Honey Bee Pathogens and Honey Bee Health

Michelle Flenniken

Research in the Flenniken Lab at Montana State University is focused on honey bee host–pathogen interactions at the colony (or superorganism), individual bee, and cellular levels. Projects in the lab involve several principal aspects of honey bee biology: (1) determining the mechanisms and contributions of RNA-triggered pathways in honey bee antiviral defense, (2) honey bee pathogen monitoring, detection, and discovery, with an emphasis on pathogens associated with colony losses (including CCD), (3) investigating the pathogenesis of the recently discovered Lake Sinai viruses, and (4) understanding the influence of the individual bee microbiome, metabolome, and transcriptome on the immune response and outcome of infections.

Honey bees are important pollinators of agricultural crops and plant species that enhance the biodiversity of nonagricultural and agricultural landscapes. Since 2006, US beekeepers have experienced high annual honey bee colony losses, which may be attributed to multiple abiotic and biotic factors, including pathogens [1-4]. Although the relative importance of these factors has not been fully elucidated, several studies indicate that the combination of high *Varroa destructor* mite infestation and deformed wing virus abundance (particularly in the Fall) correlate with colony death [5-7]. To identify the most prevalent pathogens and investigate the relationship between honey bee colony strength and health, Flenniken and colleagues have carried out several studies that have assessed pathogen occurrence, prevalence, and abundance in the Western US honey bee colonies involved in almond pollination [8-11]. The most prevalent pathogens vary with each sample cohort, but typically include black queen cell virus (BQCV), Lake Sinai viruses (LSVs), deformed wing virus (DWV), sacbrood virus (SBV), *Nosema ceranae*, and trypanosomatids (i.e., *Crithidia mellificae* and *Lotmaria passim*). In general, pathogen prevalence was lower early in the year (January–March) and was greater later in the year, with peak prevalence occurring in June, coinciding with peak colony populations. Pathogen abundance varied in individual colonies and total pathogen abundance was not correlated with colony health over the course of one study [10]. Although the number of pathogens (i.e., pathogen prevalence) was greater in weak colonies in the winter (i.e., February), in the spring and summer months colonies with large populations had the greatest pathogen prevalence overall [11]. Results from multivariate linear regression analysis indicate that the abundance of each pathogen was influenced by different factors, though in general pathogen abundance was most consistently associated with the date of sampling. Similar to other studies, we determined that DWV abundance was positively associated with the percentage of *Varroa destructor* mite infestation, whereas LSV2 was negatively associated with the percentage of mite infestation [10]. Data from these and other longitudinal observational cohort studies at the colony level (rather than the apiary or state level) that precisely account for sampling date and geographic location will lead to a better understanding of the influence of pathogens on honey bee colony mortality and the effects of abiotic factors (e.g.,

"Spring has returned. The Earth is like a child that knows poems."

—Rainier Maria Rilke

Continued on page 15
Sometimes bad things happen to good bees and good beekeepers. I recently spoke to a veteran beekeeper who has been in the business forty-six years and runs many thousands of colonies. Our conversation was about heavy winter losses. He summarized his assessment as follows: “I don’t have any answers.” To which I replied, “Do you think it is easier to make a living in beekeeping now, or pre-Varroa mite?” Without hesitation, he said that it is easier now. This is one of my favorite questions for beekeepers who have been around long enough to have commercial experience in both eras of beekeeping. I have yet to find one to answer the question any differently. This is an interesting contradiction to explore.

Beekeeping is, by most accounts, more difficult than it’s ever been. If beekeeping was easy, then what we do would have less value. It is this inherent difficulty that creates scarcity and makes every colony more valuable. We as beekeepers must recognize this value and charge for our services accordingly. I continue to be amazed by the resiliency, resourcefulness, and sheer fortitude of my fellow beekeepers. Honey bees are so complex, and there are so many variables out of our control. What new pesticide is going to be released? What is the neighbor a mile away going to spray? What new virus is going to be vectored by Varroa? What prime forage is going to be mowed down for a monoculture or subdivision? How will summers filled with smoke and other extreme weather events affect the bottom line and bee health? What is the effect of cheap, imported, and fake honey on our operations? The list goes on forever and is enough to keep one up at night ruminating.

This industry is in the space of crisis equals opportunity. It is this very crisis that drives the economics behind the value in beekeeping. How long can we exist in this paradigm? Hard to say, but generally speaking beekeepers have responded very well and have actually increased numbers of managed colonies over the last several years, as shown in the chart (left) from: www.acsh.org/news/2018/04/17/bee-apocalypse-was-never-real-heres-why-12851.

It will be very interesting to see how the numbers turn out after this winter, but if history is any indicator beekeepers will respond appropriately. I do take umbrage with the general thrust of the aforementioned article, however; one particular line caught my eye: “High prices are the solution to their own problem . . . .” Even if beekeeping was the most profitable enterprise in the world and beekeepers were infinitely resilient, it still would be very troubling to live in a world where the canary in the coal mine was on constant life support. There are limits to everything.

To be clear, beekeeping is not just about economics, and, as I have mentioned before, there are definitely easier ways to make more money; however, one cannot underestimate the value of loving what you do, even if it includes the cleanup of gross dead outs. By the time this message reaches you, spring will be well upon us and most surviving colonies will be ample and looking to divide with or without your help, so get your hive tool out, get to scraping, order some queens, and make some splits to restock those valuable drawn combs before the moths get to them. The rewards will be many and never forget, Amor fati!

Thank you all for what you do, and keep up the great work. Being a beekeeper in this day and age is no small feat. I truly love that beekeeping is simultaneously a source of pride and humility, and I feel blessed to be part of a cadre of such amazing people. Thank you.

