

Together, We Can Make Something Sweet

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The mobile observation hive brought to the Panorama Natural Burial Earth Day event in Earlysville, Virginia.

On Earth, there are over 20,000 known species of bee, found on every land mass except Antarctica. But when you think of a bee, you probably imagine the honey bee. These famous honey bees, believed to originate from Africa or Asia, are most well-known for their production and storage of honey, their construction of beeswax hives to house their highly social queen-led colonies, and their ability to sting. These qualities are not shared by all other bees! In fact, there are only eight recognized species of honey bee; most bee species do not produce and store honey, live in a highly social colony structure, or even sting. Bees come in all kinds of shapes and sizes, some developing unique features, adapting them to more effectively feed from (and more effectively pollinate) the flowers in their surroundings¹.

So what do bees have in common? One quality they share is their role as pollinators. As bees feed on nectar and pollen, they also end up

¹ Moisset B., Buchmann, S. (n.d.) Bee Basics: An Introduction to Our Native Bees. *USDA Forest Service and Pollinator Partnership Publication*. https://efotg.sc.egov.usda.gov/references/public/SC/Bee_Basics_North_American_Bee_ID.pdf

carrying pollen from one flower to another, serving as a critical conduit in plant reproduction. What we call honey is a byproduct of bees collecting nectar and pollen to feed themselves, their queen, and her larvae. Honey bees have the additional quality of storing excess honey. This is an adaptation honey bees made in order to survive colder weather. To keep warm in the winter, honey bees return to the colony and vibrate their bodies. This behavior requires a large energy source, so bees spend the warmer months of the year building up large stores of honey in preparation for colder months.

Honey bees have been introduced by humans to many different environments, including the North American continent. They are believed to have been introduced here when European settlers arrived in Virginia in the early seventeenth century. These western honey bees might be considered generalist pollinators: able to collect pollen from a large variety of shapes and sizes of flowers. However, this means there are also flowers and plants that they do not pollinate or pollinate poorly, including various plant species indigenous to North America. Among these are tomato, eggplant, pepper, melon, pumpkin, cherry, blueberry, watermelon, and cranberry flowers. These plants depend heavily on native pollinators that developed relationships with them over extended periods of time².

Unlike the honey bees, other pollinators do not produce and store excess honey³. For some, like the bumblebee, this is due to their different adaptations to survive colder weather. Rather than building up honey stores to get through the winter, they hibernate. For others, this is due to a difference in social and reproductive organization. Rather than living in colonies, they live in a solitary way, with individual bees taking care of their own eggs rather than those of a queen.

The excess honey they produce gives honey bees a unique relationship among insects to humans. They are now considered semi-domesticated animals, as their reproduction and gene selection is largely dictated by beekeepers, rather than through their own selection or environmental factors. To learn more about this relationship, we spoke with Dave Thornton of Soul Soleil Farms. Soul Soleil Farms is an apiary and lavender farm based out of Museville, Virginia. Dave and Leigh Thornton run the farm, planting, tending, and harvesting lavender. They also beekeep, working together to harvest honey. Many Saturdays, they can be found at the Farmers Market at IX Park in Charlottesville, sharing their lavender and honey products with the community. Other times, they can be found at various community events, sharing and educating others about beekeeping. They graciously took time to speak with us over two weekends.

What follows are excerpts from two hours of Saturday conversations

² Virginia Working Landscapes. (n.d.) Bumble Bees of Virginia. Smithsonian Conservation Biology Institute. https://www.vaworkinglandscapes.org/wp-content/uploads/documents/VWL_handouts/Bumble_Bees_of_Virginia_Pamphlet_VWL.pdf

³ Day, E., Dellinger, T.A. (2021). Native and Solitary Bees in Virginia. Virginia Cooperative Extension at Virginia Tech. https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt.edu/ENTO/ENTO-151/ENTO-424.pdf

with Dave, where he shared with us what he's learned about honey bee social organization, honey production, and the inter-species relationships- between flowers, bees, and the communities of Central Virginia- they have made through beekeeping. *Transcript excerpts from both conversations have been combined, edited for clarity and flow.*

Life in the Hive

We met with Dave first at IX Market, and a second time at an Earth Day event he was participating in at Panorama Natural Burial. He had joined the event as an educator, bringing with him a couple teaching props, including an empty starter hive (known as a nucleus hive, or "nuc") and an observation hive that allowed us to view the internal activities of a honey bee colony, much of which revolved around the queen and taking care of her eggs. He started us off with a challenge to find the queen.

