



Pennsylvania Beekeeper

The Official Organ of the Pennsylvania State Beekeepers Association

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News 'n Views...

Mark Gingrich, PSBA President

In 19th century New England, there was a long-standing custom known as “telling the bees.” Beekeepers would share significant life events such as births, deaths, marriages, or long journeys with their bees. In 2022, After Queen Elizabeth II’s passing, John Chapple informed the bees of Buckingham Palace and Clarence House about her death and the ascension of King Charles III. He would knock on each hive and say, “The mistress is dead, but don’t you go. Your master will be a good master to you”. Each hive was adorned with a black ribbon. So, the next time you see a bee buzzing around, remember that it might be privy to more family secrets than you might expect.

On April 15 the Apiary Advisory Board had its spring meeting at the Pennsylvania Department of Agriculture. Although the number fluctuates regularly, there are about 6,500 beekeepers registered in Pennsylvania, and 8,950 registered bee yards, holding just short of 70,000 registered colonies. 87% of colonies are kept by backyard beekeepers with less than 10 hives. 8% have less than 25 colonies and the remaining 5% are sideline or commercial operations typically functioning as a small business.

As many of you know, there have been discussions about revising the current Bee law for many years, but the work has intensified the last two. The Department of Agriculture has proposed the Plant and Pollinator Protection Act, which potentially will replace and combine the current “Plant Pest Act” and “Bee Law”. In layman’s terms, this is an amendment to Title 3 (Agriculture) of the Pennsylvania Consolidated Statutes, providing for the protection of Pennsylvania’s plant life, pollinators, as well as the plant and managed pollinator industries. Its purpose is to revise, consolidate, and define the powers and duties of the Department of Agriculture. It provides for the formulation and implementation of plant and pollinator pest surveys and quarantines. Additionally, it provides for the inspection of plants, plant products, managed pollinators, hives, and associated equipment further establishing measures necessary to prevent the spread of harmful plant and pollinator pests. It structures the licensure of plant merchants and pollinator operations to facilitate the orderly interstate and international marketing of plants and managed pollinators. Lastly, it defines procedures and penalties that will guide the department and industry moving forward. This new act is a culmination of the department and industry representatives.

The proposed Plant and Pollinator Protection Act has passed its final review and a blueback copy has been created to begin the legislative process. The Pennsylvania State Beekeepers Association has been authorized to share this document with its membership. It was recommended that we wait to do so until it has a bill number assigned, otherwise it’s still not official. The purpose of sharing this document with beekeepers across the state is to keep them up-to-date and well-informed. We intend to publish the proposed legislation in its entirety on our website along with a frequently asked questions section. We plan to follow that up with a webinar hosted by principals from the Department of Agriculture and Apiary Advisory Board to further explain, dissect, and explain the changes. The language may be altered as it moves through the legislative process, but by openly sharing we have a foundation for further discussion. The process is as follows, A member of the House or Senate introduces the bill as a proposed new law or amendment to an existing law. Then the Legislative Reference Bureau drafts the bill in legal form and the member signs it to indicate sponsorship. When that’s complete, the bill goes through committee review, debate, and votes in both the House and Senate. To pass, a bill needs a constitutional

PSBA

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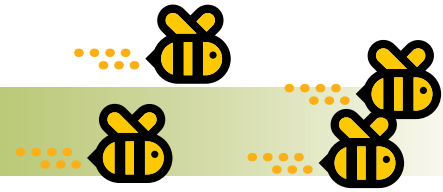
majority. If the Senate changes the bill, it goes back to the House for concurrence. The Governor can approve, veto, or take no action on the bill. If a bill isn't enacted during a two-year session, it must be reintroduced the following session, and the process will start all over again.

Earth Day this year was April 24th. Pennsylvania has about 400 species of native bees, including Bumble bees, sweat bees, carpenter bees, squash bees and many more, some with no common name. Honey bees are not native to the US, rather they were introduced to the Americas by the colonists. Bees comprise a group of insects that pollinate the majority of our crops. Through pollination, bees transfer pollen from the anther of one flower to the stigma of the same or another flower. This process initiates the production of many of the seeds, fruits, and vegetables that we harvest. Crops that either completely rely on or benefit from bee pollination include blueberries, cucurbits such as melons and pumpkins, and tree fruits like apples and cherries. All of these commodities greatly contribute to Pennsylvania's thriving economic sector. In recent decades, some studies have revealed declines in managed honey bees and wild bee species across our nation. Documenting bee population declines, increases, or stability over time can be challenging since baseline data about bee biodiversity for most species and regions is not available. For future generations of bee scientists and researchers, there must first be a next generation of bees. There are numerous stressors that we believe are causing a decline in honey bee health. They include pesticides, parasites, pathogens, and poor nutrition, commonly referred to as the 4P's, and lastly, subpar queen quality. When a bee's health deteriorates, it becomes increasingly vulnerable to diseases, pathogens, and pesticides. Management practices in migratory beekeeping often exasperate those problems. The most recent information available from the Bee Informed Partnership, states beekeepers in the United States lost an estimated 45.5% of their managed honey bee colonies. When beekeepers suffer a bad year, they take portions of healthy colonies and split the population to replenish those losses. On paper, it looks like the beekeepers recovered their losses within a single year. However, while the number of colonies is the same, they are smaller and produce less honey. According to the USDA National Agricultural Statistics Service, there were 2.71 million managed colonies on April 1, 2023 across the United States.

Honey bee swarm season is here. Typically, this occurs in late April through May, but many areas across the state have been ahead of schedule. Pennsylvania has very diverse weather conditions due to its many geographic features. The state's climate is influenced by latitude, topography, and proximity to large bodies of water. For those of you who may not be aware of what a swarm is, it is a natural process that honeybees use to reproduce. They can also occur when a colony's population outgrows its current space. Generally, the mother queen, along with 50–60% of the worker bees, leaves the original colony to find a new home. Before starting their journey, the bees fill up on honey to fuel their journey and produce wax to build new comb. The remaining bees stay behind to raise a new queen. The virgin queen will leave the hive to mate with drone bees, and then return to lay eggs. If you see thousands of bees hovering around trees and houses this time of year, that's likely a honey bee swarm, looking for a fresh place to establish their colony. When the swarm lands, scouts fly off to find a new hive location. Remember, not everyone is as familiar with honey bees as we are. Swarms are always good fodder for local news. It's a great opportunity for beekeepers to remind neighbors if they find a honey bee swarm in their yard or home, don't panic and don't try to kill them. Either wait for the bees to peacefully move on, or contact a local beekeeper immediately to safely remove the swarm without threatening your home or the honey bees. 🐝



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Upcoming Events



HONEY BEE SWARM EVENT

SUNDAY, MAY 5

12-2

JOIN US:

- Learn about the importance of bees and their role in our environment
- Listen to informative talks given by members of the YCBA & PSBA, supported by Master Beekeeper, Jeremy Barnes
- Live honey bee swarm demonstration

LOCATION: NIXON PARK NATURE CENTER

- Don't miss out on this exciting FREE opportunity!
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Beekeepers of ABCI (Armstrong, Butler, Clarion, Indiana counties)

Beekeepers of ABCI (Armstrong, Butler, Clarion, Indiana counties) will hold their monthly meetings of 2024 at HEALTH & WELLNESS PAVILION OF ACMH 79 Glade Rd. (off Rte. 422 West Hills exit), Kittanning, PA from 7:00 PM to 9:00 PM.

