

COOPERATIVE EXTENSION

UNIVERSITY OF CALIFORNIA



November/December 2015

---

*Subscriptions Thank you! Mead Making Course Oxalic Acid Is that a queen I smell?  
UCD Bee Program USDA at UCD Pollination Kids' Corner Upcoming Events*

---

#### Newsletter Emailed to You

This newsletter is published bimonthly: in February, April, June, August, October and December. If you wish to have this newsletter sent directly to your email address, please follow the instructions below.

Enter this URL into your browser: <https://lists.ucdavis.edu/sympa/subscribe/ucdavisbeenews>. When it opens, it should relate to subscribing to this newsletter. Enter your email address and then click **submit**.

If you wish to be removed from the list, then you do the same things as above, but choose **Unsubscribe** and click **Submit**.

#### Mailed (Hard) Copy Newsletter Subscribers

It is time to decide whether to continue your hard copy subscription. The mailed subscription rate is \$25 per year for the six issues. If you'd still like to continue this subscription please send a check by February 15, 2016 payable to the UC Regents and mailed to Elina L. Niño at the address in the signature block. Be sure to include your name and mailing address. If the check is not received you will not receive the next issue of the newsletter as a hard copy. This does not apply to those who already prepaid for a certain time period.

We do hope you will keep reading so don't forget that you can get the newsletter for **free** via e-mail or on-line at: [http://elninobeelab.ucdavis.edu/apiculture\\_newsletter.html](http://elninobeelab.ucdavis.edu/apiculture_newsletter.html). Thank you!

The University of California, in compliance with Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973, and the Age Discrimination Act of 1975, does not discriminate on the basis of race, religion, color, national origin, sex, mental or physical handicap, or age in any of its programs or activities, or with respect to any of its employment policies, practices, or procedures. Nor does the University of California discriminate on the basis of ancestry, sexual orientation, marital status, citizenship, medical condition (as defined in Section 12926 of the California Government Code) or because individuals are special disabled veterans or Vietnam era veterans (as defined by the Vietnam Era Veterans Readjustment Act of 1974 and Section 12940 of the California Government Code). Inquiries regarding this policy may be addressed to the Affirmative Action Director, University of California, Agriculture and Natural Resources, 1111 Franklin Street, 6<sup>th</sup> Floor, Oakland, CA 94607 [(510) 987-0696].

A BIG Thank You to the Direct Supporters  
of the E. L. Niño Bee Lab!

Funding

California State Beekeepers Association  
College of Agriculture and Environmental  
Sciences, UC Davis  
Project Apis m  
The IR-4 Project

Donors

Beekeeper's Guild of San Mateo Co.  
Delta Bee Club  
Gilroy Beekeepers Association  
Honey Pacifica<sup>®</sup>  
Los Angeles Co. Beekeepers Association  
Marin County Beekeepers  
Mt. Baker Beekeepers Association  
Sacramento Area Beekeepers Association  
San Francisco Beekeepers Association  
Santa Barbara Beekeepers Association  
Santa Clara Valley Beekeepers Guild  
South Dakota Beekeepers Association  
Bayer Crop Science (provided testing material)  
Evonik Industries (provided testing material)  
John and Jake Reisdorf (built an observation  
hive)  
JZs-BZs (provided equipment)  
Leonard, Linda, Brad Pankratz (provided  
queens)  
Mann Lake, Ltd. (provided equipment)  
Vita Europe Ltd. (provided testing material)

Partners

Honey and Pollination Center at the Robert  
Mondavi Institute

We also thank many donors who have  
contributed over the years to our outstanding  
bee and pollination program at UC Davis.

AND my biggest fear is that I have forgotten  
to acknowledge any of our supporters out  
there. So please forgive me if I did so and  
PLEASE let me know so I can add your  
name to the list of people who keep our lab  
going.

Beginner's Introduction to Mead Making  
Course (by Bernardo Niño)

Despite being the oldest alcoholic  
beverage in the world, very few people are  
aware of the wondrous elixir known as  
mead. The earliest record of mead dates  
back to 1700 in "The Hymns of the  
Rigveda". However ceramic vessels  
containing chemical signatures of a mixture  
of honey, rice and other fruits along with  
organic compounds of fermentation dating  
from 6500-7000 BC were found in Northern  
China (McGovern et al 2004).