John Jacob
SPRING IS SURVEY TIME

Dewey M. Caron & Ramesh Sagili

We will again be seeking the cooperation of Pacific Northwest beekeepers with the annual Overwinter Loss Survey. Large-scale beekeepers will be mailed a single-page colony loss survey in March and asked to kindly fill that out within a month (if at all possible), and send it back in the postage-paid envelope. If you prefer, you can also complete this survey electronically at: pnwhoneybeesurvey.com/survey. The first question (number of colonies) separates larger-scale from backyard beekeepers. Survey opens March 15 and continues through April.

We appreciate your past involvement and ask that you help provide us this information once again this spring. Participation in the Pacific Northwest Overwinter Loss Survey should not interfere with the great response of Oregon beekeepers to the National BIP survey. The BIP electronic survey will be available during the entire month of April (as last year). You can sign up for a reminder by visiting the www.beeinformed.org website. During your visit, look for the recent compilations of data on overwintering management, mite control, and other useful information; you can also look at just Oregon responses now on the website.

Oregon beekeepers involved in pollination colony rental should also have received a paper survey form asking for information on number of colonies, colony rental price, and crops pollinated in our annual Pollination Economics Survey. Started by Mike Burgett, this survey has data now for over 30 years. It is the largest continuous database of its kind. If you have not returned the surveys yet, then please do so at your earliest convenience.

If you rent colonies for pollination and did not receive this survey, or your loss survey has not arrived, then please contact Ramesh at: ramesh.sagili@oregonstate.edu.

KEEPING BEES IN APRIL

Max Kuhn

April in Oregon, here west of the Cascades at least, usually means the beginning of SWARM season. Swarm season for many of us is the most exciting time of the beekeeping year. But swarming is not the only reason to be excited. It is also the time of year when beekeepers are receiving their newly purchased bees. These bees usually arrive in the form of 3-pound packages or nucs. The bees have been ordered a few months before from a variety of suppliers located all over the US. Receiving these new packages or nucs can be as exciting as catching a swarm—especially for those unfortunate folks who are still waiting to catch that first one. To those folks I say, “Don’t give up.” As long as we have honey bees, we will have swarmers. And each year that you continue to keep bees, your chances of catching that swarm improve. So hang in there, your turn is coming.

Now back to the Packages and Nucs. A few years back, one of my beekeeper friends received one of those Packages of bees and installed them as per directions into a ten-frame Langstroth-style box. He placed the caged queen between two frames in this box, shook the remaining bees from the package into the same box, and closed it up for the night. He then added a feeder filled with sugar syrup. The next day he meandered out to the bee yard to have a look at the new hive. After watching the hive entrance for a few minutes and not seeing the expected bees coming and going, he sensed something was wrong and opened the hive for a closer look. Whoo! Every single bee was gone . . . vanished! No trace. Except one. There in her tiny little cage was the queen. The only bee left in the box!

How could this Happen?! What would cause a package of bees to leave a perfectly good hive box, stocked with sugar syrup, and furnished with the latest in hive hardware!!? — not to mention leaving their newly introduced queen still stuck in her cage? What kind of bees would do this? One possible answer to this mystery lies in the process of the building of the Packages themselves.

If you have never had the opportunity to watch or participate in the package-building process, you are missing a real treat. If you ever have the chance to go and witness this event, grab it; it is worth the effort. For those folks actually working on the process, it is pandemonium,
Oregon State Beekeepers Association
2019 FALL CONFERENCE

Tom Cinquini, Sowers Apiaries
Jay Evans, USDA-Beltsville
George Hansen, Foothills Honey Company
Brandon Hopkins, Washington State University
Melanie Kirby, Washington State University
Andony Melathopoulos, Oregon State University
Garth Mulkey, GS3 Quality Seeds Inc
Morris Ostrofsky, Master Beekeeper-Washington
Mike Palmer, French Hill Apiaries
Ramesh Sagili, Oregon State University
Steve Sheppard, Washington State University
and More . . .!

October 25-27, 2019
Florence Convention Center
Florence, Oregon
SAVE THE DATE!

W A S

“Hive Mind for the Greater Good”
2019 Western Apicultural Society Conference
Ashland Hills Hotel & Convention Center
July 12-14th Ashland, Oregon

Keynote Speakers & Workshop Leaders include: Dr. Judy Wu-Smart, University of Nebraska-Lincoln | Katrina Klett, Elevated Honey Co. | Hilary Kearney, Girl Next Door Honey | Dr. Meghan Milbrath, Michigan State University | Anna Gieselman, Bee Amour Jewelry | Sarah Red-Laird, Bee Girl | the native bee team from the Logan, Utah, USDA-ARS Pollinating Insects Research Unit | streamed opening welcome by Dr. Marla Spivak | and more. Swarm in for Networking Opportunities and Activities: Not only will you learn from the best and brightest, you’ll have a whole host of opportunities to personally connect with other beekeepers, as well as the speakers and workshop leaders, to share your stories, projects, ideas, products, and interests. Plan to arrive July 11th for some pre-conference fun: Raft the Rouge River and take in a show at the Oregon Shakespeare Festival with your fellow beekeepers.

Registration & Info at www.westernapiculturalsociety.org
but the end result of this event is the nice tidy little packages of bees that you bring home to install in their new home.

The package-making process involves a large box, of sorts, made from wire mesh to contain a large amount of honey bees. Into this box is inserted a size large funnel made of metal, or similar material, which provides a slick surface for the bees to slide through on their way into that box. The box and funnel are moved from bee hive to bee hive in the commercial beekeeper's apiary. At each hive, workers choose a few frames of bees and, after checking to make sure the frames do not contain the queen, they then shake the frames over the funnel mouth. This causes the bees to slide through the slick funnel and into the mesh box.