Here is the queen bee that Ava spotted! She has a green marking on her back that Dave added, making it easier to find her. Several nurse bees are oriented to face her.



Ava: I found the queen!

Dave: This queen is less than two weeks old, about a week. We marked her this past week. The green [marking on the queen bee's back] is the color for queens for 2024. Last year, the color was red. Most of the hives right now that we're going through will have queens from last year, so there'll be more red. And actually, it kind of wears off, too, I'm learning. [The marking] becomes very, very faint, almost pink.

[gesturing at an empty nucleus hive he had brought to the Earth Day Event]



With a nuc, or a nucleus [hive], there are five frames that we start. We can walk over in a little bit. We started an apiary here [at Panorama Natural Burial]. Two new nucs, like this size, here. We're seeing how they adapt. Over the coming weeks will grow those hives and bring more hives to this apiary as well.

Miranda: Are there any signs that a hive will succeed or adapt well?

Dave: It will come down to the health of the bees, the queen, as far as if she's laying [eggs] well. We just introduced queens [to the two new hives] through a queen cage. So we placed the queen in here, placed the gel [royal jelly⁴] in here. And then also we will buy these from other keepers to provide new genetics.

This is the sample nucleus hive, though Dave brought more frames than the usual five to fill out the box.

⁴ Royal jelly is a secretion that is used to feed larvae and adult queens. It contains important proteins, sugars, fatty acids, minerals, and antibiotic components.

What we'll do is we'll place the queen cage in the hive with the screen down, between two frames. We'll take

propolis⁵, it's kind of dry now, but we'll take the propolis to help secure the queen cage. And then, imagine if you will, thousands of bees. They will check out the queen, and they'll remove the jelly that's keeping her inside.

And hopefully [they'll] accept her, right? So if it's a hive that does not have a queen, does not have new eggs that a queen cell can be formed from, then they'll readily accept her. We had one hive this year, where [the bees] were very aggressive. They were stinging, they were very agitated, very defensive. So we started looking through the hive more closely, and we couldn't find any eggs.

[showing us a photo of bee eggs and larvae]

So this is the life cycle from egg. Egg to larva to pupa. And then they're getting ready to emerge. But we couldn't see any eggs or small larvae, so that's kind of a sign that the queen, if she's there, may not be laying or unable to lay properly. So we actually introduced a new queen through a queen cage to the hive. We'll go back to it this coming week and see how that looks. In other words, if there's already a queen there and we just made a mistake, then they'll kill the new queen. That queen will kill this queen. But we'll learn.

What Dave is referring to here is what might be viewed as worker bees enforcing the social contract of the honey bees. In the supersedure process known as "queen balling"⁶, worker bees will form a tight ball around the queen, vibrating their wings to generate heat while simultaneously stinging and biting the queen. This behavior kills many of the worker bees in the process, as they, too, are suffocated by the heat generated. A worker honey bee's successful sting requires it to sacrifice its own life, due to the mechanism of the stinger. Barbed lancets help to bury the stinger deep, facilitating entry of a secreted toxin. Once embedded, the honey bee cannot leave without self-amputating the stinger, causing the bee to bleed out. Like Dave is suggesting, worker bees will initiate supersedure when a queen is failing to produce eggs, or when a more viable queen is introduced. Otherwise, if a foreign queen arrives and the worker bees do not acknowledge her as more viable than the existing queen, they will use this process to kill her instead.

At our first meeting, Dave told us a little more about honey bee reproduction:

Ava: Is there a cycle for larvae?



This is the photo of developing eggs and larvae that Dave showed us.

⁵ Propolis is a resin-like material made by bees to build hives.

⁶ Hamdan, K. (2010). Natural Supersedure of Queens in Honey Bee Colonies. *Bee World*, 87(3), 52-54. <https://doi.org/10.1080/0005772X.2010.11417360>



A queen bee. She is the largest of the honey bees. Her abdomen is long and rounded.