Berks & Schuylkill Counties Beekeepers Association

Berks & Schuylkill Counties Beekeepers Association will hold our monthly meetings in 2024 at the Berks County AG Center, 1238 County Welfare Rd, Ste 260, Leesport, PA 19533 on the 3rd Wednesday of each month at 7pm.

For more information contact us at prez4psba@gmail.com or on our [Facebook](#) Page.

Lackawanna Backyard Beekeepers

Serving (but not limited to) Lackawanna County. Mission: To foster interest in backyard beekeeping and provide a forum for discussion among local beekeepers. Free and open to the public. Meetings are held at Abington Community Library, 1200 West Grove Street, Clarks Summit, Pa. 18411 (570-587-3440) in the Ryon Room, at 6:30 pm on the third Tuesday of the month. Date may change, if library has a conflict. Please check the [Facebook](#) Page or [contact us](#) or phone to confirm the date.

Co-leaders Renee Czubowicz , Brad Seward

Meeting are held the 3rd Tuesday of the month September – May. 6:30pm
 June July and August meeting are TBA

Website: <http://lackawannabackyardbeekeepers.blogspot.com/>

Facebook: <https://www.facebook.com/lackawannabackyardbeekeepers>

Email: lackawannacountybackyardbeekeepers@gmail.com

Northwest PA Beekeepers Association

Here is a list of upcoming meeting dates:

- June Field Day TBD, tentative June 22nd open to everyone. Non-members \$15, members free.
- Oct 19
- Nov 16

Questions? Contact Mark Anderhalt, NWPBA Secretary mark1090@windstream.net

Tri-County Beekeepers Association of Southwestern PA

Meetings start at 6:30pm the 3rd Wednesday of each month. The location is the California United Methodist Church, 227 3rd St, California, PA 15419. For more information, contact Fred Miller at 724-317-2009, or frmler@yahoo.com.



PSBA Summer Picnic - July 20, 2024

Our family-friendly summer picnic will begin at **10am on Saturday, July 20, 2024 at Knoebels**. We will have a business meeting, show & tell, great food & drink, and a presentation about Overwintering Bee Hives Indoors in Pennsylvania, which is a grant research project occurring Nov 1, 2023 to March 30, 2024 – we will learn the results from year 1.

Knoebels Amusement Resort is a family-owned and operated amusement park, picnic grove, and campground in Elysburg, Pennsylvania. Opened in 1926, it is United States's largest free-admission park.

"Turn your Knoebels visit into a family vacation. We have accommodations to match the uniqueness of your lifestyle. Pitch your tent, park your RV, stay in one of our rustic log cabins, or book a night at our quaint bed and breakfast. Your perfect Knoebels adventure is ready when you are!" For more information visit <https://www.knoebels.com/>.

To Bee Club Leaders:

The PSBA website has a page for your events to be listed. These events are also added to the PSBA newsletter.

The page is:

<https://www.pastatebeekeepers.org/Local-Club-Events/>

Also, each local club has their *own* page for additional information. Find your webpage at:

<https://www.pastatebeekeepers.org/Local-Associations/>.

Please email us at webmaster@pastatebeekeepers.org if you have any changes, updates or additions for either of these pages.



TRI-STATE BEE CONFERENCE



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 with a meal ticket number. (This will be your receipt.)

There will be various speakers about Bees on different Bee subjects.

Allen Storm, MD Bee Inspector

The Gadget Man (Allen Hayes)

Alex Taylor, Nucs

Turk, Swarm Traps

Shanda King, WV Bee Inspector

Jason Hough of The Hive House, Queen Rearing

Brad Duffy, Swarms

Kiddo's Bee Club

There is no cell coverage in the area, so Google Maps may loose connection and not get you there,
 however the Waze app. preloads the directions.

Use this address in the Waze App. to get you very close: 259 T845, Hyndman, PA 15545



Directions From Cumberland, MD:

Take MD-36 S/Mt Savage Rd NW, Ellerslie Rd NW and PA-96 N
 to Kennels Mill Rd 13 min (8.9 mi)

Directions from Bedford, PA:

Take PA-96 S to Kennels Mill Rd 30 min (25.8 mi)

Directions once on Kennels Mill Rd.:

Turn onto Kennels Mill Rd 1.9 mi

Continue onto Palo Alto Rd 1.0 mi

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Google Maps Link

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and April 24th

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 - 69% better winter survival
 - 35% more honey production

To read the full report, google "USDA ENE17-863"



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Honey Queen Report

Cheyenne Brown, 2024 PA Honey Queen

Hello Beekeepers!

As the weather begins to warm and spring is coming upon us, there have been so many exciting events coming our courts way! I had a great time this month getting to travel home for an event called From Our Farms to Your Arms.

At this event I had the opportunity to educate students at Canton Elementary School on all things beekeeping and honey production. I had a full bee suit set up where students could try on the suit and learn about some beekeeping equipment. In addition, we talked about honey and its health benefits. I had a great time getting to return home and get to see some familiar faces.

Additionally, I wanted to make sure that I shared the recent Penn State article highlighting my journey through agriculture as well as the Pennsylvania State Honey Queen Program! Take a read here: <https://ow.ly/tn8050R4g6q>

It is officially promotion season! There is still time, if you have an event that you would like to see the Pennsylvania State Honey Queen or Princess at please contact use at honeyqueen@pastatebeekeepers.org, we would love to hear from you!

Stay Sweet,

Queen Cheyenne



At the From Our Farms to Your Arms event there was a meal served with only Bradford County agricultural products! Included was a small cup of honey from a local producer, and a honey stick!



If you would like to invite the Honey Queen or Princess to your event, please contact Cathy Vorisek and Lucy Winn at honeyqueen@pastatebeekeepers.org



Here I am shown at the beginning of the event with my table set up! I had a fantastic time sharing about beekeeping, and how to start your own hives at home!