The process is repeated until the box, which may contain a hundred pounds of bees, is full. The full box is then moved to another area where the bees are scooped out with a scoop that holds about 3 pounds of bees. The scoop is emptied into the funnel again, though this time the bees are sent sliding into the wire-and-wood travel box which you eventually receive and take home to your apiary. (I apologize at this point to the commercial beekeeping profession for my oversimplified description of their package-making process, a process they take very seriously and carry out with the utmost care and consideration of the honey bees.)

The above process is coupled with the little-known fact that as many as 20 percent of all bee hives might, in April and May, contain multiple queens. Yes, it is true. During these spring months, when a colony is preparing to swarm, it may contain more than one queen. Usually they are mother-daughter queens and it is a temporary situation due to bad weather that forces the swarming colony to wait for clearing before completing the swarm process. The daughter queens are much smaller and less distinctive than the larger mother queens, which makes these virgin queens more difficult to see. I believe they can easily slip past the beekeepers preparing the packages for shipment.

Herein lies one possible reason for the absence of the bees in my friend's hive. When he installed his package of bees, it contained an extra queen! A battle might normally ensue between the two queens in this scenario, except for the fact that the one queen was contained in the small cage. So the bees in this case, not being able to attack the caged queen, may have opted for another alternative, which was to abscond or swarm.

What if this situation were to happen to you? What would you do? I have given it some thought and decided I probably would not complain to the company selling me the package. What could I say? “Hey you guys sold me two queens for the price of one, so I want my money back.” Naw . . . that might not work.

I must point out that a nuc does not have the problem described above. The nuc is normally made with a laying queen which is not caged and has already been accepted by her hive mates. The nucs are more expensive, however.

Happy Swarm hunting, and may your packages have only one queen!

A 2019 SWARM CALL NOTE

As stated in the minutes and addendum to the January board meeting (March 2019 Bee Line), the board has decided that the swarm call listing is to continue as it has previously appeared and that affiliated association swarm call lists will be added at the top of the page. The association links will be posted as they are made available. For individuals, the 2019 swarm call listing is open. It has been cleared, which means you will need to log in and sign up again even if you registered last year and are interested in collecting from the exact same locations. We ask that you please sign up for no more than ten locales this year. Thank you for your service to the public as well as the education you provide and your fine representation of the beekeeper community in doing so.
BEE WEEKEND
April 26 & 27
FRIDAY 9:30 am - 5:30 pm • SATURDAY 9:00 am - 4:00 pm

• Demos: How to install packaged honey bees by GloryBee founder, Dick Turanski, President, Alan Turanski and our other beekeeping experts.
• Meet the American Honey Queen
• Fun Family Activities
• Pick Up Pre-Ordered Honey Bees
• Bee Education
• Honey Tasting
• Food Carts

PACKAGED HONEYBEES MUST BE PRE-ORDERED!
Call 800.456.7923 to learn more or to be placed on our info list.

29548 B AIRPORT RD (HWY 99) | EUGENE | GLORYBEE.COM

For over 50 years, we have brought you the very best quality and workmanship in the beekeeping industry. For over 50 years we have used Ponderosa Pine and Western Red Cedar grown and harvested in the Pacific Northwest. For over 50 years we have been proud to say, Made in the USA!

Hobbyist Special
One pair Coveralls (S-XL)
One pair Economy Leather Gloves
Plastic Helmet & Folding Veil $72.00 (WWJAN01)

Happy New Year!
Specials!
6 5/8 Budget Supers
Same great quality and fit for a budget price!
1 - 49 $11.65 ea
50 - 499 $10.75 ea
500 - 999 $9.00 ea
1000+ $8.80 ea
Includes Free Shipping if by standard ground service.

WESTERN BEE SUPPLIES
We have assembled frames and boxes! Ask about Free Shipping!
PO Box 190, Polson, Montana 59860  406-883-2918 or TOLL-FREE 833-533-1014
www.westernbee.com Prices good through 2/10/2019


May 19, 10:00 AM to 3:30 PM: Wonders of the Hive. Registration is limited to 40. 4565 Riordan Hill Dr, Hood River. Information: bg-bees.com/wonders-of-the-hive.

June 17–23: Pollinator Week. Plan, and let us know your plans—and how things unfold!

Note: All affiliated associations invite and welcome visitors to join them at meetings. See page 16 for meeting day, website, and/or contact information. Many regional associations also offer additional opportunities for learning; they are posted on their websites as well as on orsba.org, under Events.

Regional Associations

Central Oregon Beekeepers

February was cold, and March had DEEP snow with some warmer weather later. We’re now ready for some real continued warmer weather and maybe some early blooms.

The combination of deep snow and warm weather prior to the first blooms usually causes heavy losses in Central Oregon, partially due to starvation, but other causes as well. We should be hearing about the overwintering shortly. It’s nice to hear that there are, once again, a few more suppliers for replacement bees this year.

This year, our association is not conducting a beginner bee school, but instead is providing the class content during our beginner’s corner prior to each meeting.

In February, we had to cancel our meeting because the heavy snows were starting and we have many members who live out in the wilds. In March, we did postmortems on several dead outs. In April, we’re planning on hearing about the Best Practices in residential beekeeping.

Columbia Gorge Beekeepers

Nature is a wondrous thing! February arrived to dress our surroundings in layer upon layer of snow. Meager hive insulation was soon augmented by the depth of snow surrounding them. Yet, those hives entering winter in strength could be heard a buzzing within. Alas, season’s ebb and flow has found the whiteness faded in lush green foliage, the beauty of the fruit orchard flowers enticing pollinators into their midst.

Our March meeting provided a practical demonstration and discussion on honey bee feeding, both complementary sugar...
Proven Queens

Wooten’s Queens & Bees, Inc., Steve Park Apiaries, Inc. & Wooters Bee Farms look forward to continuing to produce gentle, quality Park Italian queens with hygienic behavior and mite resistant traits that produce ample brood and large honey crops. Our continued relationship with the Bee Informed Partnership ensures we are selecting the highest quality Park Italian Queens that will be more tolerant of bee viruses, varroa mites, and nosema disease.

