want an easier way of doing their projects. In short, it will be for the benefit of anyone that is interested in doing this kind of science, whether citizen scientist or veteran researcher.

We need your help! *MorphoMetric* will be entirely community supported and open to the public in ways that our previous projects have never been. This means that in addition to raising the funds straight from the community, we are going to include our supporters throughout the entire process, using videos, pictures and discussions as the project develops. We are inviting all of our HBREL friends to play a much larger role than ever before.

There are several different ways that you can help immediately. One way is by contributing to our crowdfunding campaign on Indiegogo (<http://igg.me/at/MorphoMetric>). This page will

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Bee Informed Partnership Activities



Liana Teigen — University of Florida Honey Bee Research and Extension Laboratory

AS PART of the Bee Informed Partnership's Southeastern Tech-Transfer Team, I have the opportunity to travel the country and follow bees to various pollination events, from almonds in California all the way to blueberries in Maine. Once our bees have done their job for the year, they return home to

Florida to undergo splitting and growing, and get ready to do it again.

Fortunately for the bees (and beekeepers!), the warm climate allows Florida to have nectar flows throughout the fall months to aid in this process. In addition to Spanish needle and melaleuca (as well as many others), Brazilian pepper is a great honey flow in South Florida.

It is also one of the most invasive plant species! I have made several trips down south to where many commercial operations take their bees to the Brazilian pepper, so they can enjoy the last major honey flow of the year. This got me thinking about how beekeepers have a somewhat different perspective of invasive species than many people.

From star thistle to Chinese tallow to Brazilian pepper, some of these invasive plants have considerable draw for beekeepers for honey production despite active efforts to eradicate these plants. I thought I'd take this opportunity to share some information on the Brazilian peppertree and its history in Florida.

Brazilian pepper, *Schinus terebinthifolius*, also known as Florida holly, is native to Brazil, Argentina and Paraguay. It was originally introduced to this state in the late 19th century and marketed as an ornamental plant. Since the 1940s, it has aggressively spread throughout the Florida landscape and, according to the Florida Fish and Wildlife Conservation Commission, now covers over 700,000 acres and is listed as a Category I invasive exotic plant.

Brazilian pepper grows as small- to medium-sized trees, approximately 15-30 feet tall. Due to their rapid growth rate, the trees form a very dense canopy, which causes them to shade out any native species struggling to grow below them, such as mangroves — incidentally, another great honey source.

In addition to native plant suppression, Brazilian pepper also stifles native animal habitat and diversity while sheltering numerous other invasive species such as the exotic root weevil, the black spiny-tailed iguana, and some exotic ants.

Despite so much negative impact on the environment, Brazilian pepper is also great for another invasive species: the honey bee! From the beginning of September through October, Brazilian pepper blooms with tiny white nectar-producing flowers. The honey made from this nectar is a light golden color with a somewhat bitter aftertaste. Technically considered bakery grade honey, it is still very popular, especially in Florida. ●



Facts About Brazilian Pepper (BP)

Brazilian pepper's main bloom in Florida is September to October, but sporadically blooms throughout the year.

There are 6-8 million pounds of BP honey produced in Florida.

BP is in the same family, Anacardiaceae, as poison ivy and poison oak, and the sap can cause skin reactions.

Almost every part of the tree can and has been used medicinally. It has antibacterial and antiviral properties, as well as many other medicinal applications.



Orchard Bee Association Meeting

Cory Stanley-Stahr — University of Florida Honey Bee Research and Extension Laboratory



EACH YEAR the Orchard Bee Association gathers to share information and enjoy scientific presentations at their members only meeting. The meeting is followed by an informative symposium which is open to the public. This year's meeting was held in Hood River, Oregon, on October 1–2, against a beautiful backdrop of tree-covered mountains just starting to show their fall colors.