Dave: There are a certain number of female bees, which are the majority of the bees in the hive. The queens laying will be female. There's also the male bees, the drone bees. Eggs that are not fertilized will become drone bees, while all the fertilized eggs will be female. It takes about three weeks for female eggs to hatch. The male drones take 24-25 days. And then there's the queen. If they need to replace the queen, or if they're running out of space in the hive, they will swarm to form more and more queen cells. The queen that gets out first, usually, is the one that prevails.

Ava: So they know that they need to split, sort of?

Dave: Well, they're running out of space. If the deeps and honey supers⁷ are full, or getting to the point where the queen doesn't have room to lay eggs, the bees will sense that, and they start forming queen cells. Half the hive, they'll go with the old queen, swarm at the start to find the home, and the new queen will stay.

Ava: Have you seen a pattern in how they decide who goes to which queen? How do they split?

Dave: The old queen of the hive will leave with a number of the bees to swarm, to start a new hive, and the new queen stays at the front of the hive.

Our job as beekeepers, what we try to do is minimize swarming, so that's why we're spitting, providing more room, we take frames of cap brood⁸, and also place new foundation frames in the hive for them to draw out beeswax so they have more room, more space, and more work to do, as opposed to have the need to split into two homes.

Ava: It's more productive to keep them as one?

Dave: We try to provide an environment for them to thrive, but also for us to be able to harvest some of what they provide us, in particular the honey and honeycomb. So if we are losing, say, half of the bees in the apiary to the wilderness, there's less excess honey, which is what we collect.

Ava: Does that happen?

Dave: It does happen. The queen's cycle from egg to emerging



A worker bee. She is the smallest and most numerous in a honey bee colony.



A drone bee. He is larger than a worker bee, and has a more rectangular abdomen.

⁷ "Deeps" are larger frames used by beekeepers in their hives, bigger than those in a nucleus hive. "Supers" are short for superstructure, which are additional boxes added to a beehive for honey storage.

⁸ Cap brood refers to cells in the hive that contain a developing larva.

is 14-15 days, which means that we go through the hives in a less-than two week cycle. The other thing is that the hive will detect that a queen, at some point, is no longer able to keep them in a position with enough eggs, to have enough workers to go out and harvest for them to keep the hive viable. So at some point, the queen will either reduce the number of eggs that she's laying, or she may get to a point that she's not laying eggs that are fertilized eggs. If they're not fertilized eggs, as we mentioned earlier, it's only males, and males don't do a whole lot for them, other than reproduction. They do not harvest any resources, they do not take care of the eggs, the larvae, the newbies, they do not take care of the queen, so if you only have males, at some point, that hive is going to no longer exist.

Ava: So that's when the hive needs a new queen. How do they establish a new queen? Is it a specific way that they're born?

Dave: It is, correct. One of the major factors is the food that the nurse bees feed that egg. So, basically, it's a very large quantity of food, a very large quantity of royal jelly.

So, I just wanted to give you an example of a cap brood. You can see the ones that are capped are even with these cells. Drone bees are larger ones.

This is a parasite that is really challenging for the bees. These little dots are Varroa mites, and they are parasites that attach to the bees. Over time, they'll weaken the health of the hive, potentially destroying them.

Ava: How do they come about?

Dave: To us, they're very very tiny, but on the bee it's like having a something the size of a dog. They get into the brood before it's capped. This time of year, we'll check the drone brood. The reason for the drone brood is that it's more days from the egg until they emerge, so the Varroa mites are more drawn to that brood than the female group. We'll take some of the drone brood, decap them, and see if there's any mites.

Here, Dave illuminates the core nature of the relationship between the apiculture⁹ business and honey bees themselves. Maximizing honey production by encouraging the development of a large bee colony,

⁹ Apiculture refers to beekeeping of bee species of genus *Apis*. There is also meliponiculture, which refers to the practice of keeping stingless bees of genus *Melipona*. Meliponiculture is practiced by the indigenous peoples of Brazil and Mexico.

rather than allowing for the propagation of many bee colonies, shapes the management strategies and actions taken by beekeepers.

The emergence of the Varroa mite parasite is largely understood to be a consequence of the globalization of honey production¹⁰. It is thought to originate with the honey bees in Korea (*Apis cerana*), spreading as the western honey bee (*Apis mellifera*) was introduced. *Apis cerana*, believed to be the original host of the Varroa mite, is more resistant to predation. However, because the mite is relatively new to *Apis mellifera* –the predominant species of honey bee kept in North America– it does not have protections against the parasite. As a result, Varroa mites are consistently devastating to these colonies.

