Kelley Beekeeping
SERVING THE BEEKEEPER SINCE 1924

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# Weeds Are Yummy

IN THIS ISSUE

# From the Queen's Court

**by Melanie Kirby**

## SEASON START UP — GET YOUR VEILS ON!

I like to joke with folks that I feel most comfortable wearing my "habit"—which is a metaphor I use to describe my veil—like the habit that a nun wears. I've gone through several over the past 19 years though I get very attached to them and try my darndest to make them last until the threads are bare and my noggin has popped through the top hat.

Every time I have to replace one, it's like deciding to dispose of your favorite pair of socks as the heels have worn thin or a hole pops through the toe. But like a seasoned pair of socks, and a well worn habit-veil, there are the memories of wearing such that are the harder part to dispose of. It is these well-worn articles of attire that define so much for us—where we have been, what we saw and did. It is these seasoned fragments of material that remind us of what we learned along the way, and of the wonder and joy of discovery- embarking on a new trail, or visiting a new apiary site and beekeepers.

I am reminded of all of these ventures—and even more of the recent ventures that I've been blessed to experience while wearing my habit and my favorite socks. This past month I had the opportunity to visit several commercial queen producers in northern California. It has been such a pleasure to get to know and collaborate with some of these seasoned multi-generational beekeeping families. I got to meet Leonard and Linda Pankrantz and their son Brad Pankrants and his wife Melissa. Brad is currently serving as the California State Beekeepers Association President. Their operation—CanAm Apiaries is stellar. They run a super tight ship, and have such an impressive protocol and process. I was very humbled seeing how efficient they rear queens, stock nucs and make packages.

I also got to visit with Pat and his son Russell Heitkam of Heitkam Honeybees. These gents have a top notch rearing system. Even more impressive is that they have employees who have been with them for decades! Now that is saying something about them as



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## Queen's Court *continued*

employers and about their crew. They all work well together. Their office manager Marianne is super pleasant and down to earth. Russell is a jokester and you can tell that his crew enjoys his company.

These families shared their experience with us and really made some time to show us around and to even share a mating apiary with us to conduct some breeding exchanges. I am eager to see how it all pans out. We reared our own queens there with Aiden Wing of Wings of Nature Apiaries and then placed over 450 mating nucs in various sites, from Orland to Palo Alto to collect diverse genetics which we will bring some of them back to the southern Rockies for testing over the next two years. I appreciate those gents for sharing their resources and especially their drones for the outcross matings. This is the warm up to my own queen rearing season in the southern Rocky Mountains which will begin now!

I also got to see a few of the Bee Informed Partnership techies in the field as they were testing breeder hives and collecting samples. I'm compiling profiles of each of them as there are several teams around the nation and will share those with readers later this year. I also got to go visit British Columbia beekeepers. What a treat! I did a presentation for the BC Honey Producers Association. Next month I'll share info on that experience and a profile on the BCHPA Vice President Jeff Lee and his wonderful wife and beekeeping partner, Amanda Lee.

These are indeed, exciting times to be keeping bees and to be involved in the industry. I wish everyone the best of luck this season as spring unfurls her myriad of weather patterns and blooms. This month's cover shot is of a honeybee on milkweed taken by Scott Famous—a Pennsylvania beekeeper. Next month Xerces Society will share some info with KB readers on various milkweed species and also butterfly pollinators of milkweeds. Both bees and butterflies love flowers…as do I. Remember, send me your beautiful pollinator and bee photos and it just might end up on the cover of the newsletter!

**Sweet Spring!**
**Melanie Kirby**

*Melanie Kirby has been keeping bees professionally for 19 years. She runs Zia Queenbees Farm & Field Institute-based in the glacial carved peaks of Truchas, New Mexico at 8300'. ZQB specializes in survivor queenbee breeding, exquisite apiceuticals and hive products and consilience based field research. She can be reached at editor@kelleybees.com*

COVER PHOTO: Scott Famous is a VSH queen breeder & beekeeper at Mellibee Apiaries, in SE Penna., an executive committee member of the Montgomery Cty Beekeeper's Assoc., director of the MCBA Queen Improvement Project, and liaison to the state-wide PA Queen Project. He can be reached at scott.famous@dla.mil

*If you have a question you would like to share, email it to Editor@KelleyBees.com*

# A•Bee•Cs

## *Beginning Beekeeping*

**by Phill Remick**

## Blind Leading the Blind

Recently I met an individual who is quite new to the world of beekeeping but blessed with rather good fortune in the financial realm. His more than adequate monetary resources have opened many doors for his new business, which revolves around keeping bees.

This particular person and I were having a bee-related discussion at my office when I brought up something he didn't agree with. Suddenly his demeanor sharply changed as he told me, "I've read all the books and I've never heard that before. Are you sure?" I stared him straight in the eyes as we closed our conversation stating that having read 'All the books' doesn't mean a thing when you arrive in the bee yard, because the honey bees have their own library.

Anybody can start a business or beekeeping in their backyard or in their town while reading 'all the books'. Is that enough? The trick is to associate with reliable, trustworthy, knowledgeable sources; those capable of relating the subtle nuances honey bees display regardless of what is written about them. Learn from these individuals! Whether you've visited an apiary one time or several thousand times, there is always information to glean from our honey bearing friends and experienced beekeepers with their hive tools in hand. Their boots on the ground and years and years of seasonal experience out-knowledge any beekeeping book on the shelf.

For example: one of my students said he had been reading and reading - but now, after opening hives and listening to my explanations - he finally got it! It is one thing to read about bees, it is another to experience them and hear about them from a qualified beekeeper, capable of pointing out the differences of a particular beehive as the bees are flying around your veil… and comparing one beehive to another: a totally different venture than any book describes.

This is the verbiage of a beekeeping club whose comments I monitor: ***We are desperate for mentors! Anyone with at least a year or more of beekeeping experience is welcome to sign up to help new beekeepers.***

To me, this is the blind leading the blind and is something to be acutely aware of IF you want to be more than a backyard 'bee-haver.'

Beekeeping is detailed. It can throw you a curve ball or two, or three. In a yard of five hives each colony may present totally different problems. Your book related one or two of those issues. Guess what? Bees are not predictable, nor are the weather, water, forage, pests, pesticides or predators. Your book may not tell you all the subtleties that differentiate each hive - or how to address it. Books are books. Knowledgeable beekeepers have the experience to lead, teach and guide you through most of the variances that any hive can offer up.