The meeting started out with association business. This included the announcement of this year's winner of the Contributions to Orchard Bees Award, the very deserving Glen Trostle. Election results were also announced, and UF HBREL's very own Cory Stanley-Stahr was elected president for 2016.

The scientific presentations featured very interesting and diverse reports from the three recipients of bees from the Orchard Bee Association's grant program. Shahla Farzan of UC Davis presented research that determined which parasitoids are most likely to be encountered by blue orchard bees (*Osmia lignaria*) depending on when they emerge from overwintering. Laura Ward of UC Berkeley told the group about her efforts to get mason bees to nest within cages under laboratory conditions, which would facilitate testing of systemic pesticides. The third grant recipient, Steve Peterson of AgPollen gave an update on research he did as part of Project Integrated Crop Pollination (ICP), in which he experimented with planting wildflower strips near almond orchards to see if almond yield and the health commercially reared mason bees are affected.

Several other speakers presented their interesting research on a wide range of topics from pesticide effects to population retention. This year the association had the pleasure of hearing from some of the international members, as Chris Whittles of CJ Wildlife explained research that he is conducting in the UK, and Claudio Sedivy and Thomas Strobl of



The Orchard Bee Association Meeting was held at Hood River, Oregon.

Wildbiene + Partner came all the way from Switzerland to describe the fantastic partnership they have created between urban homeowners and rural farms in need of pollination services.

Following the scientific presentations, association members made their way to a local orchard and winery, Analemma Wines. Three companies, Masonbeesforsale.com, Crown Bees, and Watts Solitary Bees, sponsored an afternoon of wine tasting and hors d'oeuvres while members visited several stations set up throughout the orchard. At each station members were able to see how other members set up orchards for pollination by mason bees, with an opportunity at the end for everyone to discuss the different setup strategies.

On Saturday, October 3, the Orchard

Bee Association relocated to Portland State University to deliver their Annual Pollinator Symposium for the public, which was cosponsored by Project ICP. Local members gave presentations on backyard mason bee nests and native plantings that benefit pollinators. Sujaya Rao of Oregon State University showed several years of her native bee research, including her work with Project ICP. As you may recall from past issues of the *Melitto Files*, our lab is also working on Project ICP. Cory Stanley-Stahr presented some preliminary results from University of Florida as well as several other Project ICP collaborators. The symposium was well received, and everyone enjoyed learning about pollination from the local, backyard scale all the way up to the national, agricultural scale. ●



Attendees enjoyed an orchard tour during the 2015 Orchard Bee Association Meeting.