The Hive in the World

Since honey bees cannot produce honey without going out into the world and spending time among the flowers, we were also curious about observations Dave had made between the bees and their environment.

Miranda: Other than the health of the queen bee, are there any environmental factors considered when placing the hive or choosing a location?

Dave: Yes. We met here [at Panorama Natural Burial, to identify a location for an apiary] about a year ago. There are people that come here: for the NCAA National Championship, for the cross-country track they have here. This morning when I came here, they had a birdwatching club that was here. Initially they wanted to have the hives around here [near where we were standing, at the tent] or near the barn. But because of traffic, human traffic, that probably wouldn't be ideal.

We try to find a spot where we could face the opening of the hives kind of south or east, southeast, as well as a spot that is somewhat protected, not on the ridge. Even though it is on a slope. Placing the hives level is often a little more challenging.

So, one factor is just safety for people. Making sure we don't place them where there's traffic. Especially when you're going to have people visiting, and they're not familiar with the property. So one is safety.

The second is, like you're saying, the environment. At the bottom of the ridge here, there's a stream, or a water source very close for the bees. We've also got the

The two new hives installed at Panorama Natural Burial in Earlysville. There is an electric fence surrounding the hives, so we didn't get too close.



¹⁰ For more information on Varroa mites, visit <https://beekeep.info/a-treatise-on-modern-honey-bee-management/managing-diseases-and-pests/varroa-short-history/>.

meadows here which are beginning to bloom.

Having an area where you can face the hive entrance east or southeast, so that they'll see the rising sun. Then they'll get out [of the hive] as soon as possible to start gathering food.

Miranda: I see. So the sunrise helps them start their day. So they know, "I can see the sun when it comes up, now it's time to go gather."

Dave: They'll be the first out, right? Compared to other species.

The other thing that we found is important is having an area that does not collect moisture. So when it does rain, you have a thunderstorm, that's not too bad in the summer because it's still warm. But when you get in the winter, you have rain and there's pooling of water, that moisture will get in to the hive. Then it gets cold, and it kills, it can kill the bees. So the biggest challenge that you will have in the winter, in most cases, is the bees freezing from humidity and moisture that got in the hive. They'll get cold and freeze.

Miranda: So honey bees are a general pollinator, and I know you mentioned they've planted, or they're preserving like natural wildflowers around here, native species. There are also native pollinators and native bees. Part of the orientation of the hive is to help the honey bees get out and get some of the pollen before some of the native pollinators. Do the honey bees do pretty well with the native wildflowers species here?

Dave: Oh yes, very much so.

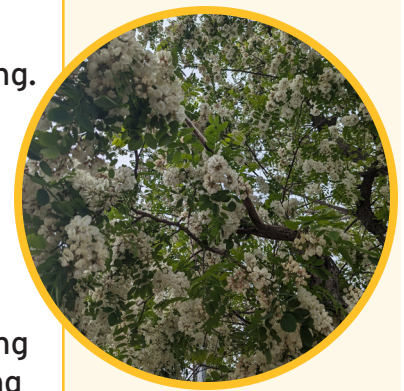
[finding a picture on his phone, then showing us].

This is one of the honey bees actually earlier in the spring. And this is a plum flower.

Miranda: Are there other species of flowering trees or native wildflowers that you observe the bees especially developing affinities with?

Dave: Yeah, so you see that with the pollen that they're bringing back. The tulip poplars will be in bloom shortly. I'm seeing some locusts starting to bloom. Those are very good for

A picture of blooming black locust trees near the Barracks Road Harris Teeter. Indeed, it's a large concentration of blooms!



the bees. The walnuts as well. The walnut trees. And trees typically are, as a food source, much more advantageous for them.

Miranda: It's a concentration of blooms.

Dave: It's much more advantageous for them where they can go to a concentrated area. Where there's an overabundance of pollen and nectar versus hopping from flower to flower or plant to plant or bush to bush. So trees are extremely important for any of the pollinators. Whether native or the honey bees.

Ava: Would non-native plants have an effect on them?

Dave: Well, these [the bees] are non-native anyway, to here. I mean, they were primarily from Europe. Italian, Russian, many different bees are based on those characteristics. Primarily, they're calmer, less aggressive or protective.