Read a book? I highly suggest reading all you can! Is that all you need to do to be a good beekeeper? NO! Is a mentor who has only had one more season of experience than you what you need as a guide? I'm sure you can answer that by now.

## A Stinging Rebuke

IF, and notice that I use the word 'IF' you want to be more than a bee-haver, you must not only read as much as you can, but align yourself with a proven, long-term, experienced beekeeper as a mentor and teacher. There is NO substitute for experience…and one season/new beekeepers just don't have it.

Check out your 'mentor.' What is their experience? How many colonies have they kept? Is it one season of beekeeping or is 15-30 years of beekeeping? Have they taught before? How many people have they taught? Do they teach beginning, intermediate and advanced? Can they supply on-site hive management and analysis of any problems you may have? Or…are they just guessing?

If you 'wing it'…your bees may die. If you decide to become a long-term, serious beekeeper, then you need to invest in a series of classes taught by an expert—not beekeepers that have only one or two seasons more experience than you do. A new beekeeper may want the notoriety of teaching a class, but their lack of long-term experience will not pay for your loss of hives.

Investigate who you align yourselves with. There is the time-worn but accurate expression, *"You get what you pay for."* You can get second-hand or even new books and try to teach yourself. You can buddy up with another newbie and together guess at what you are doing. Or, you can get years of beekeeping experience over the phone and even personal visits to your own apiary by an expert. You get what you pay for. Classes and years of experience are worth every penny if it gives you the first-hand, on-site experience that will help you to become the long-term beekeeper that can make a difference to the honey bees existence.


*Phill Remick is a former commercial beekeeper who teaches beekeeping classes, offers year round apiary troubleshooting, hive management and sells beekeeping supplies near Albuquerque, NM. Contact him at www.NewBeeRescue.com*

# Just the FAQs

*Questions & Answers*

**by Stephen J. Repasky, EAS Master Beekeeper**

## Seasonal Management

Spring—a time of year where beekeepers take a big breath and let it out enthusiastically knowing that a good time of the year (albeit busy) is just around the corner. Yet others, take that breath and seem to hold it in an almost nervous way. The difference? It's simply being prepared for what's ahead. Veteran beekeepers know what is coming and what to look for while newer beekeepers are still anxious about the year ahead. They have made it through the winter, the bees are alive and now they think back to all of the seminars they attended and all of the advice other more experienced beekeepers lectured on and panic sets in… what was meant when they talked about splits and nucs? What about requeening? Will I lose my bees to swarming since they survived? This may be just some of the questions flowing through your head, but don't let it overwhelm you! Keeping things simple and looking at the big picture will help you move through spring with the slightest of problems. This month we are going to talk about what is happening in your hive when it comes to swarm preparation and how to identify certain events so that you can prevent or minimize swarming. At the time of this writing, many of the southern states are already in swarm season while here in the northeast, we are still experiencing temperatures in the 30's!

When it comes to beekeeping, observation is key to understanding a lot of what is happening in the hive. In swarm ecology and biology, often the only signs of swarming that many beekeepers recognize are the production of swarm cells on the lower 1/3 of the frame or the bivouac itself that has formed on a tree limb (hopefully within reach!). By slowing down and really taking a look at the ENTIRE hive we can make sense of a very complex sequence of events.

Timing is everything during swarm season. A few days can mean the successful prevention of a swarm or an act of futility. Before you do anything, think about your actions and how it will affect the equilibrium of a colony. A colony in equilibrium is one that consists of a mated laying queen, brood of all ages, workers of all ages and a population of drones. Remove a part of that equation and a colony is out of equilibrium. Swarming takes a colony out of equilibrium; and as beekeepers we should understand all that is occurring in the hive and the results of our actions that may disrupt this equilibrium.

Some of the evidence that you may observe in a colony preparing for swarming is the increased presence of fresh new wax at the tops of the frames, the presence of queen cups or queen cells, crowded brood nest and increased nectar collection. Identifying the stage that the brood is in and where the nectar is being stored will help you identify what is occurring inside of the hive.

First is identifying the presence of queen cells and the location and age of those cells. Swarm cells are located on the lower third of the frame and can be numerous. Supercedure cells

(not associated with swarming) are fewer in number and generally found in the upper 2/3 of the frame. Emergency cells are present when the queen is accidentally killed, usually by the beekeeper, and can be located around the brood nest. The difference between emergency cells and swarm/supercedure cells is that supercedure and swarm cells are planned and a large amount of royal jelly is produced and fed to the developing queens during the larval stage. With emergency cells, they are not planned and the bees cannot fully devote the energy required to rear that queen. Because of this last minute rearing, queens emerging from emergency cells are often superceded in the weeks following. Back to swarming—its important to identify the type of queen cell that you see in the hive. The age of the cell will assist you in figuring out of that colony has already swarmed or if you have time to make up a nuc or artificial swarm.

Understanding the biology of swarms is also important. A swarm will issue from a hive generally speaking the day before or the day of the capping of a swarm cell. They do not all have to be capped in order for a colony to throw off a swarm as it only takes one! So take note! You will often see swarm cells of many ages throughout a colony. Also note of any cells that have emerged or have been aborted.

Virgin queens that have emerged will leave behind a cell that may have a small flap at the tip of the cell but at the very least it will have a jagged edge where the queen chewed her way out. Queen cells that have been aborted will have their tip intact but a large opening in the side where a virgin queen stung her sister to death and the workers have enlarged the opening to remove the dead queen. The presence of either of these cells tell you that you have a virgin queen running around somewhere and you can be sure that your colony has already taken off with a large number of work force.

The age of the brood combined with the age of the queen cells will also assist you in determining if the colony has swarmed. Knowing that when a queen lays an egg and that egg remains as such for three days then turns into a larvae, pre-pupae, pupae, etc gives you clues, too. The presence of eggs may mean that your mother queen is there or WAS there within the last three days. The lack of young brood indicates she was there 5-7 days ago. Seeing only capped brood? Well, we know that cells get capped around day 8, so no open brood tells us that the queen was there over a week ago. Perhaps you see brood emerging with lots of capped brood around—your queen was there over 2 weeks ago and hopefully you have an emerged virgin queen in there!

Once you start putting the pieces together, you can then do the math and determine approximately when that colony will return to equilibrium. Keep in mind that once a virgin queen emerges it can take her up to two weeks to start laying eggs. If a young queen cell that hasn't been capped is observed, you may need to wait three weeks or a little more before you see eggs. Don't rush to judgments and be patient. Let the bees tell you what is happening in their colony and guide you in your decisions. You will be surprised as to how much less stressful and more fun beekeeping becomes!