Florida Beekeeper Management Calendar – Fall 2015

	Month	Management Calendar	Blooming Plants
North Florida: Ensure that colonies have enough food. It can be cold in N. Florida during winter.	Oct – Dec Similar management schemes in Oct, Nov, and Dec. Pests become less of a problem late in year.	1) Varroa populations peaked in Aug/Sept. Treat if necessary. Options include: Apiguard, Api lifeVAR, Apistan, Mite Away II, Hopguard and Apivar. 2) Can treat colonies for Nosema disease using Fumigillin. Colonies may need as much as 4 gallons of medicated syrup to control <i>Nosema cerana</i> . 3) Monitor for and control small hive beetles (options include Checkmite+, GardStar, Hood traps West Beetle traps, beetle blasters and more.) 4) Feed colonies if light (colonies can starve!) 5) Can treat for tracheal mites (mix vegetable oil and powdered sugar until doughy - not sticky to touch: place a pancake-sized patty on top bars of brood chamber).	Oct: Spanish Needle, Mexican Clover ^N , Primrose Willow ^N , Spotted Mint ^N , Golden Rod ^N , Vine Aster ^N , Smart Weed ^N , Bush Aster ND Nov: nothing new blooms Dec: nothing new blooms
Central Florida: Varroa remain an issue through winter due to warmer temps.	Oct – Dec Similar management schemes in Oct, Nov, and Dec. Pests become less of a problem late in year.	1) Varroa populations peaked in Aug/Sept. Treat if necessary. Options include: Apiguard, Api lifeVAR, Apistan, Mite Away II, Hopguard and Apivar. 2) Can treat colonies for Nosema disease using Fumigillin. Colonies may need as much as 4 gallons of medicated syrup to control <i>Nosema cerana</i> . 3) Monitor for and control small hive beetles (options include Checkmite+, GardStar, Hood traps West Beetle traps, beetle blasters and more.) 4) Feed colonies if light (colonies can starve!) 5) Can treat for tracheal mites (mix vegetable oil and powdered sugar until doughy - not sticky to touch: place a pancake-sized patty on top bars of brood chamber).	Oct: Spanish Needle, Mexican Clover ^N , Brazilian Pepper*, Primrose Willow ^N , Spotted Mint ^N , Golden Rod ^N , Vine Aster ^N , Smart Weed ^N , Bush Aster ND Nov: nothing new blooms Dec: nothing new blooms *Brazilian Pepper blooms from September through October and is a significant Fall source of nectar for bees.
South Florida: Varroa are an important issue in S. Florida in winter because colonies are rarely broodles.	Oct – Dec Similar management schemes in Oct, Nov, and Dec. Pests become less of a problem late in year.	1) Varroa populations peaked in Aug/Sept. Treat if necessary. Options include: Apiguard, Api lifeVAR, Apistan, Mite Away II, Hopguard and Apivar. 2) Can treat colonies for Nosema disease using Fumigillin. Colonies may need as much as 4 gallons of medicated syrup to control <i>Nosema cerana</i> . 3) Monitor for and control small hive beetles (options include Checkmite+, GardStar, Hood traps West Beetle traps, beetle blasters and more.) 4) Feed colonies if light (colonies can starve!) 5) Can treat for tracheal mites (mix vegetable oil and powdered sugar until doughy - not sticky to touch: place a pancake-sized patty on top bars of brood chamber).	Oct: Spanish Needle ND , Mexican Clover ND , Brazilian Pepper*, Primrose Willow ND , Smart Weed, Melaleuca ND , Nov: nothing new blooms Dec: Maple, Willow *Brazilian Pepper blooms from September through October and is a significant Fall source of nectar for bees.

^NContinues to bloom in Nov, ^DContinues to bloom in Dec, NDContinues to bloom in Nov and Dec



HONEY BEE



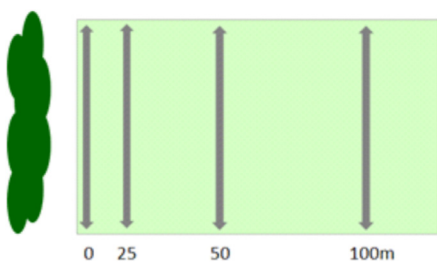
BUMBLE BEE



SOUTHEASTERN
BLUEBERRY BEE



CARPENTER BEE



Four observation rows at increasing distances from the edge of a blueberry field.

How Far Will Bees Go To Pollinate Blueberry?

Mary Bammer, Dr. Cory Stanley-Stahr, and Steven Pelkey

University of Florida Honey Bee Research and Extension Laboratory

A study on bee movement across blueberry fields, and how it affects yield

WITH SEVERAL completed blueberry seasons under our belt, the Native Bee Team at HBREL is happy to have some preliminary data to share with you from Project Integrated Crop Pollination! Project ICP aims to provide growers with best management practices, backed by research, for their crop and region to help ensure sufficient crop pollination.

Between 2014 and 2015 our team observed and collected bees visiting blueberry flowers on 15 southern highbush blueberry farms in north central and central Florida. Of these 15 farms, eight of them were stocked with commercially produced bumble bee hives. On the remaining six farms we were able to study how the distance of blueberry rows from the edge of a field affects bee diversity and abundance in a conventionally pollinated field (i.e., pollination from managed honey bee hives and wild bee populations, no bumble bees added) and in turn, how this potential change in the bee community may affect overall blueberry yield. A field's margin may provide extra forage or nesting habitat for bees that is not available farther into that field. It is important to recognize the forage ranges of pollinating bees to ensure that all parts of a field are receiving adequate pollination and fruit set.