Meadow View Beekeeping

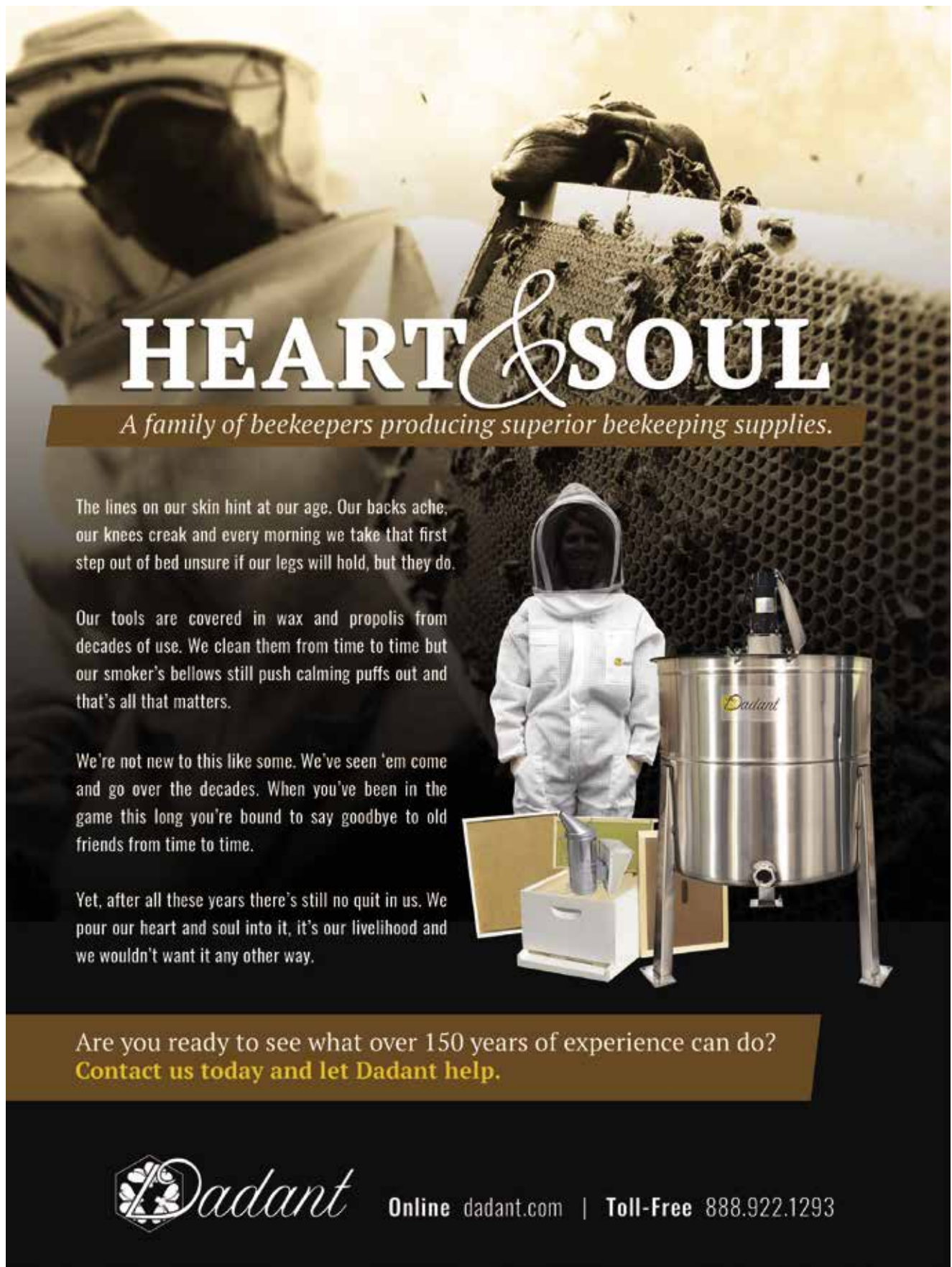
- **Mann Lake, Ltd** Dealer with plenty of stocked inventory
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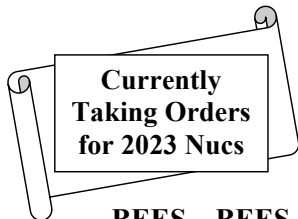
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Ask 2 Beekeepers

There is a saying in beekeeping: "Ask 2 beekeepers a question and you will get 3 answers."

Do you have a question for the Beekeepers? Email your questions to secretary@pastatebeekeepers.org and they will appear in the next month's Ask 2 Beekeepers. Please note that the questions or responses may include the opinions of the individual beekeepers and are not necessarily those of the PA State Beekeepers Association.

Q1: Heather Buechel asked: How much propolis should you scrape out in the spring? Going into fall, all of my hives were glued from wall to wall. Just enough to get frames in and out properly? More than that?

Q1: Mark: Propolis, that waxy substance made from beeswax, plant and tree resins, provides so many benefits to a honey bee colony. It is also associated with increases in colony strength, vitellogenin levels, adult bee longevity, brood survival rates, hygienic behavior, and honey production. I would only remove enough so that inspections can occur without unnecessarily damaging frames when removing them. Propolis helps bind the hive together and improves its structural integrity. It provides waterproofing that helps prevent fungal decay of the hive walls. Propolis has antimicrobial properties and acts as a natural antibiotic against microbial pathogens. When a colony is sick, bees collect extra propolis to fight off infection and give the whole colony a form of "social immunity".

Q1: Steve: Dr Marla Spivak has done some fabulous research on the "propolis envelope" in honey bee colonies. The more propolis the better however it is important to be able to access your frames for regular inspection of mites and disease. I only scrape off enough to be sure that the frames are easily accessible and that the inner cover, if used, is able to be repositioned correctly after and inspection.

Q1: Charlie: I only scrape propolis that gets in the way of frames fitting into boxes. That generally includes the frame rest area of the boxes and the frame ears where they fit frame-to-frame. I'm not so concerned with the brood boxes, so long as I can get them apart. Going into fall, the propolis is important to keep the hive sealed, so I don't mess with it much unless there is a need. "Clean" to people is too clean for bees. They need propolis and wax to control bacteria and moisture. Supers get scrapped as they are extracted. Again, just what is needed to fit everything back in.



**Charlie Vorisek > < Mark Gingrich
& Steve Repasky**

Q2: Phil Tyson asked: What is your position on queen excluders. He states that he has never used queen excluders consistently for 45 years of beekeeping. He will sometimes use them earlier in the season and then take them out for the honey flow. After removal of queen excluder, he then has to deal with brood in the lower honey supers at extraction time.

Q2: Mark: The purpose of a queen excluder is to prevent the queen from moving from one area of the hive to another, so in this instance, to prevent her from laying eggs in

your honey supers. This allows the workers to continue provisioning the cells with honey, which can then be easily harvested. There is no denying that having a queen-free super makes things a bit easier. You can harvest honey without having to worry about that little patch of brood hiding. Some colonies will refuse to work above the queen excluder, and some don't seem to mind at all. Many beekeepers prefer wood-bound, metal wire excluders over injection molded plastic ones. You can also put your excluder on 90° from the way you traditionally would use them. This creates a little area front and back allowing bees free movement but while still limiting the queen no pause. Ultimately, using an excluder comes down to personal preference as a beekeeper. If you choose not to use one, it's as simple as keeping a close eye on where the queen is laying eggs.

Q2: Steve: I'm a fan of honey excluders. They have a place and time. Some beekeepers will not use them allowing the queen free access to whatever comb she wants and during a honey flow the queen will naturally move back down, however that's not always the case and you may find brood in the supers.

I find that using supers allows for easier harvest of honey because I don't have to worry about where the queen is - she will likely always be below the queen excluder.

Some have trouble with excluders and it usually because of

improper use of— meaning that they get put on below super of undrawn foundation and because of that the bees have no reason to cross that barrier. In this case I'll often leave the excluder off until the bees begin to draw comb then I'll add the excluder. I also prefer wood bound metal excluders over any other type because I believe that the extra bee space below and above the excluder allows for easier transition for the bees through the excluder. Don't forget that drawn comb is a super attractant and the smell of that comb will encourage the bees to forage and want to store excess nectar thereby "forcing" them across the excluder.