So as you can imagine, this  
November we were all-a-buzz with  
excitement for the UC Davis Honey and  
Pollination Center's 2-day "Beginner's  
Introduction to Mead Making" course. The  
course participants came from all over the  
country and one participant even traveled all  
the way from India. Their backgrounds  
ranged from experienced mead makers with  
very little knowledge of honey or honey  
bees to expert beekeepers looking for  
something to do with all their extra honey.  
This class was led by some of the biggest  
names in the mead making industry here in  
the US and the world. Ken Schramm, Mike  
Faul, Petar Bakulic, and Michael Fairbrother  
delighted participants with their vast  
knowledge of ways to create this ancient  
drink of royalty. Dr. Elina Niño joined  
Amina Harris in rounding out the presenters  
and added valuable information about all  
things honey and honey bees to the novice

mead makers. After, all understanding the honey flavors and factors that affect the flavor is essential to creating outstanding mead.

Aside from being able to spend time with these industry giants, participants were able to try their hand in making their own bottle of mead. The UC Davis LEED Platinum Winery was the perfect setting to have a hands-on tutorial for the mead making process. The class of 60 was split into 5 smaller groups and shown the mead making process by the masters themselves. We learned about the nuances of cultivating different flavors within the mead and the types of mead that can be made. Yeast selection, fruit addition, timing of the fermentation process, as well as different brewing equipment were discussed in great detail.

Other highlights included tasting a wide variety of meads, most of which were award-winning, and enjoying a myriad of honey flavors from all over the world. For something so simple even a caveman could do it (and someone like me), mead has an infinite number of possibilities and can be more complex than many other fermentation processes. Mead making can take years to perfect but only a weekend to get started. We are truly in the golden age of mead, with over 300 meaderies here in the US and more and more people looking to swarm to the opportunity to tap this sweet endeavor. So grab some honey (from your local beekeeper!), yeast and a bucket and get that mead brewing!

And as luck would have it, the January 2016 issue of the American Bee Journal has a very nice article about mead if you want to learn even more.

## Oxalic Acid

I was sitting at the California State Beekeepers Research meeting and one of the topics that came up was oxalic acid. With its recent registration for use on honey bees in the US it certainly has sparked an interest in a lot of beekeepers.

I wrote at length about oxalic acid treatments in the March/April newsletter (<http://elninobeelab.ucdavis.edu/assets/newletters/MarchApril%202015.pdf>) so I just wanted to quickly come back to it after reading an article that might interest you.

A group of European researchers were interested in determining whether the use of oxalic acid could have benefits other than controlling varroa mites, as for example in controlling *Nosema ceranae* infection. Nanetti and colleagues tested their prediction both in the lab and the field settings. The set up was simple – in the lab they created three groups: an untreated, non-infected group, and *N. ceranae* infected treated or non-treated group. They collected bees 4, 6, and 8 days post infection and checked spore loads. Indeed they found that the infected, treated group contained significantly higher spore numbers (~3X more) by the final collection time.

In the field, researchers assessed the levels of naturally occurring *N. ceranae* infection with and without the oxalic acid treatment as well as the colony survival. Colonies were treated twice in the fall, samples were collected and the colonies were checked in the spring.

Analysis of individual bees showed lower prevalence of *Nosema* in treated colonies and treated colonies had a greater

survival when checked the following spring. Admittedly, the surviving colonies were still in rough shape, and the study could benefit from a further follow up. But these results are of interest considering that the reports of Fumagilin efficacy against *N. ceranae* have not been very consistent.

Please keep in mind that you should still not be using oxalic acid to treat your *Nosema* – it is not register for that use and as far as I'm concerned there is still some research that needs to be done (certainly add a few more replicates and try this out in different areas and with different races/lines). But down the road if it turns out that we could kill two birds with one stone, hey, why not?!

Reference: Nanetti et al. (2015) Effect of oxalic acid on *Nosema ceranae* infection. Research in Veterinary Science 102: 167-172. You can find the article here: <http://www.sciencedirect.com/science/article/pii/S0034528815300333>

Is that a queen I smell?

I'm sure that as a beekeeper or just a lover of delicious produce you thought about bees and plants. But did you ever think about how they “talk” to each other?

A couple of weeks ago my colleague Dr. Rachel Vannette sent me an interesting article “Nectar Attracts Foraging Honey Bees with Components of Their Queen Pheromones” By the way Dr. Vannette is a new faculty member in the Dept. of Entomology and Nematology at UC Davis and she does some neat honey bee research as well. Check out her lab website here <http://vannettelab.faculty.ucdavis.edu/>

Now, we all know that bees and pollinators coevolved and they are dependent on one another. The bees help spread plant pollen around so the plants can reproduce and in return plants provide them with nectar and pollen to feed themselves and their young.

But how do the plants attract bees to provide this service for them in the first place? Well, they just keep producing the compounds that the bees are already attracted to, of course. Liu and colleagues designed a clever study to put this to the test.