Our Beekeeping family wishes all of you the best in 2019!

EVERYTHING FOR A SUCCESSFUL SEASON
FEEDS ● HIVE KITS ● WOODENWARE ● FOUNDATION ● EXTRACTORS
HIVE TOOLS ● MEDICATIONS ● SUPPLEMENTS ● GIFTS ● AND MORE!

MANN LAKE
WE KNOW BEES

800-880-7694
www.mannlakeltd.com

*Free shipping applies to most orders over $100 shipped standard ground delivery within the lower 48 states.
and pollen substitute. The regular meeting’s subject was “Swarm Triggers, Behavior and Who Leaves” presented by Charlie Vanden Heuvel. Unfortunately, like many reports around the state, our hives have not fared well with the onslaught of Varroa Destructor Mites. The numbers have yet to be tallied, but we suspect 40 and even 50 percent may be the loss. The challenge comes down to a consistent hive management articulated monthly throughout the bee season.

Jerry Frazier

Douglas County Bees

An upcoming class, In the Hive on April 6, is a day in the apiary with the bees, great for new beekeepers to get more familiar with their girls. Weather pending. At each of several additional upcoming events, we will have a booth for information, catalogs, raffles, and, if weather cooperates, an observation hive. The events include the following:

- April 20, 10:00 AM–4:00 PM: Douglas County Earth Day and Energy Fair 2019, Douglas County Fairgrounds.
- April 27–28, 9:00 AM–5:00 PM: Glide Wildflower Show, Glide Community Center.
- May 4, 9:00 AM–4:00 PM: Douglas County Master Gardeners 32nd Plant & Garden Expo. Douglas County Fairgrounds.

The 2019 Umpqua Valley Home Builders Association and Garden Show was this last weekend and was a great show. We are still recovering from snowpocalypse, some members and a lot of Douglas County are still out of power and stranded at home thanks to downed trees and snow accumulation, but overall it was a great turnout.

For our April meeting, we will have Max Kuhn from Lane County, a student in the Master Beekeeper Program currently training at the Master level, here to discuss the new “Residential Practices in Beekeeping.” This is great for our new members who haven’t had a chance to hear it.

With spring coming, our members are urged to check food stores, lifting hives to determine if feeding is needed, be prepared to do mite checks, and look at various mite treatment when brood starts to emerge.

Ivory LosBanos

Klamath Basin Beekeepers

Here in the Klamath Basin, we’re celebrating more snow? While it seems like spring is delayed and the ground is covered in some areas in feet of snow, as beekeepers, we’re keeping our eye on the prize – more water makes the plants grow. Here in the Basin we’re focused on ordering bees and getting ready for warmer weather.

Last month’s meeting was presided over by Vice President John Wilda and Head of the Bee Ordering Committee Terri Torres, as the president and education officer (Paul and Katharina Davitt) were in Salt Lake City at a bee conference where Katharina presented several topics to the attendees. John and Terri educated association members on what they should be doing in the terms of Spring maintenance. Our March meeting will be technically the last day for members to order bees. We will also have elections for board positions at this meeting.

In February, Klamath Basin members did two educational events. Paul and Katharina did bee education at the annual Winter Wings Festival at Oregon Institute of Technology. John Wilda taught at the annual Klamath Basin Farm Expo; over 550 4th-grade students from across the Basin learned about bees and pollination in an event John has done for over a decade. We also had our annual beginning beekeeping class at Klamath Community College last weekend.

Here’s hoping we can stop snow blowing soon and get some flower blooms.

Paul Davitt
Our queens are thriving in the cold of Montreal and Montana; the deserts of Dubai and Libya; the hills of Ohio and Saskatchewan; the agriculture fields of California and Alberta and tropics of Barbados and Hawaii...

Olivarez Queens are bred to thrive and handle any climate. With over 50 years’ experience, we are your source for all things queen bee. Using the skills we learned from our forefathers combined with our collaboration with industry leaders, fellow beekeepers and scientists, we modify our queen genetics so they can tolerate environmental changes.

We honor beekeeping by raising the next generation of bee enthusiasts! Our mission is clear: repopulate colonies with strong, disease-tolerant queen bees because we know an amazing queen can change everything.

OHB QUEEN TRAITS:
- Economic Sustainability
- Honey Production
- Overwintering
- Tolerance to environmental changes

OHBEES.COM

<table>
<thead>
<tr>
<th>CALIFORNIA</th>
<th>HAWAII</th>
<th>TOLL FREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>530. 865. 0298</td>
<td>808. 328. 9249</td>
<td>877. 865. 0298</td>
</tr>
</tbody>
</table>

QUEENS BEES • HONEY • MONTANA • HAWAII • CALIFORNIA • HOBBY DAY
Lane County Beekeepers

On March 9, we held our annual Bee School with 48 in attendance. Sessions included large groups with attentive listening, as above, as well as four small groups, such as this group (right) with Morris Ostrofsky teaching. It was a great class with positive feedback.

Pam Leavitt

Linn Benton Beekeepers

It’s swarm season. Are you ready? It is typical for swarms to start appearing about the second week of April in Linn and Benton counties, sometimes sooner. Prior to a swarm, scout bees will begin looking for a new home and you may see bees investigating areas not normally visited by bees—for instance, chimneys, house siding, fence posts, etc. In the Northwest climate, when there have been a couple of nice clear warm spring days around 60 degrees followed by a cold spell and then another run of nice days, swarms will start to emerge. Some swarm-control methods include making splits, supering early, reversing the hive bodies, requeening, maintaining good brood comb, and maintaining strong healthy colonies.