It's an interesting question, because our business, or my wife's focus is on lavender. So to me, it's so interesting that in the summer, or late summer... a lot of the native vegetation [blooms] primarily in the spring here. You still have some of the wildflowers. Some trees will bloom in the summer as well. Not as profusely as the spring.

But the lavender, we've observed this, has been a very good food source for apiaries that we have in the area to go to.

Lavender Mutualisms

It's important to note that Soul Soleil Farm started as a lavender farm, rather than an apiary. The lavender farm itself came as the Thornton's started a new chapter in their lives, returning to the Central Virginia area and looking to start a local agricultural business. Dave explained how observations about the relationship between pollinators and their lavender plants inspired them to start beekeeping.

Ava: How did you decide to farm lavender?

Dave: We thought we were retiring. But we moved back to Charlottesville in 2016 and we ended up with some property that we purchased soon after we moved here. We had no idea what we might be able to do with it. Most traditional farms in the area are cattle, beef, dairy, chickens, grain, orchards, or vineyards. But we were

interested in seeing if there was anything else that may be viable. We ended up visiting Virginia Tech's agriculture department, and we came up with some different ideas for plant types of crops that we might consider. Leigh ended up visiting a lavender farm outside of Harrisonburg, where they've been farming for 15-20 years. The owner shared some of her experiences, and we ended up attending a lavender conference, a national lavender conference for a week to learn more about the crop and what you can do with it. Some people just do wholesale, they just grow lavender, harvest, dry it, then sell the bundles or the buds. Others wholesale the oils. They will harvest the still for the essential oil and the hydro salt, and they'll sell that wholesale. And then there's others that do retail and agri-tourism. We first decided to plant lavender to see if it was viable on the property. Any idea how many plants we did first, back in 2017?

Ava: I'm guessing a lot?

Dave: We ended up getting six plants, and those six plants are still there today. It's pretty wild. In 2018, 2019, and 2020, we plant a number of plants every year, and we increase.

Ava: So you started with lavender and then added bees?

Dave: The first hives we got were in 2019. Leigh thought of it, since you see bees out, butterflies, and other pollinators in the lavender. We grow approximately two dozen different varieties, so the bloom season, or budding and blooming, varies throughout the season. Some of the varieties bloom in early to mid spring, and other varieties bloom in the summer. Some varieties have two blooms: once in early spring, and again in late summer or early fall. We noticed, especially in the summer and going into the fall, that the lavender was just covered in bees, bumblebees, and butterflies. But the bees in particular. So Leigh thought it would be great to try bees. We ended up purchasing two small hives, or nucs, from a local keeper. Nucs have five frames. We purchased two of those and that's how we started with the bees. We're still learning. I mean, you learn each time you go into anything, you'll see something you haven't seen before. They teach us a lot. One of the things that they're very susceptible to are chemicals. If you register your hives, then neighboring farmers that may spray different pesticides and herbicides and fungicides should notify you of the time that they plan to

spray. Assuming they do, then you're able to proactively close off the entrance to the hive, so that the bees are staying home instead of going out the next morning and getting exposed to chemicals that can harm or kill them. That goes for any kind of crop that may be sprayed, be it grain or vineyards. Vineyards are sprayed constantly, especially early on.

Miranda: Do the bees get restless if they can't get out and collect? Does that tend to increase their restlessness?

Dave: Yes, later today, we'll find an apiary to take them to and we'll take the top portion off, so all of these bees will then go out. We'll open the front door here [gestures to a currently-blocked off opening in the observation hive]. This will let them come down. I don't typically use the smoker, I just let them calm down, removing a frame at a time. I'll usually take the frame with the queen first, that'll attract all the other bees.

As far as the environment is very important, if a neighboring farm sprays [chemicals: herbicides, fungicides, insecticides], all we have to do is close the front entrance to the hive. We'll want to do that the night before [the spraying]. Once the field bees come back from harvesting, I'll go out at midnight to close the door. Or, I'll do it early in the morning, before sunrise. We'll place something over the entrance that keeps them inside during the day, and maybe open it during the evening.

Miranda: So beekeeping requires some coordination with your neighbors.

Dave: Hopefully, yes. Hopefully there's communication.

Ava: Do you communicate a lot with other beekeepers?

Dave: Yes, that's how we learn. We learn from each other, and we're able to help each other out. Say if someone has a bear that gets into their hives and destroys everything, then they have to start over. So we'll help them to find a queen and some bees so they can start their apiary again.