They opted to test two different honey bee species *Apis mellifera* and *Apis cerana* and two different plants, a common buckwheat (*Fagopyrum esculentum*) and Mexican sunflower (*Tithonia diversifolia*). Before any bioassays were conducted, the authors identified compounds in the nectar of these two plants and found several phenolics. These included components of the queen mandibular pheromone (QMP), as well as a couple of compounds found to be repellent and also toxic to bees. How interesting!

They then tested preferences of individual bees in a laboratory assay followed by the preferences of hived foraging bees in a semi-field environment. Individual bees of both species didn't care much for sugar-water that also contained QMP and the repellent phenolics, but in *A. mellifera*, the presence of QMP slightly increased the consumption of sugar-water that also contained the repellent compounds.

The effect of different compounds on foraging was even more dramatic when the whole colonies were tested. Fewer bees were recruited to the feeders containing the

repellent compounds as compared to the pure sugar solution, but fewer bees were recruited to the pure sugar solution as compared to feeders containing QMP. However, foragers of both honey bee species preferred the sugar-water that contained both QMP and repellents as compared to QMP alone.

It appears that plants have found a way to lure in their pollinators by using the components of QMP even when potentially harmful compounds are present. More interestingly, if bees consumed or were exposed to QMP prior to testing they preferentially went to sugar water with repellent compounds as compared to sugar solution without them.

Queen pheromones significantly alter worker brain gene expression, physiology and behavior so it is not necessarily that surprising that worker foraging preferences are altered after exposure to QMP. And clever, clever plants over a (very) long time period evolved to benefit from the unique family dynamics. In fact the plants “figured this out” way before humans even thought about creating a synthetic QMP blend that would be sprayed on crops to attract the bees.

You may ask: “Now why would plants produce compounds repellent and toxic to pollinators in the first place?” Plants might have been producing these compounds to protect them from pestiferous insects before the pollinators even came on the scene. Also, these compounds at concentrations detected in plant nectar did not outright kill the bees, but it is possible that they do have some sublethal effects on bees. But from the plant’s point of view, as long as the bee delivers the pollen to the

next flower to achieve reproduction, does it really matter what happens to the bees after that? If you are a plant, then probably not.

The full reference for this article: Liu et al. (2015) Nectar attracts foraging honey bees with components of their queen pheromone. *Journal of Chemical Ecology* 41: 1028-1036 and it can be found here: [http://link.springer.com/article/10.1007/s10886-015-0642-2/fulltext.html?wt\\_mc=alerts.TOCjournals](http://link.springer.com/article/10.1007/s10886-015-0642-2/fulltext.html?wt_mc=alerts.TOCjournals)

#### Research from UC Davis Bee Program

We are really busy bees here at UC Davis and we have the publications to prove it! Dr. Neal Williams was involved in a study reporting an alarming decrease in wild bees in areas of agricultural intensification. You can find the news story here <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=19807> and the full article here <http://www.pnas.org/content/113/1/140.full.pdf>

Dr. Rachel Vannette and Dr. Brian Johnson recently published a study showing that foragers, unlike nurses, in their mandibular and hypopharyngeal glands express immune and detoxification genes which might protect them from the harmful agents they encounter while foraging. You can find the news story here <http://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=19463> and the full article here <http://www.nature.com/articles/srep16224>.

#### USDA at UCD

At the very beginning of November the United States Department of Agriculture -Agricultural Research Service hosted a

Pollinator Health workshop at UC Davis. Now you might be thinking – “NOT another workshop! Those rarely ever yield any results” But this workshop was different.

You might have heard it already and if not now you will know – the USDA is establishing a honey bee lab at UC Davis this year. And this workshop was held to gain a better understanding of what are the stakeholders’ immediate needs.

The workshop brought together an exceptional group of bee scientists from UC Davis, many beekeepers and growers, as well as folks from several different “bee-supporting” organizations. Ideas were flowing and the excitement about this new lab was palpable.

Dr. Kevin Hackett, the national program leader, gave an overview of the current honey bee and wild bee research at the USDA – ARS labs across the country. USDA clearly provides a tremendous amount of research into honey bee issues and we are all getting eager to welcome the two new scientists that will form the new USDA lab at UC Davis.

As for the focus of the lab, we still don’t know what this will be. Overwhelming voice of those present was (in the famous words of Jackie Park-Burris) “Varroa, Varroa, Varroa!” followed by pesticide exposure, and nutrition. Since the other USDA labs are already working on some of these issues, one of the ideas was to implement their findings at the UC Davis lab towards creating an integrated management approach.

USDA is still in the process of hiring the scientists and the staff as well as setting

up the lab space, but the word on the street is that the activities will start this spring. So stay tuned to learn about more great things to come.

### Pollination 2016

Holidays are over, the pies and cakes have been eaten and the pollination season is upon us. You likely already noticed hives popping up along the roadside hauled from all over the country to satisfy the needs of almond pollination.