Q2: Charlie: I've only been messing with queen excluders for 30 years. Most of those years not consistent either. I keep an excluder on every hive. Sometimes it is just stored between the inner and outer covers. Here's where I finally have consistency...for me. No excluder in the spring. I add supers and let the queen have all the room she wants. The bees will 'chimney' up the center 4-5 frames. They may use 3-4 boxes for brood. As the honey flow kicks in, the bees pack honey around the brood 'chimney', filling those boxes with honey. As the brood hatches, the queen gets forced back down and they back-fill the hatching brood. I start using the excluder to shift brood down and honey up. I continue to shift honey and brood until I establish the number of brood boxes I want. That may happen by July. For the remainder of the season, the excluder is in place. My brood stack is either 2 deeps or 1 deep+2 mediums. If the excluder acts as a 'honey excluder' in the fall, that's okay. I want the brood boxes packed heavy for winter. If there is a good fall flow, they will move honey into supers with no problem. I found if the fall flow is really bad, they still make the brood chambers heavy. Always give them a reason to cross the excluder. Drawn comb, wet extracted supers or a frame of brood above will entice them through.

Q3: Jon Hick;s asks a 2-part question. 3a. Best procedure for starting a package? 3b. Best procedure for starting a nuc?

Q3: Mark: Buying a package of bees is a popular way to start a hive or replace a dead out and can be used with any style of hive equipment. I believe the best way to get a package going is to have drawn comb, a frame of pollen, a few frames of capped honey or a feeder. I think the best way to start them is in a (5) frame nuc, carefully monitoring them so you are aware when they are ready for a second box.

When starting a nuc, the method you use to acquire a queen will dictate your approach to your process. The nuc must have sufficient honey reserves and a large enough population to nurture and sustain itself. The nuc should be given mostly nurse bees. In the nuc box you will need two frames of all stages of brood, two frames of honey and pollen, and an empty frame with comb already drawn out

for a total of 5 frames. The only other important addition is your queen.

Q3: Steve: The procedure for starting a package is to install with at least one frame of drawn brood comb or even better yet a frame of eggs and larvae from another colony. This allows the package to be anchored by the pheromones and reduce the risk of absconding.

Starting a nuc is easy — just install it in a huge body with sufficient frames whether they are drawn or not. In my opinion nucs are always a safer option as the colony is already established and the queen already accepted whereas the packages are unrelated and prone to various problems such as absconding, superseding, population loss, queen failure etc.

Q3: Charlie: I'm not sure I have the 'best' procedures. I do what works for me. I'm not a fan of package bees. Mostly because there is a high percentage of queen failures. For a package, it would also depend on whether one is starting with foundation or drawn comb. In either case I don't want my packages too early in the spring. Weather needs to be warm enough for them to forage. I find using a drywall screw to gently put a hole in the candy works well. Don't push... turn it. Place the queen cage between frames near the center of the hive. Put the screen side down and angle the hole down. The workers will feed the queen through the screen. Some people like to give the bees a spray of sugar water while in the package. This tends to keep them from flying so much and keeps them busy. One thing I'll never do again is put in multiple packages in the same yard. The workers are not committed to the queen in their package yet. It's impossible to keep them from flying. As they fly, they will drift to the better queens, leaving the lesser quality queens with no bees. Install one at a time and put the lids on. Stagger locations while the previous package settles down. Feed packages as much as they will take until they are well established with capped brood. I prefer to feed inside the hive. Some sort of top feeder is okay here. Do not put a cage queen directly under a feeder...in case it leaks.

Nucs may cost more, but not a lot of tricks to getting them started. Essentially, they are already started. As a buyer, you should look inside before you accept it. Once you pay for it, it's yours. Nuc building can be time sensitive. A well-populated nuc with a good queen can outbuild the space quickly. Be sure there is brood of all ages, from egg to capped workers. Eggs will tell you there is a laying queen. You don't need to find her. A minimally intrusive check is all that is needed. Pulling to many frames increase the chances of injuring the queen. There should be a frame with honey. In a 5-frame nuc, sometimes there will be an empty frame for expansion. If a seller says, 'don't open it for 2-3 weeks', don't buy it.

Installing a nuc into 8 or 10 frame equipment is simple.

Simply transfer each frame in the same sequence and orientation as it is removed from the nuc box. Center it in your box, adding foundation or drawn comb to the outer positions. If you have honey from a dead-out, add that.

Again, I prefer to feed inside the hive with some type of top or frame feeder. The type of feeder isn't important.

For the first season, with either package or nuc, I recommend feeding until they are well established in the number of brood boxes you want. That can happen differently depending on quality of queen and when your honey flows happen. The most important thing is having enough stored, capped honey for the first winter. Don't feed if you add surplus supers.

Do monitor for mites. Don't assume they do or do-not have mites. I would give a package 2 months, a nuc one month to get established. Use an alcohol wash or powdered sugar shake. If you treat, check the mite load a week after the treatment. Premature treatment of a small colony can be fatal. 🐝



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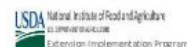
<ul style="list-style-type: none"> • May 28 – TBD – David Tapy, North Carolina State University • June 25 – TBD – Liz Walsh, USDA-ARS Baton Rouge 	<p>Last Tuesday of the month</p>
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Jeremy's Corner

During the roughly 300,000 years that Homo sapiens wandered the earth, nature dictated the rhythms of their daily activities as they hunted and gathered. And the relationship between work and the seasons became even more distinct after the development of agriculture — planting and harvesting in the spring and fall with the objective of an excess that was essential for winter survival.

That relationship and dependency ended some 300 years ago with the Industrial Revolution and its increasingly urbanized population.

Not only were workers in the mills and factories, as well as in the offices, protected from the worst of the weather, but with the capital incentive there was a clear relationship between time, effort and reward.

The more hours the factory was in operation, the more productive it was — the intensity of the work regardless of the season. Initially that was from 8 am. to 6 pm. six days a week, until labor unions compelled regulatory innovations like a 40 hour week over 5 days with a standard of minimal pay. Ironically, today, with the techno-computer revolution, and because we can work from anywhere, many of us are working longer hours than did our grandparents but in better surroundings.

But what is meant by productivity? We tend to measure it in terms of numbers and profits, which is a bar that keeps rising ever higher and requires increasing busyness — faster responses to e-mails and chats, more meetings, more tasks, more hours. What is missing from the equation is quality.

An example is Boeing. A report into the company's safety culture by an expert panel after two recent accidents found a "disconnect" between senior management and regular staff, with the latter being hesitant to report problems for fear of retaliation. Multiple employees interviewed by the panel stated that the pressure from management came in the form of increased production at the expense of quality.

One only has to read Charles Dickens to realize just how miserable life was in the mills and factories. Cal Newport, an associate professor of computer science at Georgetown University and the author of *Slow Productivity: The Lost Art of Accomplishment Without Burnout*, argues this form of work is also ineffective. "The process of producing value with the human brain ... cannot be forced into a regular, unvarying schedule. Intense periods of cognition must be followed by quieter periods of mental rejuvenation. Energized creative breakthroughs must be supported by the slower incubation of new ideas."

He cites the work habits of many successful creative people outside the traditional work place (eg. Georgia O'Keefe, Lin Manuel Miranda, Marie Curie and John McPhee) for whom taking time off or varying the pace of their efforts was not just about relaxation or escape but also about improving the quality of their output over time.

The disruptions of the coronavirus pandemic allowed some workers, no longer committed to an office regime, to discover for themselves more radical ways of organizing their work life, such as fully remote positions and four-day workweeks. First, we need to recognize this is more difficult for those involved in essentially manual occupations, and secondly, some jobs can't support long breaks from intensity — the host of a weekly podcast cannot easily take breaks from releasing new episodes, for example. Thirdly, there have long been examples of this concept on a grand scale. In academia, for example, professors are typically offered a semester free from teaching responsibilities roughly once every seven years, an idea borrowed from Jewish Scripture, which commanded that one leaves one's farm fields fallow one year out of every seven. The idea is that the sabbatical will be used to refresh oneself and explore new ideas in one's field. In a corporate setting, this might translate as rewarding work on particularly hard projects with mini-sabbaticals, perhaps two to four weeks long, during which one is freed from attending meetings or working on difficult tasks.