Miranda: Apiculture, compared with other forms of raising livestock, seems so much more involved since it is so dependent on the local environment.

Dave: And unlike working with cows, goats, chickens, pigs, turkeys, the bees already know what they need. How to take care of each other, how to thrive. Where with other types of animals, they require assistance on a daily basis. The bees take care of themselves. In conjunction with the lavender, it's really interesting to see the relationship.

New Relationships, New Understandings

After considering relationships, mutual care, and thriving, we also wanted to ask Dave how his apiary and lavender farm had influenced his life beyond the farm.

Miranda: How have you gotten to know your local community better, how have you gotten to know Central Virginia better through the practice of beekeeping?

Dave: We look at it holistically, not just with bees, but with the lavender, birds, plants that we're experimenting with on the farm. All we're trying to do is take the excess honey from the bees and sell it along the way. But that's not the only thing. One reason we beekeep is because of our age, too. We're on the other side, right, of our journey, we think. You never know what medicine or science we'll come up with, but we're on the other side. We look at it as how we can work from a business perspective with other entities, other businesses in the area, how we can work with others in a cooperative way. With the lavender, with the honey... Leigh works with a chocolatier. They do truffles, they do chocolate bars. She works with an apothecary, called Elderberry, on blending teas, with chamomile and other teas. She's working with the creamery for lavender ice cream [...] with a bakery for cookies, with a florist for bouquets. Someone wanted a lavender bouquet, and she works with a florist on those arrangements. Right now, they're dry. In the summer, they're fresh. I prefer the dry. She works with wedding planners, who might want other items. She works with other businesses. [showing us a gift box of lavender products]. They make party favors, aromatherapy oils, candles, these are a few of the items. Lollipops.

To your point, not working just by yourself. It's also about reaching out and partnering with others to make something that doesn't currently exist, or to make something even better for the community.

The other thing is education. Working with elementary



The Soul Soleil Farm stall at the farmer's market at IX Art Park in Charlottesville. This table contains their lavender goods.

A sample gift box with a variety of products Soul Soleil Farm has crafted through local collaborations.



schools, I'll tour the hive for students, especially young students, to see, to observe, to experience. Or for something like this, for Earth Day. Doing events for the community. We did an event with Elderberry last week, for their 10-year anniversary, where different partners they work with came together. I brought a different hive, with a red [marked] queen.

Ava: How do you think this has immersed you in nature? Has this built your relationship with nature?

Dave: After graduating from UVA, I worked as a consultant in the IT industry. So I was not outside much, I was in an office or conference room or lab, or wherever we were working on a project or with a client. We moved here in 2016 and started planting lavender to see if it would adapt to the property in 2017. We started with six plants, we thought they were all the same variety, there are actually two varieties. They're still there, still thriving. We grew into it from there.

I didn't garden for 40ish years. No gardening, only some mowing, depending on where we lived. We'd go hiking, but as far as day-to-day, being in nature wasn't top of mind. But now it's every day. You're out in the woods, in the lavender, several days a week. You're in the bees at least one day a week until the summer. Then, we have other crops, we have friends that grow other crops and raise animals. We visit or help, we barter. We barter for eggs. I don't eat meat and dairy anymore, so I eat a lot of eggs. A lot of veggies, a lot of fruits. Getting closer to nature has helped us both spiritually, but also physically. When I go to my primary doctor in Charlottesville, when we first moved here, he was like, "Dave, your blood pressure is... your cholesterol is... not good! Dave, you have to start getting physically active." That all helped some, but being out working every day, you don't really notice it, but over time...I had my most recent physical earlier this year, and my blood pressure is down, cholesterol, no medication anymore that I have to take!

Of course, you never know. But the thing is, I feel so much better. I am able to do things that I physically couldn't do when we moved here eight years ago. My mind thinks I'm 21! My body, at times, thinks it's 21! Of course, it isn't anymore, but it's been such a blessing.

I keep track of how far I walk every day. So far today, I've walked 5.6 miles. I got up earlier this morning to do some things that needed to be done. Almost every day, I'm looking at 10 miles.

To your question, also, I've been more mindful of my impact on the environment. When I was your age, I wasn't. Now, more of the youth are, so we're learning from you guys.