However, the reports of failing colonies before the winter even started are numerous. This combined with the much needed rainfall in California (encouraging the growers not to remove their orchards) might be driving the price of hive rental up close to \$200.

If you are a beekeeper still looking for a pollination contract or a grower in need of bees you might want to visit the Almond Board of California’s website for their pollination directory: <http://www.almonds.com/pollination#tc-pollination-directory>

### *Kid’s Corner: “The 4-H Essay Contest”*

Every year The Foundation for the Preservation of Honey Bees, Inc. runs a contest for the 4-Hers and this year is no exception. California 4-H members have participated in this national contest organized by Dr. Eric Mussen on the state level. Last year Dr. Mussen passed the torch onto me, but I was a little disappointed that I received no essays from the California 4-H members. So let’s see if we can get your creativity buzzing.

The 2016 Essay topic is a great one and especially applicable and important for Californians: “Bees and Pollination. How important is it?” I would say VERY, VERY important, but I will leave it up to you to put your pens to paper (or fingers on your keyboard) and start telling everyone else just how important bees and pollination are to our own wellbeing.

If you are an active 4-H member and want to participate, send me ([elnino@ucdavis.edu](mailto:elnino@ucdavis.edu)) your essays by **February 15, 2016** and I will forward the winning essay to the National judging team by March 4, 2016. To get all the details about the contest visit <http://preservationofhoneybees.org/essays#rules-overview-2> And if you need more motivation, every state’s winner receives a book about bees and beekeeping, and the national winners receive a nice sum of money that they can put in their piggy banks.

### Upcoming Events

1.) **World of Honey – Honey Tasting Series.** Robert Mondavi Institute, Honey and Pollination Center, UC Davis. January 27, 2016. The first in a series of four, this event will feature California honeys. To register: <http://honey.ucdavis.edu/events/world-of-honey-honey-tasting-series>

2.) **The Feast: A celebration of Mead and Honey.** Robert Mondavi Institute, Honey and Pollination Center, UC Davis. February 6, 2016. Wonderful food, amazing honey and lots of mead! Register now: <http://honey.ucdavis.edu/events/mid-winter-beekeepers-feast>

3.) **Continuing Mead Making, Business of Making Mead, and Tour and Tasting at Rabbit’s Foot Meadery.** Robert Mondavi Institute, Honey and Pollination Center, UC Davis. February 8-11, 2016. These classes are perfect for taking your mead making to the next level. To register: <http://honey.ucdavis.edu/events/continuing-mead-making>

4.) **Planning Ahead for Your First Hives course.** E. L. Niño Bee Lab, UC Davis. February 13, 2016. For you or a brand new beekeeper in your life. To learn more and to register: <http://elninobeelab.ucdavis.edu/fh.html>

5.) **Working Your Colonies course.** E. L. Niño Bee Lab, UC Davis. February 20, 2016. Perfect for those who have taken our “Planning Ahead” course or just want to learn more about beekeeping and perhaps do some troubleshooting for their colonies. To learn more and to register: <http://elninobeelab.ucdavis.edu/wc.html>

6.) **The Chancellor’s Colloquium: “Me to We: Using Honey Bees to Find the Genetic Roots of Social Life” by Gene Robinson.** Vanderhoef Studio Theatre, Mondavi Center for the Performing Arts, UC Davis. February 22, 2016. Dr. Robinson is a world renowned honey bee researcher and to learn more about his research visit <http://www.life.illinois.edu/robinson/index.html> This event is free. To register: <https://events.r20.constantcontact.com/register/eventReg?oeidk=a07ebzqpdcdca0cc330&oseq=&c=&ch=>

7.) **Queen Rearing Techniques Short Course.** E. L. Niño Bee Lab, UC Davis. March 12 and 13, 2016. This is a 2-day short course and definitely a “fan-favorite”. To

learn more and to register:  
<http://elninobeelab.ucdavis.edu/qrtsc.html>

8.) **Bee Health Symposium.** Robert Mondavi Institute, Honey and Pollination Center, UC Davis. May 7, 2016. This event was a huge success last year and people are thirsty for more! The speaker line-up is great and it includes Yves Le Conte and Dennis vanEngelsdorp. Details are still being worked out so stay updated by visiting: <http://honey.ucdavis.edu/events>

**Disclaimer:** Mention of any company name or product does not constitute a promotion on our part.

Sincerely,

*Elina L. Niño*

Extension Apiculturist  
Dept. Entomology and Nematology  
University of California, Davis  
Davis, CA 95616  
Phone: (530) 500-APIS [2747]  
E-mail: [elnino@ucdavis.edu](mailto:elnino@ucdavis.edu)