*Stephen J. Repasky Stephen Repasky is the author of the book Swarm Essentials. Swarm Essentials outlines the ramifications of swarming behavior (highlighting the often overlooked benefits), proven prevention and management techniques, and how to recover and even prosper from a successful swarm attempt. It can be purchased through Kelley Beekeeping. Reach him at www.meadowsweetbees.com*

# X•Y•Zs

## *Advanced Beekeeping*

**by Dennis Brown**

**Hi Dennis,**
**My husband and I have been beekeepers now for three years. We are currently down to four hives. Last fall one of our hives went queen-less and we had to stack it on one of our other hives. It was too late in the year to purchase another queen. We really wanted to get through the winter with five hives so we could make some nice splits in the spring to increase our hive count.**

**How can we avoid this problem in the future? I'm sure we will run into this situation again at some point. Thanks for helping us once again; we appreciate having you there when we have problems.**
**Susan Ferguson**

Hello Susan,
You're welcome. You've experienced a situation that all beekeepers will run into sooner or later if they stay in beekeeping very long. There's actually a real simple solution to the problem. I like to refer to it as a "Utility Hive." It's nothing more than a nuc hive.

You should always keep a utility-hive in the bee yard. Depending on how many hives you hive, you may need to keep more than one available.

A utility-hive has many uses in the bee yard.
- If you have a hive that has lost its queen, you can use the queen from the utility-hive.
- If you have a hive that needs a boost in population, you can remove sealed brood from the utility-hive.
- If you need some foundation drawn out, you can have the utility hive do it.
- If you have a hive that has a bad queen, you can kill her and unite the utility-hive with it.
- If you just need to increase hive numbers, you can let the utility-hive grow into a full size colony.

I've always kept utility-hives available in all my bee yards. They are so versatile and have saved me lots of unnecessary grief over the years.

Sometimes what seems to be a huge problem in the bee yard can be solved using the simplest method. I've been a beekeeper since 1964 and I'm still learning. Beekeeping is one of those endeavors that no matter how long you are in it, you can never learn it all. That's one of the most fascinating things about it for me.

***"A day of work in the bee yard gives us the strength to bear the hectic parts of life in the real world."***
**Dennis Brown**

*Dennis Brown is the author of "Beekeeping: A Personal Journey" and "Beekeeping: Questions and Answers." Contact Dennis at www.lonestarfarms.net.*

# Bee Health

## Can Mushrooms Save the Honeybee?

**by Sylvia Kantor**

*This article first appeared on www.crosscut.com. Permission to reprint by author.*

Paul Stamets has had a life-long love affair with mushrooms, one that goes well beyond their culinary and psychedelic qualities. Wearing his signature hat — made from mushrooms — a turtle pendant and, always, a blue scarf, the nearly 60 year-old mycologist runs Fungi Perfecti, a family-owned farm and business in Shelton, Washington.

Stamets jokes that it only took him three decades to have his epiphany about the relationship between his beloved fungi and the threatened honeybee. He first began to connect the dots after noticing honeybees feeding on the mycelium (root-like filaments) of mushrooms growing among the wood chips in his garden.

Later, through research supported by the National Institutes of Health and the Department of Defense, Stamets showed that certain species in a class of mushrooms called polypores contained substances that were effective against human pathogens such as pox viruses, flu viruses and herpes. He later learned that these same mushroom compounds, present in certain polypores associated with trees and rotting logs, help bees break down pesticides, herbicides, fungicides and other toxins, and bolster the bees' immune systems.

This is welcome news, because the modern day honeybee faces a litany of health threats. As many as 61 different variables may be at play in colony collapse disorder, the mysterious phenomenon responsible for a mass disappearance of bees in the last decade. Although researchers have yet to identify a specific cause, pathogens play a key role in colony collapse disorder. Scientists, beekeepers and farmers are working feverishly to protect the tiny insect that packs such a huge economic punch. At stake is our food supply and a $15 billion U.S. agricultural industry that depends on bees for pollination.

Certain mushrooms produce anti-viral compounds that could protect threatened honeybees. Credit: Flickr user Flikkersteph

## Mycologist meets entomologist

Early last year, Stamets asked Washington State University entomologist Steve Sheppard to help confirm his hunches about bees and fungi. The two have since joined forces to explore the connections that, as far as they know, no one has ever made before. This unlikely pairing of entomology and mycology could lead to less toxic and more effective ways to control the diseases and pests that are implicated in winter hive losses and colony collapse disorder.

Steve Sheppard credits his great grandfather, a beekeeper in Savannah, Georgia, for his own interest in bees. As a child Sheppard was surrounded by the books and beekeeping inventions his great-grandfather had left behind. It was no wonder then that seeing one of his college professors handle bees captivated him.

"I watched him spread bees around with his hand like they were a bunch of leaves or something," Sheppard recalls. "It was fascinating seeing someone interact with these social insects that could sting you to death, but didn't."

Sheppard would go on to become an entomologist known for his work on the evolution and genetics of honeybees. He now chairs the department of entomology at WSU. He also heads up the APIS Molecular Systematics Laboratory, or the bee lab, where he works with commercial beekeepers to develop practical solutions for the challenges they face.

It's normal, says Sheppard, for commercial beekeepers to lose five to 10 percent of their hives in winter. But not long after the Varroa destructor mite arrived on the scene in 1987, those losses rose to an average of 15 percent. Since 2006, the rate of loss has doubled. "With a 30 percent loss, commercial beekeepers can still make it, but it's very tough" says Sheppard. "Imagine losing one third of your cattle in one year."

*WSU entomologist and bee lover Steve Sheppard.*

Varroa mites spread viruses that can be deadly to bees. Sheppard explained that what keeps many commercial beekeepers up at night is the fact that the pesticides

currently used to control mites are becoming ineffective. Mites have such a short life span that they quickly evolve and develop resistance to synthetic pesticides.

Sheppard and Stamets may have found a way around the problem.

## Beehives made of mushrooms

The research partners are studying how different mushroom extracts — particularly those with antiviral qualities — affect honeybees. Initial screening has identified extracts which reduce the virus load without hurting the bees. "Steve's biggest thing is, 'let's not harm the bees'," Stamets says. "I appreciate that, because he protects them like they're his little children."

Sheppard and Stamets tested extracts from about a dozen different mushrooms by mixing the extracts with sugar water and feeding different concentrations to different groups of bees (watch the video above). When they compared the results to the control group of bees, which had received only sugar water, they discovered that several extracts had a significant and unexpected impact.