Ava: You mentioned it spiritually influencing you, could you expand on that?

Dave: It's made me more aware, more in the moment. Versus, thinking here are all the things I've got to do. Like with school, you have all these tasks you need to finish to be successful. So being more mindful, more aware. We went to go see the eclipse with family that lives outside of Texas. The only time I see him is if there's a death in the family or if someone is ill. Those are the only times I ever see him. He's 78. He grew up in Virginia, worked in Charlottesville, Richmond, Virginia Beach, then moved to Pittsburgh, Boston, then Dallas. He lived most of his life in Boston. He moved to Texas, thought he was retiring, but he still has his office, he still works! When I went to visit, he was still on phone calls! He runs a minimum of 3 miles a day. We went to see the eclipse outside of Dallas.

Commit to yourself to see totality. Speaking of spirituality, I would say that is very...I have an engineering degree. So when you get into spirituality, I was more of a 1's and 0's, Yes and No, Right and Wrong. But that's not reality.

Bees in a Flora of the Future

Throughout our conversations, Dave's enthusiasm for learning from the bees and sharing his knowledge with others was infectious. Also evident was his kindness, generosity, and desire to connect with the community around him. Still, the business element of beekeeping shapes the beekeeper's role as one that is mostly focused on maximizing honey production, rather than stewarding the entire environment that the bees are part of. We heard variously about how advantageous it is for honey production to have fewer, larger bee colonies rather than encouraging greater genetic diversity through the breaking up of one colony into smaller, more numerous ones, and how beekeepers position beehives to give them advantages over other pollinators. It is primarily economic relationships that hold this assemblage together, rather than ecological ones.

Ecological studies have begun to elucidate the importance of native pollinators to native ecosystems and biodiversity¹¹. Honey bees, as a non-native species with relatively low genetic diversity due to their domestication, have been shown to have adverse effects on native ecosystems, particularly those which have been disturbed or where native plant species have been made scarce. As Alison McAfee describes in Scientific American:

“Many of [the species that honey bees are effective at pollinating] are also invasive, including Scotch broom, dandelions, Himalayan blackberry and Japanese knotweed, among others. And beekeepers secretly love invasive plants. Their intense proliferation provides a lucrative and predictable nectar flow— perfect for the honey bees, and beekeepers, to capitalize on— but the plants, too, disrupt native ecosystems.”¹²

Of course, ecosystems are not limited to a fixed set of species. Ecosystems arise out of the relationships that different species co-develop between one another and their surroundings, which includes non-living attributes. Factors like soil composition, present chemicals and minerals, water systems, climate, and topography also play a role in how different species shape their behaviors and relationships. However, with human influence tipping the scales towards a system that best supports a profit motive rather than collective sustainment of life systems, we must reconsider our orientation and affinity for monocultures, or the dominance of a few manageable species.

In recent years, considerable attention has been brought to the importance of pollinators in agricultural production through the “Save the Bees” campaign¹³. This campaign does encourage environmental restoration, but the bulk of their efforts are directed towards beginner beekeeping, rather than informing the public about the importance of native pollinators. The irony in this is that many of the threatened native agricultural species are best pollinated not by the honey bee, but by these native pollinators which unfortunately do not yield the additional agricultural bounty of honey.

Despite all this, apiculture and beekeeping does foster community and new relationships between people and environment, so clearly illustrated through Dave’s conversations with us. Ultimately, more is more. One extra step in “saving the bees” would be to shift the focus from honey bees instead towards native species. This can be done through planting more native plants; reducing or stopping the use of introduced pesticides, herbicides, and fungicides; and protecting land from tilling, soil disturbance, and pollution. Together, we can make something sweet: not just for ourselves, not just for our human communities, but for the greater assemblages of life that sustain us all.

¹¹ Cunningham, S.A., et. al. (2022). Density of Invasive Western Honey Bee (*Apis Mellifera*) Colonies in Fragmented Woodlands Indicates Potential for Large Impacts on Native Species. *Scientific Reports*. 12: 3603. <https://doi.org/10.1038/s41598-022-07635-0>

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¹² McAfee, A. (2020). The Problem With Honey Bees. *Scientific American*. <https://www.scientificamerican.com/article/the-problem-with-honey-bees/>

¹³ This is the main webpage for the 501(3)(c) non-profit. <https://savethebees.com/>