*Do fewer things;
work at a natural pace;
obsess over quality.*



I was fortunate to experience two sabbaticals, each of which radically changed not only my professional life but my personal relationships as well.

Smaller-scale variations in effort can equally make a difference. If an episode of a podcast is published on Friday, maybe the following Monday is kept clear of appointments, allowing a slower start each week to better balance out a more harried end. At first this might feel as though one is 'wasting time' on Mondays, but what is being gained is a more sustainable pace that sidesteps burnout and keeps quality high.

For those steeped in the virtual-factory mind-set, Cal Newport argues, these seasonality strategies might be unsettling. "In the industrial context that shapes so much of how we currently think about work, the game played between employer and employee is zero-sum: time not spent busy is revenue lost. But in the knowledge sector ... extracting value from the human brain is not something that can be regularized like installing a steering wheel on a Model T. Introducing more variation into the pacing of our work is not a concession made to labor but a smart recognition of how to produce the best results over time ... It's the grinding regularity of manufacturing that's the outlier, not our instinctual attraction to a more natural pace of work."

Again, as is so often the case, honey bees offer us a model of an 'instinctual attraction to a more natural pace of work.' They are superbly adapted to the seasons, namely colony build-up in the late winter, colony reproduction in the spring, food collection and storage in the summer, and preparation for winter survival in the fall.

In the first bee class that I took, more than 25 years ago, it was stated categorically that it was the length of daylight time that determined a colony's behavior. Thus, for example, outside of the tropics, it was the increasing length of daylight in late January which prompted a queen to start laying after the winter recess. Unfortunately environmental degradation is making this less simple, not least the correlation between warming temperatures and blooming plants, which has significant implications for the bees. A study released last month by Washington State University showed that, with warmer autumns, forager bees are working longer than had been the case — something we have all witnessed. The consequence is that with the disintegration of their wings these winter bees are dying earlier, to the point that models suggest that by early February there will not be sufficient numbers to maintain the new brood, and colonies will collapse.⁽¹⁾

Wayne Esias using NASA satellite photos of foliage cover, showed that, in Maryland, over the space of 40 years, the onset of leaf emergence in early spring had advanced by 28 days. Consequently many colonies have not reached their ideal numbers of bees and brood at the onset of the pollen, and later the nectar, flows.⁽²⁾

The three principles of 'slow productivity,' as defined by Cal Newport, are

- do fewer things;
- work at a natural pace;
- obsess over quality.

That is what honey bees, and pollinators in general, do instinctively, and is another lesson as we struggle to find an equilibrium in a world that changes more rapidly than we can understand. 🐝

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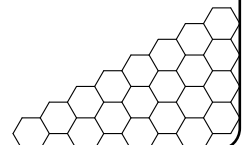


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INNER NATURE

The Current Understanding of the Nature of our Universe

Vidya Rajan

The Big Bang was an explosion of immense power at a point in space about 13.7 billion years ago; the singularity from which everything in this universe — energy, space, time, matter — originated. Consensus on the universe’s origins from a fiery explosion emerged because of one incontrovertible signature that it left behind: a little bit of the heat from the fiery explosion that permeates all space evenly. It is called the cosmic microwave background radiation (CMBR), which heats interstellar space to 3K (-270.15oC) and is spread everywhere evenly, no matter where one looks. It could only mean all the universe was once a single point, and this origin story has been accepted since 1965, when CMBR was discovered. $1/1037$ th of a second ($1/0.000,000,000,000,000,000,000,001$ th of a second!) after the Big Bang was the hypothesized “inflationary period” where the universe dispersed its explosive energy by going from the size of a proton to the size of a football (about a 1,000,000,000,000,000-fold — 1 quadrillion fold expansion). One of the big head-scratchers is whether other universes were also created at the same time as our own universe. The way I visualize it is to imagine a soap bubble emerging from a wand: Was it a single large bubble or many bubbles that were formed. But there is no clear answer about whether we are in a single universe, or if there are universes of different sizes all over the place. Then to the shape of the universe, which seems to have undergone initial inflation rapidly, but then settled to long-term expansion. Currently there are three views of the shape of the universe based on the difference in the density of the universe. If gravity is high, the universe will shape itself into a ball. This is unlikely, given that the universe is expanding. If the density is low, space will warp negatively, making a saddle. Finally, as seems “most plausible”, the universe has the perfect density of six protons/1.3 cubic yards, making it expand evenly without warping. This gives us a flat universe.¹ This is not as odd as it feels. Imagine the two parallel lines extending out. If they meet, the universe is spherical; if they diverge, it is saddle shaped; if they remain parallel, the universe is flat. For more information on this perplexing structure, please see Physics Girl’s explanatory video at <https://youtu.be/MTUsOWtxKKA?si=kOuN-YBTVpvvDe>



Figure 1: Left: Alternative visions of the structure of our universe as a unique entity, or as one of many universes in a multiverse. Created using AI drawing platform Craiyon.com. Right: Possible shapes of the universe. Top: sphere; middle: saddle-shaped; bottom: flat. The current view is that the universe is flat because its density is optimal, giving it net zero energy.

Experimentation has told astronomers much about the events following the Big Bang. From the instant of the Big Bang to about 100 seconds after it, in the Radiation Era, some energy transformed into particles of matter. (Einstein's $e=mc^2$ governs this transformation and it is also the principle by which smashing particles in colliders releases enormous energy which causes new particles to be formed.) From 101 seconds after the Big Bang to the present is called the Matter Era. It is the time period during which matter formed from the organization of subatomic particles into atoms and then molecules, forming all the stuff in the universe.

Sophisticated telescopes can look back in time for light dating from the explosion. But the very existence of the explosion creates an "event horizon" which cannot be penetrated. To the questions arising: Are there other universes beyond ours? Or is there only an endless vacuum? are unanswerable. So, let's shift our gaze back to our own universe, because it, too, has plenty of unanswered questions. For starters, when astrophysicists add up the mass of all galaxies, stars, dust, comets and planets, they find it only accounts for about 5% of the total. About 25% is thought to be what is called "dark matter", because it does not radiate light, but does show gravitational influence, for example, by affecting the movement of light. The remaining approximately 70% cannot be seen or sensed by any of the apparatus we can use to detect light, heat, sound or radiation. This stuff is termed "dark energy". It is only known to exist because it is pushing matter in the universe further apart at an incredible rate of about 73.3 kilometers per second, leading to the famous "red shift", where light from stars stretches into the red wavelength as they move away, like the wail from a siren as it recedes in the distance. (It cannot be dark matter, because its gravity would pull matter closer together.)