"I was surprised that some actually kept the bees alive longer than bees in the control group," Sheppard says. "The viral counts were also significantly lower among bees given the fungal extracts."

The extracts were provided by Fungi Perfecti. They came from mushrooms that grow on birch, willow and Douglas-fir trees, trees that bees visit to collect the resin they use to seal up gaps in their hives. It's no coincidence, says Stamets, that bees favor trees whose resident fungi come with antiviral properties.

It's way too soon to explain why bees that received mushroom extracts lived longer, says Sheppard. The initial study did not identify which viruses were affected by the extracts. "This is a really new area," he says. "Once you find out what's working, you want to get at why it's working."

Stamets and Sheppard are now repeating their extract trials, this time looking at the impacts on bees injected with specific viruses.

They are also assessing the fungus called *Metarhizium anisopliae*, which is known to parasitize and kill insects.

*Mycologist Paul Stamets with his prototype beehive. Credit: Sylvia Kantor*

## Bee Health *continued*

Based on evidence that the fungus can kill *Varroa* mites without harming bees, Sheppard and Stamets are designing experiments to expose the mites to *Metarhizium* spores.

One experiment involves a prototype beehive made from mushrooms. The hive's panels are compressed sawdust that has been mixed with mycelium of the *Metarhizium* fungus. As the bees do their work, they'll spread the spores of the parasitizing fungus around the hive — to the detriment of the mites.

Sheppard and Stamets will also try placing pieces of cardboard impregnated with mycelium into standard bee boxes. Sheppard explains that bees don't like clutter and will tear the cardboard apart to get rid of it, in the process dusting bees and mites with fungal spores.

The research duo plan to put their lab results to the test in the field. Working with one of the largest commercial beekeepers in the state, they intend to set up large-scale experiments with their mushroom extracts. The hope is to establish a sound body of evidence for what could become a commercially viable and sustainable alternative to pesticides. And in so doing, save the honeybees.

"Nature leads us to solutions if we connect the dots, are open minded and think creatively," Stamets says. "We need to be innovative to create solutions that help tilt the balance to help bees, and ultimately us. Working with Steve Sheppard is a perfect example of scientists working across disciplines to become part of the solution."

**To watch a video on the mycelium fed bee research,**
**visit https://www.youtube.com/watch?feature=player_embedded&v=pg3GOMCWHpg**

# Bee Science

## Drones and Selective Breeding

**by Liz Frost**

If you plan to raise queens for yourself or for sale this season and haven't put drone comb in your top-performing colonies yet, stop reading this article! Light up your smoker and put a frame of drone comb in your best hives. Right now! And don't forget, if fresh pollen and nectar isn't coming in from the field, your drone mother colonies should be fed sugar syrup and supplemental pollen or protein mix in order to stimulate drone production.

Now that you've done that, let's talk about breeding with a purpose. Good queen rearing practices will yield healthy, robust queens. Queens of superior quality, however, will result from a combination of:

- good drone rearing/stocking practices
- good queen rearing practices
- a program of continual stock selection

The genetics of a queen and the drones she mates with have a major impact on most colony characteristics including, but not limited to productivity, temperament, swarming tendencies, and resistance to pests and diseases. With this in mind, it is in the best interest of stock maintenance to flood your mating apiaries with drones from colonies with known desirable characteristics.

### Small-Scale Options

Small-scale queen producers raising a few to a few hundred queens over the season may obtain adequate matings without using specific drone mother colonies and introducing drone comb frames for drone production. Strong healthy colonies will naturally raise drones given appropriate conditions.

However, the drones your virgins mate with may be from both managed and feral hives in the area of the mating apiary and drone congregation area. Given this knowledge a small-scale queen producer will still benefit from increasing the population of drones in colonies with desirable traits if the characteristics of feral colonies or managed colonies within a 2.5km radius of the mating yard are unknown or undesirable (for example-very defensive or prone to swarming).

### Drone Production

Putting drone comb in drone mother colonies, chosen for their desired characteristics, is the first step in queen rearing. 40 days must pass from the time the queen lays unfertilized (male) eggs until drones reach sexual maturity. For your drones to be sexually mature at the time your virgins take their mating flights, grafting should start no earlier than 21 days after drone comb is laid up by your drone mothers. When fresh nectar and pollen is scarce, drone mother colonies should be fed sugar syrup and pollen or protein supplement, otherwise workers may purge adult drones from the hive and cease drone rearing. Many queen breeders start drone and queen rearing activities at the onset of good rearing conditions, that is, when temperatures start to increase, fresh nectar is available and three different sources of pollen are coming in from the field.

## Drone Stocking Rate

The stocking rate for drones in mating apiaries is based on the following:

- Virgins mate with an average of 12 drones
- 1 full-depth drone comb may yield 3,500 mature drones in perfect conditions (i.e.-rarely)
- Environmental conditions vary (nectar, pollen availability)
- Queens and drones fly up to 3km (usually) to mate in Drone Congregation Areas

**For 100 mating nucs (i.e.-100 virgins), between 4-10 drone mothers should be managed with 2 drone combs in the brood box of each drone mother.** The second drone comb frame should be introduced 14 days after the first drone comb was introduced to ensure availability of mature drones for subsequent rounds of virgins in the 100 mating nucs.

## Location

Drone mothers may be located anywhere within 2.5km of the mating apiary, as virgins and drones fly about the same distance to the drone congregation area and virgins don't necessarily mate with drones from colonies within the same apiary.

## Fundamentals of Selective Breeding

1. **Evaluate colonies within your operation.** Colonies may be evaluated for specific characteristics of queen (i.e.-brood pattern), workers (i.e.-temperament, productivity, resistance to diseases, etc.) and drones (i.e.-population, colour). Record this information.
2. **Select breeder queens from colonies with desired characteristics.** These queens will produce the next generation and are either used as queen mothers or drone mothers. Never use the same colony to produce queens and drones in the same year as this may speed inbreeding (evident in poor brood patterns).
3. **Control matings between queens and drones produced by breeder queens.** If artificial insemination (AI) or isolated mating is not possible to produce future breeder queens, flood the mating apiary with selected drones using the recommended stocking rate.
4. **Evaluate the next generation** – the mated daughters of the breeder queens. Evaluate queens individually (i.e.-brood pattern) and the colony as a whole for specific characteristics (i.e-short-term weight gain to gauge productivity, hygienic testing to gauge disease resistance, etc.). Record this information.