To test this, we observed bees visiting blueberry flowers at four rows of bushes. One row was at the edge of each field, and the other three were at increasing distances into each field: 25 meters, 50 meters, and 100 meters from the field edge. Across 21 sampling events, we observed four groups

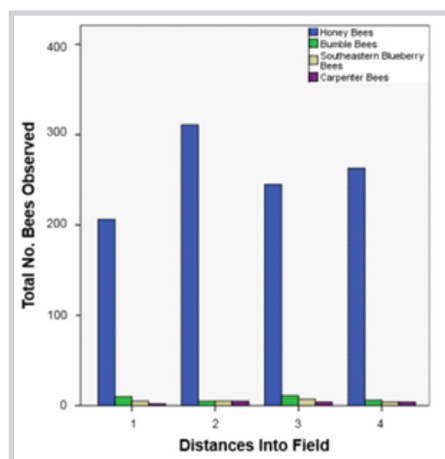
of bees: honey bees, bumble bees, the southeastern blueberry bee, and carpenter bees. Of these four, the number of honey bees observed far outnumbered the other three groups, which are all considered wild bees. This was true at all four distances into the fields. We then determined whether how far we went into the field affected how many bees we saw in each group. For all four groups of bees, distance into the field made no statistical difference on the number of bees observed from each group.

Finally we looked at the diversity of bees observed at each of our fields and found that in all instances there was very low bee diversity. This is due to the vast number of honey bees that we observed pollinating blueberry flowers. The sheer number of them flooded our dataset and drove overall bee diversity down. Because all of our fields had such low diversity, there was then no link between bee diversity and total blueberry yield.

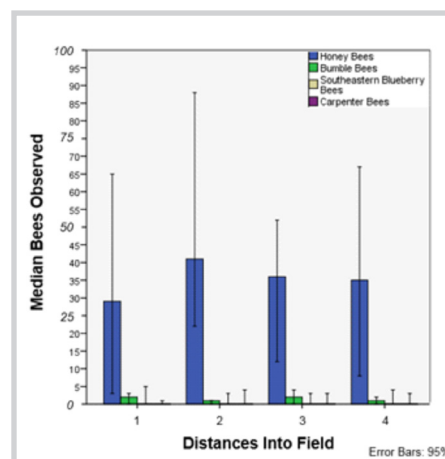
What can be gathered from these results is, in part, that 100 meters (the farthest depth into the fields) is still within the foraging

range of all of the bees that pollinate these blueberry farms. Diversity and abundance did not change by moving farther from the edge of the field because these bees can have forage and nest sites along the edge and can still reach the 100 meter row of the blueberry field. In this case, they can have their cake and eat it too — or maybe they can have their homes and eat blueberry too. Perhaps if bees were observed at even farther distances, say 200 or 400 meters into a field, then we might start to see bee diversity or abundance decrease at those depths. Finally, with the high number of honey bees driving down overall diversity at these fields, we are not able to see if bee diversity affects blueberry yield. Because we cannot remove honey bees from these systems, we cannot truly say what impact wild populations of bees may be having on yield.

Make sure to look for the results of other ICP research in future editions of the Melitto Files! To learn more about Project ICP, visit www.ICPbees.org or like us on Facebook at www.facebook.com/IntegratedCropPollinationProject. 🐝



Total number of bees observed at four field depths across all sampled fields.



Mean number of observed bees compared across four field depths at all sampled fields.