You can also try your luck at catching swarms from other managed hives or feral hives. Swarm traps come in different shapes and sizes and can be purchased commercially or be made at home. Whichever type is used, they should be in place at least three weeks in advance of swarm season. They should be placed, on average, 15 feet off the ground and in partly shaded areas. An ideal situation would be to place them at least a quarter mile away from the original colony. Synthetic queen pheromone lures or the use of lemongrass essential oil will increase your odds of catching a swarm.

Our April general meeting features Dr. Andony Methalopoulos. His presentation is titled, “How To Keep Bees Out Of Trees So They Can Make Honey.”

Bee Joke: Why is a beekeeper always late? Answer: Because they always run bee-hind.

Amber Reese

Oregon South Coast Beekeepers

Oregon South Coast Vice President Maarty Van Otterloo attended the OSU Extension Service Bee School: Native Bee Taxonomy Course that was held in Grants Pass on January 26. He obtained info on the Oregon Bee Atlas Project, an effort being made to collect NATIVE bee species all around the state in order to assess their concentrations, health, etc. He plans to help organize that effort in the Curry County region via Oregon South Coast beekeepers.

Weather was our greatest challenge during February here on the South Coast. Though not to the extent that the inland bees experience, our beach bees experienced several cold-weather events in the midst of our typical wet weather that they’re not used to. The smaller/weaker colonies may not have survived those periods, but reports are that most everyone’s bees made it through. Ah, that milder climate that being next to the ocean brings.

Spring finally sprung in March on the South Coast. Several of the plant species thought they’d get an early start with spring in February, but the freezing storms put the kibosh on that plan. Many of the non-native plants are now in recovery mode, and the bees are out and about getting the bee year started.

Our members are looking forward to receiving package bees in April. A little weather-related delay is expected this year.

Jesse Fletcher

Portland Metro Beekeepers

Thankfully, spring may very well be on the way after surprise snow days, plural, and more than enough! I have noticed here that even though the sun may rule in the afternoon, if the temperature is too cold and the wind is strong, my girls huddle inside. But when they decide it is good enough, they are out the door! I have also noticed that the bees will attempt to gather pollen from my most detested weed: the evil celandine – okay, technically, it is a lesser celandine.

Portland Metro planning is in full swing for the annual Bee Day to be held April 20 at Foothills Honey Company in Colton. The day includes morning and afternoon classroom training and in-hive tours for beekeepers of all ages and experience. Included in the classroom sessions are topics such as the latest research at OSU and best practices for successful hive management, along with tips for efficient, effective periodic hive exams. The event is limited to 175 attendees; registration is open at: portlandmetro.org.

For our February member meeting, Jim Barlean presented his methodology to prevent/deter swarms; the March meeting will cover installation, feeding, and care of nucs; in April, Carolyn Breece will discuss brood disease; and in May, Ellen Topitzhofer will talk about bee nutrition. We are looking forward to some coaching on bee-friendly plant material and
**The Bee Line**

**Beeline Apiaries & Woodenware**

See us for all your beekeeping supplies!

- Woodenware
- Bee Health Products
- Foundation
- Suits and Jackets
- Tools
- Books
- Oxalic Acid Vaporizers

**Bee Packages and Nucs available in Spring**

**PH:** 360-280-5274  
**Email:** beelineofwa@norcell.us

**Store Hours:**  
Open Monday – Friday  8 AM to 5 PM  
Saturday -- By Appointment  
Sunday – Closed  
August – January  Call

Store Address: 19019 Moon Rd SW Rochester, WA 98579

---

**Hive These Bees!**

Order honeybee starter colonies now – supplies are limited.

There's still time to get our naturally reared honeybees on Western Shallow frames available in early May. Eight frame starter colonies are only $200 plus equipment deposit. Our bees come on wooden frames with only beewax foundation built in our shop and grown out in our hives. Locally adapted stock, managed with organic inputs. Enter to win an assembled hive of our custom woodenware, or get more information about our live hive tour dates and honeybee starter colony booking, see our website at digginlivin.com

---

**Foothills Honey Company Is Now Taking Orders**

**2019 Nucleus Hives**

- 5 Frames  
- 2019 Laying Queen  
- Disposable Cardboard Box  
  (no box return/exchange)

Available after April 1, 2019

**Pricing, Details, and Pickup Dates:**

(503) 824-2265  |  contact@foothillshoney.com

*We stand by our product.*
sources. I think, also, a presentation on the flavors of honey and their various sources would be great.

Once again, I find the cover-page article of the Bee Line most informative, this time about the hierarchical trait of mite-biting. A couple of questions crossed my mind: once a mite has been bitten, are they incapacitated? How much mutilation is necessary to incapacitate them? I also appreciated the comment regarding the amount of vegetable oil to use on sticky boards; I plan to use more this year on the sticky boards and perhaps check further with a good magnifying glass.

Nancy Winston

Portland Urban Beekeepers

It had been a fairly warm winter until February! Portland Urban beekeepers have been impatiently tolerating winter, and we are eager for the spring season to start. In Portland, we are seeing late winter/early spring blooms of crocus, heather, Japanese Andromeda, Viburnum, willow, rosemary, and dandelions, along with a few early camellias.

Over the winter we have had some meeting venue issues, so we did not hold a February meeting, which was no loss with the wintry weather. After an intense search, we found a great, centrally located place, the Multnomah Friend’s Meeting Hall, where we held our March meeting.

Our March meeting had 67 in attendance with about 10 new members. We continue to hover at about 200 active members. Our guest speaker was Priyadarshini (Priya) Chakrabati Basu, PhD, who is currently a postdoctoral researcher in the Oregon State University Honey Bee Lab. She discussed her most recent project, which was interesting and important research on bee forage/nutrition, and how it impacts the health of our bees.