## Timing

The following chart is an **exact time schedule for the development and sexual maturity of queens and drones**, adapted from the publication Instrumental Insemination of Queen Bees by the Institut für den Wissenschaftlichen Film in Göttingen. Timing is essential to ensure that sexually mature drones with desirable characteristics are available when virgins take their mating flights. This chart can be adapted by the AI technician with the addition of excluders to drone mother colonies before drones start emerging on Day 23 and the caging of queen cells by Day 14 (10th day after grafting) upon which they are either immediately introduced into their own queenless nuc or returned to the queen bank for emergence. Use this chart to guide your drone and queen rearing schedule.

| DRONES | | | | | QUEEN | |
|---|---|---|---|---|---|---|
| Work Needed | Stage of Development | Day | Date | Day | Stage of Development | Work Needed |
| **Give 1st drone comb**, supplement feed as needed, possibly confine queen to comb | | -10 | | | | |
| | | | | | | |
| | | -3 | | | | |
| | | 0 | | | | |
| | Egg | 1 | | | | |
| | | 2 | | | | |
| | | 3 | | | | |
| | Larva | 4 | | | | |
| | | 5 | | | | |
| | | 6 | | | | |
| | | 7 | | | | |
| | Prepupa | 8 | | | | |
| | | 9 | | | | |
| | Capping | 10 | | | | |
| | | 11 | | | | |
| | | 12 | | | | |
| | | 13 | | | | **Place empty brood comb in breeding colony for grafting** material, supplement feed |
| **Give 2nd drone comb** if **2nd GRAFT** planned, supplement feed as needed | | 14 | | | | |
| | Pupa | 15 | | -2 | | |
| | | 16 | | | | |
| | | 17 | | 0 | | Eggs are laid |
| | | 18 | | 1 | Egg | |
| | | 19 | | 2 | "" | |
| | | 20 | | 3 | "" | Set-up **Swathmore swarm box** or other queenless cell starter colony |
| | | 21 | | 4 | Larva | **GRAFT** |
| | | 22 | | 5 | | Move graft to cell builder |
| | Emerging | 23 | | 6 | | |
| | Emerging | 24 | | 7 | | |
| | | 25 | | 8 | | |
| | | 26 | | 9 | Capping | Move to bank/incubator or move w/in cell builder to add **2nd GRAFT** |
| | | 27 | | 10 | | |
| | | 28 | | 11 | | |
| | | 29 | | 12 | | |
| | | 30 | | 13 | | Put cells in queenless nucleus colonies |
| | | 31 | | 14 | | |
| | | 32 | | 15 | Emerging | |
| | | 33 | | 16 | Emerging | |
| | | 34 | | 17 | | |
| | Beginning | 35 | | 18 | | |
| | of sexual | 36 | | 19 | | |
| | maturity | 37 | | 20 | 5 days old | |
| | | 38 | | 21 | Sexual | **Mating flights** to Drone Congregation Area unless weather delays |
| **Mating flights** to Drone Congregation Area until death by mating or hive exile | Full | 39 | | 22 | maturity | |
| | sexual | 40 | | 23 | 7-8 days old | |
| | maturity | 41 | | 24 | | **Leave nuc for 1 week** |
| | | 42 | | 25 | | |
| | | 43 | | 26 | Possible start | |
| | | | | 27 | of egg-laying | |
| | | | | 28 | | |
| | | | | 29 | | |
| | | | | 30 | | Check egg-laying |

## A Simple Improvement Program

In Queen Rearing and Bee Breeding published in 1997, authors Harry Laidlaw Jr. and Robert Page Jr. propose a simple program of stock improvement for beekeepers who may not have the resources to conduct an extensive breeding program. They write:

*"[Beekeepers] can improve their stocks if they eliminate queens in colonies that have bad characteristics, such as brood diseases, strong defensive behavior, poor productivity, etc., and replace them with queens derived from good colonies. In addition, all colonies should be requeened regularly with good stock in order to provide a pool of drones of good quality to mate with new queens produced throughout the season. In time, the general quality of all colonies should improve, however, not to the degree that may be obtained with a more vigorous program."*

I will describe such vigourous selective breeding programs in-depth in the forthcoming NSW DPI publication on queen bee breeding. Until then, keep up the good drone production!

*Elizabeth Frost specializes in bee breeding and instrumental insemination of queen bees. She has just returned from working as a Honey Bee Development Officer with The University of Newcastle in Australia. Her current focus is beekeeper vocational training in the form of an online course on honey bee pests and diseases and an educational online and hard copy publication on queen bee breeding. She got her start in beekeeping working for Sue Cobey at UC Davis and has worked for the Bee Informed Partnership as a field technician on the California and Midwest Bee Tech Teams and the New South Wales Dept. of Primary Industries as a Honey Bee Development Officer. Elizabeth provides honey bee semen collection, queen insemination services and training under her business E. Frost Apicultural Services on a contract basis. To follow Elizabeth's passions and progress in real time, follow her on Twitter @bee_Efrost. She can be reached at frost.elizabeth.a@gmail.com*

Figure 1. Drone with eye color mutation. A research tool, but not a commercially beneficial characteristic.

# Diversified Pollinators

## Native Pollinator Bee Barn

**Model #7000**

### Provide an attractive habitat and grow garden pollinators with the Bee Barn.

Many solitary and native bee species require nesting sites near a garden to be effective pollinators. The Native Pollinator will provide the appropriate material and cavity size to attract and multiply important pollinators such as blue orchard mason bees and leaf-cutter bees. These solitary bees are excellent pollinators of fruit, flowers and vegetables and do not compete with honeybees for nectar sources or require any hive management. The Bee Barn will not attract carpenter bees. The KB Native Pollinator Bee Barn can be ordered on the KelleyBees.com website or by calling us and placing an order at 1-800-233-2899. Kelley supports positive stewardship of all pollinators.

**For info on various species of solitary and native bee pollinators, visit www.pollinatorparadise.com, established by Dr. Karen Strickler of Idaho.**

Dr. Strickler is an adjunct instructor at the College of Western Idaho in Nampa, Idaho, where she teaches biology. She is also the owner of Pollinator Paradise, a company that is dedicated to the conservation, increase, and management of native bee populations for crop and wildflower pollination through research, education, and commercial management of native pollen bees. She was an assistant professor at the University of Idaho from 1993-2000, supervising their pollination ecology program.