Busy Bees: Events of the Honey Bee Lab

Bee Colleges, Welsh Honey Shows, Master Beekeeper Training, and More

Emily Helton — University of Florida Honey Bee Research and Extension Laboratory

IF YOU were unable to make it to the 2015 South Florida Bee College, I have to say, you missed a doozy. SFBC is a two-day event we hold every year that is open but not limited to beekeepers in South Florida. It was held at that Florida Research and Education Center in Davie, Florida, where we hosted many wonderful speakers and a variety of classes for every level of beekeeper from entry to experienced.

We were pleased to have two very wonderful keynote speakers this year. Jerry Hayes of Monsanto spoke of his lifetime of beekeeping experience and how beekeeping has made him who he is today. Dr. Hachiro Shimanuki spoke on the different crises that honey bees have faced throughout history and how they have overcome them. Both were fascinating and very informative.

Another great opportunity at SFBC was our Welsh Honey Show. I would like to take a moment to recognize what a great program this is. If you would like to know if you actually have the bees that produce the finest honey, the Welsh Honey Show is the place to do this. There are not only categories for honey but also artwork, photography, wax crafting, gadget making, mead making, and many more. Anyone who attends these events can enter the Honey Show. We had a great variety this year, ranging from great honey to great photographs and crafts. There are grand prize ribbons given during the banquet ceremonies. The next winner could be you!

Not only was SFBC a place to learn, it was also a place to connect. We had beekeepers and bee enthusiasts from all over attend our event this year. Who says that you have to limit your knowledge

gain to the lectures? You also get the advantage of networking with beekeepers, extension agents, and others in your area that have the same bizarre interest in these little stinging creatures that the rest of the world just does not understand. You are able to chat and exchange advice and tips that have worked for you in the past. You have a plethora of information at your fingertips.

Now, I know what you are thinking: “Oh man, I should have gone to South Florida Bee College. It sounds so interesting and awesome, and now I have to wait a whole year before I can experience this amazing event for myself.” Well my friend, it just so happens that SFBC is not the only event during the year. The 9th Annual Bee College is fast approaching. It will be held at the Whitney Marine Lab in St. Augustine on March 4 and 5, 2016. One of our keynote speakers will be Kim Flottum, the editor-in-chief of *Bee Culture* magazine. We will also have a lineup of awesome vendors that can provide you with top-of-the-line beekeeping equipment, books covering a vast span of bee knowledge, and gifts. This is our

largest event of the year and seats are limited, so register early! Registration can be found on the Eventbrite website in the near future. We will also be holding a Welsh Honey Show open to all attendees.¹

We will be holding Master Beekeeper Training and Exams the day before Bee College at the Whitney Lab, March 3, 2016. The Master Beekeeper Program is a beekeeper training and certification program offered by the University of Florida. There are four levels that take a minimum of five years to complete.² Lunch and dinner will be provided for those who register. There is also a test review available after dinner for those who would like to know the answers to questions for which they might not have gotten the whole concept. Registration is now open on the Eventbrite website³.

We hope you will take advantage of this amazing opportunity and join us as we learn and grow as beekeepers and bee enthusiasts. Happy Beekeeping! ●

¹ <http://entnemdept.ufl.edu/honeybee/extension/welshHoneyJudging.shtml>

² http://entnemdept.ufl.edu/honeybee/extension/master_beekeeper.shtml

³ <https://www.eventbrite.com/e/university-of-florida-master-beekeeper-program-spring-session-2016-tickets-18964689898>



Dr. Hachiro Shimanuki spoke about the problems that honey bees face.



Jerry Hayes of Monsanto also was a keynote speaker at South Florida Bee College 2015.

Introducing Cameron Jack

New PhD student at the University of Florida Honey Bee Research and Extension Laboratory

HELLO fellow melittophiles! I am grateful for the opportunity to introduce myself. My name is Cameron Jack, and I recently moved from Corvallis, Oregon, to become a part of the HBREL team. I have just begun my PhD program under the mentorship of Dr. Jamie Ellis, and I will be researching various aspects of Varroa control during my time here.