The focus of her project was to better understand the role of 24-methylenecholesterol, a plant sterol, in bee development, health and its forage sources. Her thesis is that if honey bees are able to obtain optimal nutrition, which includes adequate amounts of 24-methylenecholesterol, they will have improved survival rates when they are exposed to stressors such as pesticides, Varroa infestation, and viral infections.

As she described her latest study (final data analysis pending), we learned more about the intricacies and details of good research design and protocol. To summarize the evening, natural pollens are far superior (at present) to commercially available pollen substitutes (patties and dry mixes). We sat on the edge of our seat waiting to know exactly which pollens were best, and Dr. Priya did not disappoint! While the list is very incomplete as she is still cataloging, examining, and quantifying this particular plant sterol in various pollens, her current list includes almond, plum, apricot, cherries, borage, borage oil, and soy. When asked if the plant’s environment played a role in levels of 24-methylenecholesterol, she was not certain, but was confident that plant genetics most likely played an important role. What a great talk!

On a more sober note, our most recent work party in March revealed that the PUB apiary has experienced about 50 percent losses. Mites were certainly an issue, and we plan to rethink how many colonies we want to maintain and consider a much more aggressive approach to mite monitoring and treatment. We were monitoring about three times during the season and treating twice, in late July/early August and mid-September.

On a more exciting note, PUB has contracted with a team of software engineers to develop our own swarm reporting site and swarm notification list. Currently, we working the “bugs” out, but hopefully it will be up and fully operational for the 2019 swarm season.

Finally, the PUB Bee School will be held on March 16 at the Kennedy School, and even with a date change, we have sold out. Hopefully, we will have a new, eager cohort of urban beekeepers.

Cheryl Wright

Southern Oregon Beekeepers

Our 2019 Spring Bee School, a day-long class with guest speakers Dewey Caron and Ellen Topitzhofer on April 20, still has a few openings. For information and to register, visit our association website at:
At our upcoming meeting in April, we will be hosting Dewey Caron.

**Tillamook Beekeepers**
Our bees are dying at an alarming rate. An unofficial count reveals about 50 percent of all our hives have died over the winter. A few died from bears, and a few from stormy weather knocking hives over. Several have absconded, but far too many have simply died. This has been a very bad year for the Tillamook beekeeper.

The good news is that we are a resilient bunch and almost without exception everyone is buying Nucs and Packages to get a fresh start for this year. We are committed to do better at treating for Varroa mite and other hive management practices to protect the bees.

More good news is that we are getting the word out to the public to help us save bees and all pollinators in general by planting more bee-friendly shrubs, herbs, flowers, and flowering trees. I have spoken recently at the local Kiwanis Club and will soon be the keynote speaker at the Tillamook Master Gardener Spring classes about bee gardening.

**Brad York**

Tualatin Valley beekeepers have new members going into 2019, both in the larger beekeeper community and on our board. We have additions to our tvba.weebly.com site, with added resources.

Our yearly beekeeping class, aka bee school, had 39 new beekeepers (bottom, opposite column) asking excellent questions to be answered by three of our most experienced members: Mike Standing (below), Paul Andersen, and Mark Gorman.

This year we had it all in one long school day on a Saturday. We had tons of gear for demonstration, and the three beekeeper experts worked together well helping each other out. We look forward to helping the new beekeepers start up with new nucs this spring.

**Eddie Frie**

**TRUE SOURCE CERTIFICATION**

Soon you will be seeing a new True Source Certified label on select GloryBee retail and bulk honey! Pure, delicious honey has always been a top priority for GloryBee, a honey and natural ingredient company that has been sourcing high-quality honey for decades. The True Source Certified® program, a program dedicated to certifying ethical and traceable honey, is a logical next step in their pure honey journey. Not all honey is legally and ethically sourced, and despite federal crackdowns, fraudulent honey may still be entering the United States and infiltrating grocery store shelves and pantries across the nation.

The True Source Certified Honey program was developed to distinguish honey that is pure and can be traced from hive to table. An internationally recognized third party firm conducts audits to certify the source of the honey all the way up the supply chain. The program also confirms that packers and exporters test and analyze honey purity, which GloryBee has been doing for years. Currently, only 30 percent of honey sold in North America is True Source Certified.

It has always been part of GloryBee’s nature to source high-quality, delicious honey from ethical beekeepers. GloryBee has many close relationships with honey producers and knows the value of hive to table traceable honey. They are proud to be certified by a program that protects customers, consumers, and the reputation of honey across the globe.
Pathogens and Bee Health—Continued from page 1

season/date, weather events, and agrochemical exposure) on these associations.

Colony-level studies indicate that pathogens, including viruses, specifically positive single stranded RNA (ssRNA) viruses, negatively impact bee health, but the mechanisms of honey bee host – virus interactions remain largely uncharacterized. At the individual bee level, virus infections can remain asymptomatic, cause paralysis, and/or result in death. These differential outcomes are largely dependent on host immune responses, yet the mechanisms of honey bee antiviral responses remain largely uncharacterized. Viruses produce long double stranded RNAs (dsRNAs) during replication, which are recognized as a “beacon of virus infection” by host-encoded proteins involved in antiviral defense. To investigate virus pathogenesis and honey bee antiviral defense mechanisms, including RNA interference (RNAi) and additional immune pathways, members of the Fenniken Lab performed laboratory-based virus infection studies that enable more precise examination of the effects of viruses on individual honey bees. To better characterize the mechanism(s) of honey bee antiviral defense, bees were infected with a model virus in the presence or absence of dsRNA, a virus-associated molecular pattern. Regardless of sequence specificity, dsRNA reduced virus abundance. Next generation sequencing was utilized to examine transcriptional responses triggered by virus and dsRNA at three time points postinfection. Hundreds of genes exhibited differential expression in response to co-treatment of dsRNA and virus; the number of differentially expressed genes increased with time postinfection [12]. Virus-infected bees had greater expression of genes involved in RNAi, Toll, Imd, and JAK-STAT pathways, but the majority of differentially expressed genes are not well characterized. To confirm the virus-limiting role of two genes, including the well-characterized gene dicer and an uncharacterized gene MF116383 in honey bees, the expression of these genes in individual bees was reduced using RNAi and, as a result, virus abundance increased. These results indicate that these two honey bee genes (i.e., dicer and MF116383) are involved in antiviral defense and further our understanding of honey bee antiviral defense mechanisms, particularly those triggered by dsRNA, a hallmark of virus infection [12].