At UI she studied the pollination of alfalfa for seed by the alfalfa leafcutting bee, Megachile rotundata. Prior to working at UI, she had 14 years experience studying solitary bees in Massachusetts, New York State and Michigan; and 7 years experience studying pests of apple at Michigan State University. She maintains a web site about the blue orchard bee, Osmia lignaria, and other solitary bees. She lives in Idaho, and sometimes visits family property in Taos Canyon, her "basecamp" for the New Mexico Native Bee Pollinator Project.

# Beekeeping 'Round the Globe

## Haitian Bee Project, Part II

**by Bo Sterk, Master Beekeeper**

**Summary:** The mission of the project is to help the local Haitian farmers/ beekeepers create opportunities for sustainable income thru beekeeping that equals better education, better food, and better health, The goals are to provide more information about honeybees, the art of beekeeping, modern apiculture, and demonstrations and trainings in effective practices with their hives and within their apiaries for proper management and increase in productivity. Part I appeared in the March 2015 issue of KB.

In November of 2009, I returned and continued work with REJEPMA. Word had spread about the success of the first mission, and many more came for the teachings and trainings, including Ammivil's nepews, 13 and 14 yrs of age. The teenagers attended ever lecture. I also used a young man's apiary, who did construct many top bar hives after my initial visit. He had become a mentor for others in the village. I was beginning to see the fruits of our efforts.

Unfortunately the devastating earthquake of January 2010 crippled the nation, and plans for continued trainings put on hold. Despite this, beekeepers are resilient peoples and full of hope.

I finally traveled back in June of 2011 to lecture and train again to the village. Evidence of the earthquake was everywhere in Port of Prince, yet these rural areas showed signs of rebirth. For example, an Apiculture College was started north of the capital in Hinche, to support youth orphans from the earthquake. Hinche, the location in the breadbasket of Haiti, is the perfect location for training new beekeepers. Today it has around 30 students, both male and female.

Part of lectures and training this time I introduced the use of steel drums as TBHs. I demonstrated how to convert the drums into efficient TBHs. Steel drums are prevalent and cheaper than the wood.

Besides instruction, I also had the opportunity to inspect apiaries in a few villages. I was very excited to see the young teenagers' apiary. The boys, now 16 and 17, had cleverly adapted found wood to build the hives, and had many that were a construction of both old and new. Especially rewarding, was inspecting their mentors apiary. He had increased his count from 7 hives to 60 in 2 years. He was having some commercial success selling his honey to a candy making company on another end of the island. This success has now allowed him to attend college for agronomy.

The island of Hispaniola, which is shared with the Dominican Republic, is likely the repository of the first European honeybees transported to the new world by early Spanish explorers/colonists. The majority of the honeybees are solid black in color.

The art of beekeeping has been part of Haitian culture for generations, perhaps even tracing back to honey-hunting traditions from ancestral Africa. Haitian "beetenders" hive their bees in logs much as they would have in the 16th century. These "beetenders", with their traditional log hives, still use smoke from dried banana leaves in old kitchen "smudge" pots. Although following what their ancestors had done before them, Haitian "beetenders", are slowly becoming aware of the benefits of modern apiculture. From missions and projects such as the Haitian Beekeeping Project, individuals and organizations can make a difference.

Through teaching bee biology, building their own equipment, the use of movable frame top-bar hives, and the vital importance of bee space in a hive, it was my hope that this project would and will assist in providing for is a sustainable income for families in order to help this crippled nation.

Traditional log hives are still the common, but TBH's are used when funds allow for it. Wild honey bees are plentiful and easy to catch, the downside is that Africanized honeybees have been reported in neighboring Dominican Republic.

We know the perfect storm that looms on the horizon for all beekeepers; it doesn't matter how remote the village is, disease and pestilence loom at the hive entrance. This was one more good reason for a movable frame hive project as it's hard to inspect a log colony.

Traditional log hive.

Peace Corps beekeeping manuals were printed in French and distributed along with blueprints of hives and smokers among the class members. Hopefully this would give them a guide to reference after we leave. Presently I'm working on writing a short reference manual in Creole.

The earthquake set them back again, but the rebirth is beginning. An Apiculture college is north of the capital in Hinche. It is supporting youth orphans from the earthquake. It has 30 students, both male and female. This is the breadbasket of Haiti, so it is the perfect location for training new beekeepers. I found the Haitian beekeepers are like most beekeepers, willing to learn if given the chance.

I stay in contact with the REJEPMA's president, Amainvil Yossoiné, on a regular basis. Amainvil was an elementary education teacher, but his school was

destroyed by the earthquake and cannot be rebuilt, so he is unemployed. Better beekeeping is still a goal and he requests my return regularly for more training classes. It takes longer than 3-4 days to teach beekeeping. My trips have proven that progress can be made through continual work with one group.

Beekeeping projects and instructors in Haiti are always welcome. Education is the greatest gift we can give to this ailing nation.

*References / Support:*
*David Westervelt,*
*Chief of Apiary, State of Florida*
*Dr. Jamie Ellis, University of Florida, Bee College, Gainesville, Florida*

Using a smoker on the hive.

*Bo Sterk, Master Beekeeper; Advanced Beekeeper of the Year, Univ. of Florida Bee College 2011; Instructor, Caribbean Bee College; St. Johns County Beekeeping Association - President; Florida State Beekeeping Association – Board of Managers; Director, Bees Beyond Borders; FAVACA volunteer – 2003-2015, Volunteer of the Year, 2007; Past, Associate Professor, Case Western Reserve University, Cleveland, Ohio.*

# Bee Thinking About
## The Art of Queen Rearing - All-Day Event

Dear All,
**THE ART OF QUEEN REARING** is an all-day event put together by the Texas A&M University Honey Bee Lab, and led by world-renown Sue Cobey, who will be sharing with us her expertise on queen rearing and giving a demonstration on instrumental insemination of queens, as time and weather permit.

The cost of registration is $100 (including lunch), and space is limited to the first 30 people that register and pay by 20 APRIL 2015.

Instructions for registration:
1. Send email of intent as soon as possible to Dr. Rangel at: jrangel@tamu.edu
2. Once you receive a confirmation e-mail, send this registration form and payment to secure spot
3. Send payment and this registration form to secure your spot by 20 April 2015
4. Only the first 30 paid registrants will be able to participate in this year's workshop
5. Late registration, or registration by those that were not confirmed via email might not be able to attend and their checks will be returned. We can only accept the first 30 people that pay.

Thank you and I hope to see you all in May!