I grew up in a small, rural farming town in southern Nevada. It was there that I became exposed to beekeeping at a young age. My Grandpa was a sidelineer who kept about 60 honey bee colonies on his property, selling honey and wax candles. Grandpa occasionally needed help working with the colonies, and I was often volunteered by my mother to give him a hand. I loved the time together with my Grandpa, but in my youth, I didn't care much for insects that could hurt me.

After high school, I attended Southern Utah University with every intention of becoming a high school biology teacher. However, during my junior year, a professor invited me to participate in his research by catching bats and recording their echolocation calls. I was immediately hooked and fell in love with scientific research. I then made up my mind that I would attend graduate school so that I could fulfill my need for both teaching and research.

During my years of estrangement from honey bees, I learned about the profound ecological impact these creatures have on our agriculture and the impact honey bee decline has had on the beekeeping industry. I found an opportunity to pursue a master's degree while researching honey bee health at



Cameron Jack rocks a bee beard out West, where he lived and kept bees before moving to Gainesville to study for his PhD at the Honey Bee Research and Extension Lab.

Oregon State University with Dr. Ramesh Sagili. There, my research focused on the honey bee gut pathogen *Nosema ceranae*, and it provided useful insights regarding colony infection dynamics and the role of pollen nutrition on *Nosema* infection. That work has the potential to aid in the development of better sampling protocols and the prevention of colony losses due to *Nosema*.

Part of my research at OSU involved painting thousands and thousands of newly emerged honey bees to mark them so I could recapture them at a later age. While I painted these newly emerged bees, I would often find *Varroa* mites on the bees. I found that I could use

my paintbrush to remove the *Varroa* mites from the bees and paint them to the wall of my container. Instead of painting bees, I often became obsessed with killing the mites. It was during those moments that I learned something important about myself: I really like killing *Varroa* mites!

I am hopeful that our research conducted here at the HBREL will have a positive impact in our fight against the scourge of the honey bee, the *Varroa* mite. I am very excited to be in Florida, and I look forward to meeting many of you. If you have any questions, please feel free to contact me at cjack@ufl.edu. 🐝

SAVE THE DATES! The Honey Bee Research and Extension Laboratory 2016 Extension Events:

UF Master Beekeeper Program Training and Exams

March 3, 2016

The Whitney Laboratory for Marine Bioscience

9505 Ocean Shore Blvd.

St. Augustine, FL 32080-8610

UF Bee College

March 4 & 5, 2016

The Whitney Laboratory for Marine Bioscience

9505 Ocean Shore Blvd.

St. Augustine, FL 32080-8610

Caribbean Bee College

Dates to be announced

St. George's University

True Blue Campus, St. George's

Grenada, West Indies

South Florida Bee College

August 12 & 13, 2016

UF Ft. Lauderdale Research and Education Center

3205 College Ave.

Davie, FL 33314

Register up to
three months
prior to any
event at



<https://www.eventbrite.com>

MorphoMetric, Continued from Page 1

also serve as the central hub for information regarding the project.

Why do we need funding? Consider the metaphor of writing a paper. You could use either Notepad or Microsoft Word to write your paper, since both have the same function, but it is absurd to expect anyone to favor the bare-bones, no-formatting functionality of the former over the rich, user-friendly experience of the latter. We now have the Notepad version of Morphometric. It shows a lot of promise, but we have a vision for something that is so much more!

You can also share our project with your friends and family.

One of the main ideas behind MorphoMetric is that it is "so easy anybody can do it," with the hope being that anybody *will* do it. From professional researchers, to citizen scientists, to students, to teachers, to state employees, we expect anybody that is interested in learning, teaching, or doing science will want to know about this software.

Another way to support us and this project is to share and like our posts on Facebook, Twitter, and Instagram (@ufhoneybeelab). Plus, it is a great way to interact with our lab. You can request pictures and share your ideas about the project. ●

 Follow us on twitter @UFhoneybeelab

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