Here is a visual to put it all in perspective:

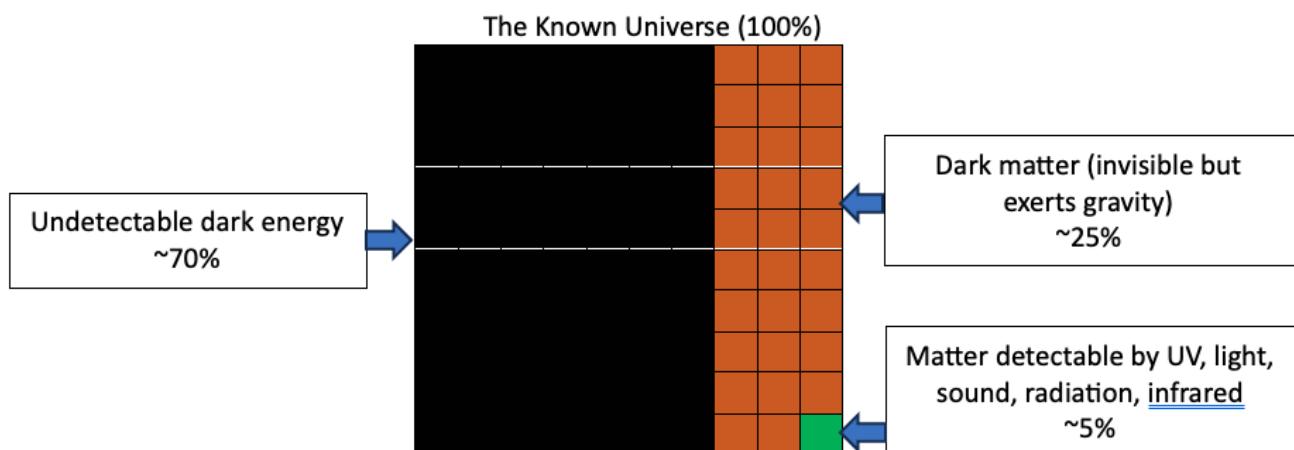


Figure 2: The composition of the universe: ~70% dark energy; ~25% dark matter; ~5% matter

Matter is essentially a solid form of energy and came into existence around 1 second after the Big Bang. Since the universe was so hot, subatomic particles just milled around for another 99 seconds until the first elements, hydrogen and helium were formed. Matter also has a mirror-image, called antimatter.² When the two come into contact, they annihilate and produce a burst of energy. By a quirk, though, more matter particles are present than are antimatter particles, so our matter-made universe exists. Had there been equal amounts of both matter and antimatter, they would have canceled each other out. Although it only accounts for $1/10^9$ particles more of matter than antimatter, this adds up to make all the matter particles that we can observe and is as yet unexplained.³

The current understanding of the nature of the universe is based on a theory called the "Standard Model", which is supported by experimental evidence obtained by smashing particles in colliders. This model is considered the most successful of all theories to date and it posted a major hurrah in 2012 when the Large Hadron Collider in Geneva found a particle that was predicted by Peter Higgs in 1964⁴, and therefore called the Higgs boson. The Standard Model posits the presence of the "fundamental" building blocks of the universe:

6 matter particles called leptons, 6 matter particles called quarks (which come in “flavors” called *up*, *down*, *charm*, *strange*, *top* and *bottom*). Finally, there are force carriers called bosons (*gluon*, *photon* and the three related bosons called W^+ , W^- , Z^0) that mediate matter particle interactions. Finally, there is the Higgs boson, a force carrier that confers mass on particles that interact with it.⁵

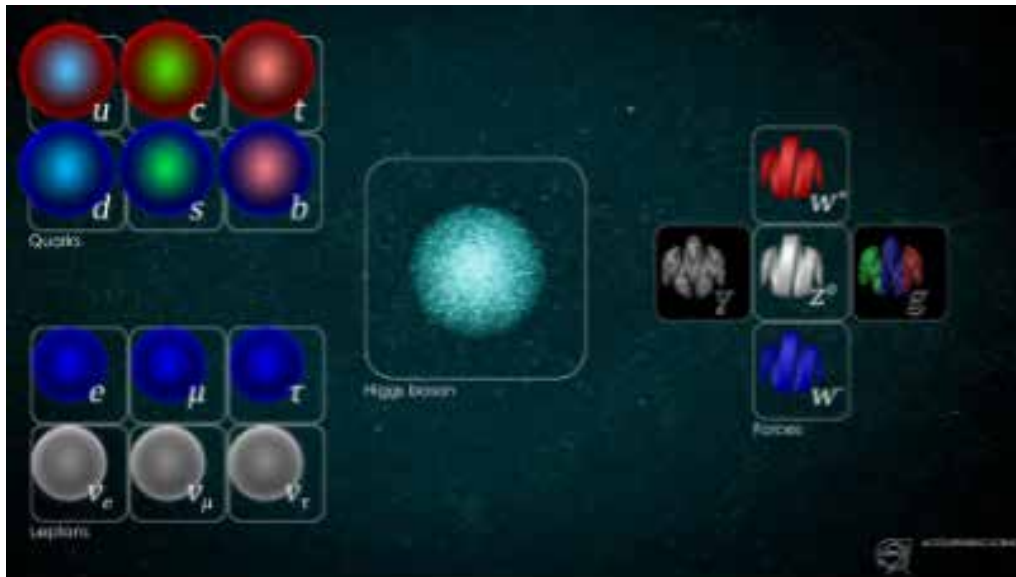


Figure 3: The Standard Model containing the fundamental building blocks of matter and force in the universe.⁶ Quarks come in “colors” (u=up; d=down; c=charm; s=strange; t=top; b=bottom). The term “quark” comes from James Joyce’s novel, *Finnegan’s Wake*, and was adopted by Murray Gell-Mann because quarks come in three pairs.

Matter is made of atoms which contain a nucleus with protons and neutrons and orbiting electrons. Broken down to fundamental particles, atoms need only 3 particles: *up* and *down* quarks, and electrons. A proton is made from two up quarks and one down quark held together with gluons; a neutron is made from two down quarks and one up quark. The roles of the other particles are not known beyond the fact that they exist.

There are four fundamental forces in the universe that control the actions of matter. In order of decreasing strength, they are: 1. The strong nuclear force is mediated by gluons (g) which “glue” quarks together in various combinations to make protons or neutrons. This is the energy that makes the atom bomb so powerful; 2. Electromagnetism is 1/100th of the strength of the strong nuclear force. It is due to the attraction of opposite charges or poles. Its force carrier is the photon (γ); 3. The weak nuclear force which is carried by electrically charged W^+ and W^- bosons and neutral Z^0 bosons. It is this force that allows some particles to escape the nucleus as what we call alpha- and beta- radiation; and 4. Gravity, whose operation at the atomic (quantum) level is a mystery. At the large-scale level, Einstein showed that gravity is due to a warping of space-time. Scientists have posited particles called “gravitons” but haven’t found any. Yet.

In this article, I had hoped to put the “fun” back into the fundamentals of the structure and function of the universe. Rather, I may have inadvertently put in the “mental”, as in, “the universe is crazy”. But it is undeniably fun to look up and consider that so much exists beyond the 5% that is visible.

Let me end with the first image sent by the newly launched James Webb telescope, which was peering back in time to about 4.6 billion years ago, when our solar system was just forming. This image of the universe shown in Figure 4 covers the space equivalent of a grain of sand held at arm’s length. So, yes, this means that the universe is very, very big. And so very, very, beautiful. To solve the mystery of how it came to be means so much.

Darwin said, in *On the Origin of Species*: *There is a grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.* This statement could also apply to our understanding of the universe we live in, and we are still just learning about that beginning.