Sincerely,
Juliana Rangel

Dr. Juliana Rangel
Assistant Professor of Apiculture
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College Station, TX 77843-2475
Tel. 979.845.1074; Fax 979.845.6305
E-mail: jrangel@tamu.edu
Website: http://honeybee.tamu.edu
Facebook: https://www.facebook.com/TAMUhoneybeelab

**THE ART OF QUEEN REARING**
**COURSE SYLLABUS**
**2 May 2015**
**Janice and John G. Thomas Honey Bee Facility, College Station, TX**
**Head Instructor: Sue Cobey**
**Co-Instructors: Dr. Juliana Rangel, ET Ash, Liz Walsh, Adrian Fisher, Pierre Lau, Mary Reed**

| | |
|---|---|
| 9:00a - 9:30a | Coffee and Introductions |
| 9:30a - 11:00a | Lecture - Principals of Queen & Drone Rearing |
| 11:00a – 12:00p | Field - Setting Up Cell Builders, Queen-Less & Queen-Right |
| 12:00p – 1:00p | Field - Banking, Incubating Queen Cells |
| 1:00p – 2:00p | Lunch |
| 2:00p – 4:00p | Lab: Grafting Queen Cells, Instrumental Insemination Demonstration & Practice |

**Concurrent Sessions**

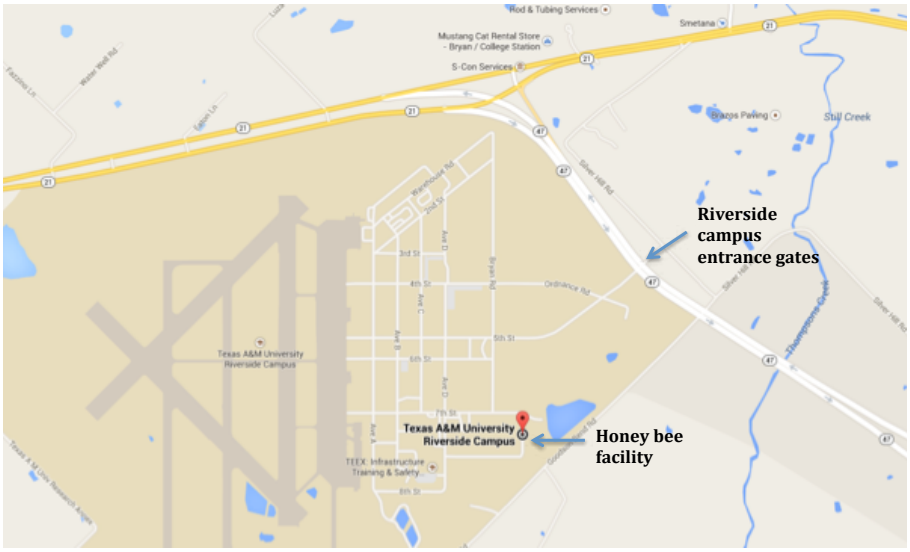
- **Sessions 1:** Establishing Nucleus Colonies, Celling Nucs
- **Session 2:** Handling, Candling & Cutting Queen Cells
- **Session 3:** Finding, Marking & Clipping Queens
- **Session 4:** Evaluating Drone Maturity & Queen Mating Status

| | |
|---|---|
| 4:00p – 5:00p | Classroom Discussion - Exploring CB Systems, Situations & Troubleshooting |
| | Wrap Up & Question & Answers |

Directions to the **Janice and John G. Thomas Honey Bee Facility:**

**Address:** 3100 State Highway 47
Bryan, TX 77807

Once you enter the gates of the campus, make a left on Bryan Rd., then a left on 7th Avenue, and follow the road all the way until you find the honey bee lab.



**THE ART OF QUEEN REARING**

2 May 2015

Janice and John G. Thomas Honey Bee Facility, College Station, TX

**REGISTRATION FORM**

**Name:** _____

**Address:** _____

**City:** _____ **State:** _____ **Zip Code:** _____

**E-mail:** _____

**Phone:** _____

**Lunch preference:** ☐ Meat ☐ Vegetarian

**Instructions for registration:**

1. Send email of intent as soon as possible to Dr. Rangel at: **jrangel@tamu.edu**
2. Once you receive a confirmation e-mail, send this registration form and payment to secure spot
3. Send payment and this registration form to secure your spot by 20 April 2015
4. Only the first 30 paid registrants will be able to participate in this year's workshop
5. Late registration, or registration by those that were not confirmed via email might not be able to attend and their checks will be returned. We can only accept the first 30 people that pay.

**Payment:** ☐ Enclosed is a check for $100

**Make payment payable to:** Department of Entomology, Texas AgriLife Research

**Please send payment, along with this registration form BY 20 APRIL 2015 to:**

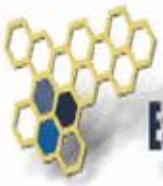
Ms. Sherry Boyd
Department of Entomology, Texas A&M University
412 Heep, 2475 TAMU
College Station, TX 77843

# EAS 2015 is coming to Canada!

University of Guelph, Guelph, Ontario **August 10-14, 2015**

EASOntario2015
CANADA

*Yours to Discover*



EAS
Eastern Apicultural Society

Hosted by: OBA
ONTARIO BEEKEEPERS' ASSOCIATION

## Speakers

**Mark Winston, Robert E. Page Jr., Dewey Caron, Phil Craft, Robert Currie, Keith DelaPlane, Ernesto Guzman, Pierre Giovenazzo,Tammy Horn, Zachary Huang, Greg Hunt, Doug McRory, Heather Mattila, Medhat Nasr, Gard Otis, Steve Pernal, Nigel Raine and many more!**

## Workshops

**Queen rearing, Integrated Pest Management, mead and beer making, how to win at honey competitions, beginner, intermediate and advanced beekeeping**

## Technical Tour

**Full day bus tour featuring Niagara Butterfly Conservatory, Rosewood Estates winery and meadery, two of Ontario's largest commercial apiaries and a BBQ with queen auction and live entertainment**

**Register at www.easternapiculture.org**

**Mail in registration is now open, online registration will open early April**

# Bee SYMPOSIUM

SATURDAY
MAY 9, 2015
With Generous Funding From:
**The Henry J. Kaiser Family Foundation**

# Keeping Bees Healthy

*Presented by the Honey and Pollination Center and Department of Entomology and Nematology, UC Davis*

This educational program is designed for beekeepers of all experience levels, including gardeners, farmers and anyone interested in the world of pollination and bees. In addition to our speakers there will be an active 'Buzz Way' featuring graduate student research posters, the latest in beekeeping equipment, books, honey, plants and much more.