References

Note: Michelle Fenniken, PhD, is Assistant Professor, Plant Sciences, and Co-Director of the Pollinator Health Center, Montana State University. She presented “Honey Bee Pathogens and Bee Health” at the OSBA 2018 Fall Conference. As part of an outreach project for Fenniken’s National Science Foundation CAREER Award, she worked with MSU Communications to generate two additional videos for a three-part video series about honey bee research at MSU, honey bee pathogens, and honey bee pathogen detection, which are available at: www.montana.edu/pollinators.
Oregon State Beekeepers Association

EXECUTIVE BOARD AND AFFILIATED REGIONAL ASSOCIATIONS

Columbia Gorge Beekeepers
Meets 6:15–8:15 PM, third Wednesday, Hood River
President: Jerry Frazier—jerry1.frazier@gmail.com
Website: gorgebeekeepers.org

Coos County Beekeepers
Meets 6:30 PM, third Saturday, Myrtle Point
President: Randy Sturgill—541.430.4095; randys@rfpco.com

Douglas County Bees
Meets 7:00–8:30 PM, first Wednesday, Roseburg
President: Ivory LosBanos—ivohart@gmail.com
Website: www.douglascountybees.org

Klamath Basin Beekeepers
Meets 9:00 AM, last Saturday, Klamath Falls
President: Paul Davitt—president@klamathbeekeepers.org
Website: www.klamathbeekeepers.org

Lane County Beekeepers
Meets 7:30 PM, third Tuesday, Eugene
President: Mike France—michaelj62@gmail.com
Website: www.lcbaor.org

Linn Benton Beekeepers
Meets 6:30 PM, third Wednesday, Corvallis
President: Everett Kaser—everett@lbba.us
Website: www.lbba.us

Oregon Prison Beekeepers
Program Manager: Chad.E.Naugle@doc.state.or.us

Oregon South Coast Beekeepers
Meets 6:00 PM, third Tuesday, Gold Beach
President: Mike France—michaelj62@gmail.com
Website: www.ibba.us

Portland Metro Beekeepers
Meets 7:00 PM, second Thursday, Clackamas Comm Coll
President: Rex McIntire—503.720.7958
Website: portlandmetro.org

Portland Urban Beekeepers
Meets 7:00–9:00 PM, first Wednesday, Portland
President: Mandy Shaw—president@portlandurbanbeekeepers.org
Website: portlandurbanbeekeepers.org

Southern Oregon Beekeepers
Meets 6:30–9:00 PM, first Monday, Medford Public Library
President: Risa Halpin—303.807.1830; rhalpin906@aol.com
Website: southernoregonbeekeepers.org

Tillamook Beekeepers
Meets 6:30–8:00 PM, second Tuesday, Tillamook
President: Brad York—dbradleyyork@gmail.com
Website: www.tillamookbeekeepers.org.

Tualatin Valley Beekeepers
Meets 6:00–8:00 PM, last Tuesday, North Plains
President: Eddie Frie—ejfrie@frontier.com
Website: tvba.weebly.com

Willamette Valley Beekeepers
Meets 7:00 PM, fourth Monday, Salem
President: Richard Farrier—rfarrierfarms@gmail.com
Website: wvbahive.org

OSBA OFFICERS

President
John Jacob—541.582.2337; oldsolbees@gmail.com

Vice President
Joe Maresh—503.703.5060; joemaresh@bctonline.com

Secretary
Karen Finley—541.753.4120; finleykk@yahoo.com

Treasurer
Joe Hansen—503.824.2265; osba.treasurer@gmail.com

Past President
Harry Vanderpool—503.399.3675; shallotman@yahoo.com

OSBA REGIONAL REPRESENTATIVES

North Coast
Kathy Cope—541.264.9222; beachwalkinlady@hotmail.com

South Coast
Mureen Walker—541.425.0535; mureen.walker.111@gmail.com

Columbia Basin
Bill Edwards—541.354.2223

Eastern Oregon
Jordan Dimock—541.372.2726

Portland Metro
Tom Cinquini—503.547.5386; tomcinquini@gmail.com

South Central Oregon
Robert Clements—541.205.8562; kbabees@gmail.com

Southwestern Oregon
Eric McEwen—541.415.5171; beetruehoneybees@gmail.com

North Willamette Valley
Steven Coffman—503.838.2981

South Willamette Valley
Tim Wydronk—541.740.4127; tim@aldercreekhoney.com

REGIONAL ASSOCIATIONS

Central Coast Beekeepers
Meets 6:30 PM, fourth Wednesday, Newport
President: Jon Sumpter—jonsmptr@msn.com
Website: www.ccbaor.org

Central Oregon Beekeepers
Meets 6:00–7:30 PM, fourth Tuesday, Bend
President: Allen Engle—aengle@bendbroadband.com
Website: www.cobeekeeping.org

* REGULATORY AND AFFILIATED ORGANIZATIONS

Central Coast Beekeepers
Meets 6:30 PM, fourth Wednesday, Newport
President: Jon Sumpter—jonsmptr@msn.com
Website: www.ccbaor.org

Central Oregon Beekeepers
Meets 6:00–7:30 PM, fourth Tuesday, Bend
President: Allen Engle—aengle@bendbroadband.com
Website: www.cobeekeeping.org