Figure 4: NASA's James Webb Space Telescope has produced the deepest and sharpest infrared image of the distant universe to date. Known as Webb's First Deep Field, this image of galaxy cluster SMACS 0723 is overflowing with detail.⁷

Note: This article draws upon the current accepted scientific opinion of how the universe began and progressed. Future discoveries may change things. Science accommodates new discoveries and developments and shifts to accommodate new findings. 🐝

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CiCi Sweeny runs around 40 colonies in Grove City, PA, specializing in selling Northern Survivor Queens and nucs. CiCi is the President of Northwestern PA Beekeeping Association and is a member of four local clubs along with the PSBA and Eastern Apicultural Society. She is an active member of EPIQ, an educational program led by Dr. Robyn Underwood focused on the production and insemination of queens. CiCi instructs eight-hour 'Basic' and 'Beyond Basics' Beekeeping classes locally, and does extensive speaking in the community about beekeeping to local clubs, schools, and groups.

The struggle is real. Beekeepers are sick of hearing about treating bugs on a bug, and tired of dealing with the deadly viral loads that happen when Varroa mites are not kept under control. There are Varroa-resistant bees out there, but even if you manage to get some, it is difficult knowing the extent of the resistance, or for how many generations those genetics will stick around for.

Fresh out of the box is Optera's UBee0 Test Kit launched in 2024, which may bring the beekeeping industry another step closer to long-term Varroa-resistant bees. Testing for Varroa Sensitive Hygienic (VSH) behavior through unhealthy brood odor is much quicker than other methods to detect resistance, and even can be done alongside mite treatment. This is perfect for queen breeders and queen producers, who can go a long way in monitoring VSH levels in the breeder queen options through a simple selection test done in the field.



The UBee0 Test Kit with two 5-test vials, ordered from opterabees.com. Vials will last about a year, but once punctured, must be used that day. As a local queen producer, this kit provides me a way to improve what I offer without going fully treatment free and risking the health of the bees.

Historical Sidebar

Current events are great, but sometimes a brief history lesson is necessary to better understand what is going on today. Let's start with the Eastern honey bee, the Varroa mite's original host, who has coexisted in balance for a long time. The bee species *Apis cerana* has evolved with the Varroa mite and has three special adaptations to keep the mites in check¹:

Social grooming (allogrooming) of mites by adult bees to adult bees

Worker brood is very sensitive to parasitism, often dying if a mite feeds upon them

Drone cell cappings are extra thick with a small hole to allow air exchange; sick drones are not strong enough to chew their way out, and die under the capping.

The species *Apis mellifera* has been struggling to catch up the last couple decades, with researchers and motivated beekeepers speeding up adaptations with research studies and focused breeding utilizing Instrumental Insemination (II). There was substantial work over the years done in breeding for mite-resistant bees.

In 1994, Dr Marla Spivak at University of Minnesota chose breeder queens through a freeze killed brood assay. This test uses liquid nitrogen to kill a sample of brood and examining how many are removed within 48 hours, providing a percentage of hygiene related to detecting dead brood under the comb. It was shown that the resulting high performing hygienic stock were able to consistently remove larvae infected with American Foulbrood and Chalkbrood before the contagious stage². There was also some resistance to Varroa mites, but studies in 2001 and in 2007 showed that a high hygiene score based on freeze killed brood was not enough to control mite population^{2,3}.

In 2001, Ernesto Guzman-Novoa et al. did a study in Mexico on multiple resistant avenues, and was inspired by grooming behavior⁴. He went on to work with Perdue University's Bee Lab, whose additional research and breeding program resulted in the Perdue Mite Biter line⁵. This is still

Specific brood hormone was found to trigger VSH bees to uncap and pull out infected or parasitized brood (Wagoner et al, 2018). Think of it as spoiling milk — not everyone has the same sense of smell. Some can only tell milk bad when it is curdled. Others take one whiff and dump it down the drain immediately. Most *Apis mellifera* honey bees have a poor sense of smell, and can't pick up on the unhealthy brood odor coming from capped cells. VSH hygienic bees are very sensitive, uncapping the cell, and either dragging the brood out of the colony, or recapping the cell once the mite's reproductive cycle is disrupted.

Here's something to turn any beekeeper's head ... a queen rated at 60% or higher UBeeO score can generate offspring that potentially would be able to handle colonies without mite treatment (Wagoner et al. 2021).

In addition, Dr. Kiara Wagoner shared with me that there is a manuscript in the works describing data that are indicating a positive correlation with a high UBeeO colony scores with lower Nosema, Chalkbrood, and virus levels (versus low UBeeO colonies). The data also suggests that colonies with UBeeO scores as low as 20% may be resistant to chalkbrood.

Cory Stevens, the Missouri rock-star VSH breeder, is often heard talking about how Deformed Wing Virus is a thing of the past in his apiaries, and his testing with UBeeO last year scored extremely high with multiple queens in the 90% range.

Although DMV and UBeeO testing hasn't been done officially yet, this anecdotal experience from Stevens with VSH is encouraging. Pair that up with research from Drs Spivak and Reuter in 2001 that showed resistance to American foulbrood disease in freeze-killed hygienic bees, and we might be looking at a very effective tool in UBeeO. This is speculation, but adding up the possibilities point the way for a great looking future where *Apis Mellifera* honey bees may be able to defend themselves if we can actively breed for and spread the hygienic traits.

I am a small queen producer who runs 9 distinct mite or disease-resistant bee stock in my apiary for the diverse genetics. I tried the Harbo Assay, not treating the prior season, and didn't have enough mites under the cappings to count (and ended up having 3 colonies suffer to the end with parasitic mite syndrome, see past article about that nightmare). I never got around to trying the freeze kill brood test, despite the best intentions. THIS test was on my agenda since hearing Dr. Kiara Wagoner talk about it a few years ago!

Last week was Testing Day in my apiary, with my UBeeO sprayer assembled with the vial of brood pheromones, instruction manual laid out in front of me, and a list of colonies with excellent traits to choose from for this breeder test before grafting. I felt like a kid offered samples in a bulk candy shop, as I peeked in at each perspective beehive to narrow down the list to five that I was going to test that day. I finally settled on a descendant colony from the Red Line Mite Mauler, a Perdue Mite-Biter, two Varroa Sensitive Hygienic-Carniolan colonies, and a

available today, an amazing testament to back-breeding and Instrumental Insemination to bring certain traits to the foreground. It was found that Perdue Mite Biters bred over time started to manifest shorter, sharper mandibles that are able to amputate Varroa mites easier.

Dr John Harbo from the USDA-ARS Bee Research Lab in Baton Rouge, LA led a research team for ten years to specifically select for mite resistance. The team created the Harbo Assay, to test for what they called Suppressed Mite Reproduction (SMR). It requires not treating for mites in the test populations for at least a season prior, to encourage a mite load during the test. One hundred purple-eyed pupa are carefully removed from under the cappings and examined for Varroa mites. Then a calculation is made comparing non-productive and productive foundress mites. The non-reproductive foundress mites have no progeny that will be ready to emerge with the adult bee. A ranking system based on this labor-intensive test follows the queen through her life. After comparing notes with Dr. Marla Spivac in 2004, the team realized the assay tested for a specific form of hygienic behavior, and SMR was renamed Varroa Sensitive Hygienics (VSH)⁶. The Harbo Assay is described in detail on his site, updated in 2024 for anyone who wants to selectively breed for VSH⁷.

Before the UBeeO test (explained in the article), there were only three available methods without a lab to identify and breed for mite resistance:

Sticky boards- count dismembered mites within a two day 'drop' period

Freeze Killed Brood (FKB)- kill 200 capped brood using liquid nitrogen or cutting out part of comb and freezing it, find percentage after 48 hours back in colony

Harbo Assay- determines Varroa Sensitive Hygienic (VSH) score by evaluating 100-200 purple-eyed pupa for non-reproducing and reproducing mites under cappings

All three of these tests are not simple for queen breeders and producers to do, but there are some breeders and commercial



The cleaning solution came sealed with a metal cap. Apparently, I should have removed the middle section instead of puncturing through the metal. Oops...glad I didn't damage the applicator. I'm sure future printings of the manual will include that detail.



I really love new bee toys; especially innovative tools that assist with beekeeping better. The applicator is well made with adjustments possible. I wish I played with the nozzle a bit more during the cleaning solution phase before testing, as it should have been a more even spray than a concentrated squirt. Still worked admirably. Quick note-spraying the three squirts without a 15-20 second pause can cause the wax to dissolve. Following directions is key.

granddaughter of an Indiana treatment-free colony that was designated as 'yellow' in Dr Underwood's recent Genetic Comparison study (which showed excellent pathogen control). All of these colonies tested under the 3 mite threshold throughout 2023, with good honey crops and strong overwinter clusters. I was ready to go, read the directions five times backwards, with adrenaline rushing through my veins.

- I chose the first frame, and uncapped a few brood around the perfect test spot to make sure the brood was purple-eyed or younger (Apparently, choosing older brood close to emerging can make them vacate their cells prematurely, skewing the results).

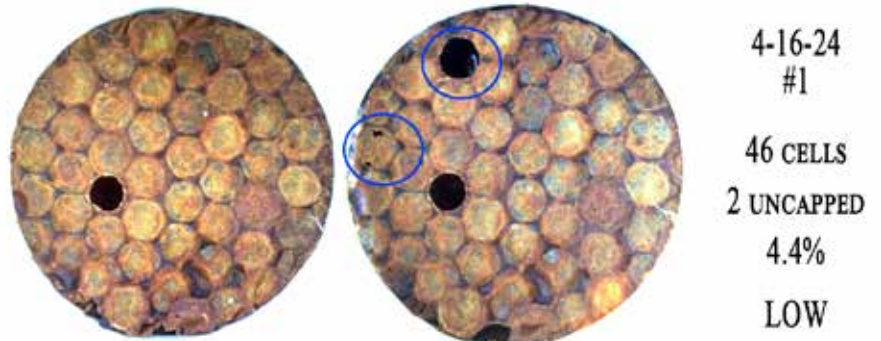
beekeepers that have continually worked on honing their genetics using one or a combination of methods. Kudos to them, and may they continue pushing the genetic possibilities of our beloved *Apis mellifera* honey bees.

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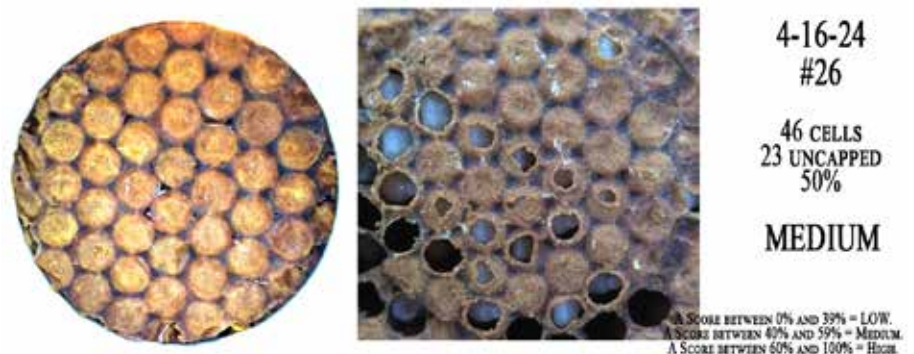
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- I put the testing ring down, twisting gently to make a mark but not break the cappings, and took my 'before' image
- Sprayed three times (after priming with the cleaner), making sure to do a slow 15 second count to have each spray dry thoroughly (another way to skew results, as too much spray can dissolve wax ... following directions is good).
- Tossed the frame back in the original colony, and repeated.
- Two hours on the dot, and pulled it out for another image to compare.

I have to admit, I was disappointed in the results. All but the VSH had low UBeeO scores, and 50% was the highest score. I was really hoping for what Cory Stevens described as a 'Pupae Pulling Party,' but that will come with time. I am on the right path, and will continually stock my yard with genetics to reduce dependency on miticides. (Last minute update- I just made an order with Cory for a dozen VSH virgin queens, and will use my second UBeeO vial to test them 7 weeks after they start laying. This wait will ensure that the new queen's offspring will be the ones being tested. Rock on!)



Brood frame from an open-mated Purdue Mite-biter queen bought from breeder; in the Purdue University Bee Lab, the VSH and hygienic FKB traits were introduced at certain points, but biting was the primary focus. I had hoped for a larger percentage of uncapping, but now I know. With any luck, her drones will pass on the mite-biter traits to virgins I graft off of the top VSH queen.



This brood frame was from a VSH-Carniolan open-mated queen. I was really hoping for a better score, but it beats guessing. I will test this colony again in another month, during a strong nectar flow. There was nectar in the frames during this testing day, but I wouldn't call it a strong flow. Notice the shining nectar between the cells on the 'before' image? I had shaken the bees off the frame, and then wiped off the sticky mess before applying the brood pheromone. Didn't seem to effect the uncapping results.



Another VSH-Carniolan open-mated queen, with 48% UBeeO score. It is possible that there were not enough nurse bees in that box to do the UBeeO test justice. I had sequestered the queen and young larvae frames below the capped brood (including this frame) the previous week with a queen excluder, as I had expected to use the capped brood to make up mating nucs that day for a shipment of VSH-Pol queens from a breeder. They cancelled my order once they learned I planned to UBeeO test them for evidence of VSH, and their mite-resistant claims were taken down from their website. Apparently, the breeder was more of a producer with two large commercial outfits with unknown genetics camped next door.

I am not suggesting that every beekeeper run out and buy a UBeeO testing kit. That is best left to the queen breeders and queen producers. At the current test price of \$20 per colony, it would be hard for queen breeders and producers to justify NOT using it yearly to test for Varroa Sensitive Hygienics in their current stock before choosing which queens to graft from. This is especially true for those who claim to be selling those genetics.

I do suggest asking questions of your provider, the next time you need to buy queens. It will be hard at first to 'strike gold' and get a daughter from a high-scored UBeeO queen, as the availability is still very low. The fact of the matter is, without testing pressure by the queen producers, and buying pressure from YOU, true mite resistance is a LONG time coming. Every beekeeper I've talked to would love for treatment free to be a reality.

Here's where this product shines: for very little time and financial expenditure, breeders and producers can evaluate their breeder Queens, and extrapolate what benefit that will be to the buyers of their product. The research is here, and so is an easy, affordable test.

The UBeeO test kit is a small step forward for a treatment free reality to happen in our generation. Sure, it needs refined and improved like every new product can benefit from, but it is like the first step on the moon for man ... There's more to come. And that is thrilling. 🐝

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