Columbia Gorge Beekeepers
Meets 6:15–8:15 PM, third Wednesday, Hood River
President: Jerry Frazier—jerry1.frazier@gmail.com
Website: gorgebeekeepers.org

Coos County Beekeepers
Meets 6:30 PM, third Saturday, Myrtle Point
President: Randy Sturgill—541.430.4095; randys@rfpco.com

Douglas County Bees
Meets 7:00–8:30 PM, first Wednesday, Roseburg
President: Ivory LosBanos—ivohart@gmail.com
Website: www.douglascountybees.org

Klamath Basin Beekeepers
Meets 9:00 AM, last Saturday, Klamath Falls
President: Paul Davitt—president@klamathbeekeepers.org
Website: www.klamathbeekeepers.org

Lane County Beekeepers
Meets 7:30 PM, third Tuesday, Eugene
President: Mike France—michaelj62@gmail.com
Website: www.lcbaor.org

Linn Benton Beekeepers
Meets 6:30 PM, third Wednesday, Corvallis
President: Everett Kaser—everett@lbba.us
Website: www.lbba.us

Oregon Prison Beekeepers
Program Manager: Chad.E.Naugle@doc.state.or.us

Oregon South Coast Beekeepers
Meets 6:00 PM, third Tuesday, Gold Beach
President: Mike France—michaelj62@gmail.com
Website: www.ibba.us

Portland Metro Beekeepers
Meets 7:00 PM, second Thursday, Clackamas Comm Coll
President: Rex McIntire—503.720.7958
Website: portlandmetro.org

Portland Urban Beekeepers
Meets 7:00–9:00 PM, first Wednesday, Portland
President: Mandy Shaw—president@portlandurbanbeekeepers.org
Website: portlandurbanbeekeepers.org

Southern Oregon Beekeepers
Meets 6:30–9:00 PM, first Monday, Medford Public Library
President: Risa Halpin—303.807.1830; rhalpin906@aol.com
Website: southernoregonbeekeepers.org

Tillamook Beekeepers
Meets 6:30–8:00 PM, second Tuesday, Tillamook
President: Brad York—dbradleyyork@gmail.com
Website: www.tillamookbeekeepers.org.

Tualatin Valley Beekeepers
Meets 6:00–8:00 PM, last Tuesday, North Plains
President: Eddie Frie—ejfrie@frontier.com
Website: tvba.weebly.com

Willamette Valley Beekeepers
Meets 7:00 PM, fourth Monday, Salem
President: Richard Farrier—rfarrierfarms@gmail.com
Website: wvbahive.org
Oregon State Beekeepers Association
Membership Application

The Oregon State Beekeepers Association is a nonprofit organization representing and supporting all who have an interest in honey bees and beekeeping. Membership is open to anyone with an interest in bees and beekeeping. You do not need to own bees or reside in Oregon to join. Membership includes the ongoing work of the organization on behalf of the honey bee and beekeeping, a vote in OSBA elections, discounts on publications, and an annual directory and subscription to The Bee Line.

Please send check made payable to OSBA with a completed form for each individual to:

Oregon State Beekeepers Association, Membership
4207 SE Woodstock Blvd, Ste 517, Portland, Oregon 97206

Date: ______________________
First Name:___________________ MI:____ Last Name:_____________________
Company name: ____________________________________________________
Type: q Small scale (less than 25)  q Sideliner (25–300)  q Commercial (more than 300)
Mailing address:____________________________________________________
City:____________________________ State:__________Zip:________________
Telephone number: ________________ e-mail address: ___________________
Newsletter: Please select version: q Digital  q Print  County: ___________________
Membership Directory: The OSBA respects the privacy of members. Please indicate contact information to be included in a directory mailed to OSBA members only:

q Do not include contact information
q Share all information OR Share: q mailing address  q phone number  q e-mail address
Local group, if member: _____________________________________________

Membership dues: $40 per person ($50 per person outside the US)  $_______

To renew online, please visit: osba2018.orsba.org/product/osba-membership. Thank you!
To join or renew membership by mail, see form on page 17; online, go to orsba.org and click on Join OSBA!

If the date on the mailing label is April 2019 (or earlier), this is your friendly renewal notice.

---

**The Bee Line**

*The Bee Line* is the official publication of the Oregon State Beekeepers Association. Annual subscriptions to the newsletter are included with membership.

Please send news about your bees and your experiences in keeping them, as well as events, corrections, comments, questions, photographs and stories, interviews, recipes, points of view—and ads/advertising—to: Rosanna Mattingly, *The Bee Line*, 4207 SE Woodstock Blvd Ste 517, Portland OR 97206; e-mail: osba.newsletter@gmail.com. It’s *your* newsletter—we want to hear from you!

The next issue to be printed will be the **May issue, 2019**. The deadline for submitting copy is **April 10, 2019**. Please let me know if you find difficulties with the deadline so we can work out the space and timing for the material.

*Be well!*

---

**Advertising**

<table>
<thead>
<tr>
<th>Event</th>
<th>Listing</th>
</tr>
</thead>
<tbody>
<tr>
<td>All events, space permitting (15 words)</td>
<td>Free</td>
</tr>
</tbody>
</table>

**For a nonprofit-group event**, an additional 30 words (total of 45) in the listing or an article

**Free**

**Advertising**

<table>
<thead>
<tr>
<th>Advertising</th>
<th>Per Issue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business card</td>
<td>$10.00</td>
</tr>
<tr>
<td>Quarter page</td>
<td>$25.00</td>
</tr>
<tr>
<td>Half page</td>
<td>$50.00</td>
</tr>
<tr>
<td>Full page</td>
<td>$100.00</td>
</tr>
</tbody>
</table>

**Classified Ad (30 words)**

| Members | $3.00 |
| Nonmembers | $5.00 |