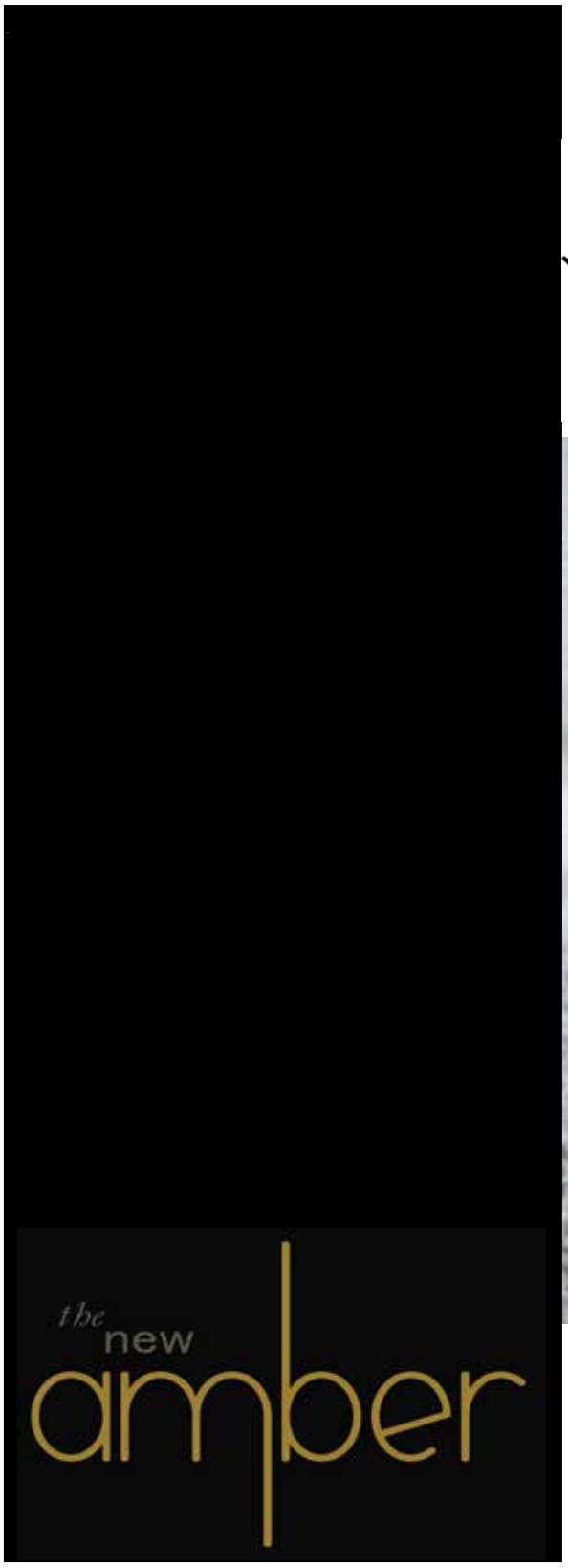
**Additional Speakers Include:**
**Christine Casey, Brian Johnson, Elina Lastro Niño, Amy Toth, Neal Williams**

**To Register, visit:**
**https://registration.ucdavis.edu/Item/Details/147**

Keynote:
MARLA SPIVAK
Distinguished McKnight Professor
University of Minnesota
2010 MacArthur Fellow

# Bee Arts

## Drops of Amber by N'aan Harp




friends of honeybees®

the drop of honey heard around the world

## Coming into Being ... The New Amber Story

It was a sticky-sweet summer bottling day in our 3rd floor apartment kitchen at the Grove Arcade, in Asheville North Carolina. Our hobby honey business had been expanding rapidly. We now had about a 100 hives scattered across the Western North Carolina mountain farms of friends and family. The honey had won multiple awards at State Fairs for our unique presentation and quality. Everything in my life's jumble-mix was dovetailing beautifully. Especially between me and the bees.

Working in a cloud of honey bees, without need of veil or gloves had been one of the 'aha!' moments of my life. Like a lost memory … a missing connection was being restored. Honey bees and I just sort of hummed and nuzzled and smiled at each other, happy to reunited. Their murmurings had an effect on me I couldn't explain logically. It seemed they 'spoke' to me … coherently, somehow. My career had spanned being a horticulturist and landscape design-contractor, an avid organic gardener, editor, consumer-activist, PR communicator and designer. But bees were returning a lost, misplaced song inside me. It felt like an ancient promise was being kept. As if I was coming out of amnesia.

Meanwhile, back at the processing end of beekeeping … We'd purchased a 20-frame electric extractor which was temporarily in a barn at the farm. Extracting in an open space the bees could access was a bit chaotic. Plus, lacking a sufficient farmhouse kitchen and having not yet found the ideal commercial space to house our collective business interests that could also accommodate honey processing, we were still making endless trips with the pickup truck, hauling 5 gallon buckets of unfiltered honey back to the downtown apartment for a clean bottling room.

Trip after trip. Driving down into the parking garage. Off-loading 60-pound bucket by 60-pound bucket. Hand-trucking them double stacked into and up the elevator to the third floor. Rolling precariously down the carpeted hallway and into the apartment. Back breaking grunt labor. Slapstick funny some days.

Any small-to-medium scale hobby beekeeper who filters, bottles or packages honey knows the inevitability of mess. Sticky mess. Traveling, transferable, mobile mess. It just comes with the territory. In our case even the handle of a hammer in a toolbox would be sticky. The soles of our shoes were tacky. The bathroom doorknob.

World's Sweetest Apple

My helper, Joanna and I were teamed-up in the tiny apartment kitchen that morning, filling hex jars. Chatting, laughing. Groaning as we precariously lifted and poured bucket-loads of filtered honey into the gated bucket … and hoisting that up onto the counter. Talking turns at the bucket and lining up the cleaned and ready jars. We used my rolling butcher block table to streamline the shuffle of ready-to-fill and filled-and-cleaned jars back into their cases to be labeled on another day.

Coming back from a bathroom break, I leaned on my elbows at an elevated counter section, watching Joanna filling jars, absorbed in her task, humming to herself. Idly wiping my sticky forearms and the counter with a damp cloth, looking at the filled glass jars lining the counter that glowed with a heart-moving color vibration, I was suddenly conscious of how much honey we had to wipe away in a day's work. How much honey was wiped from the lip of a bucket or got tracked away on our shoes?

As my reverie expanded, I laughed and said to Joanna, " Ya know, I'll bet that right now I'm wearing the amount of honey a worker bee produces in her entire life. I just wish I could wear it in a way that's beautiful instead of sticky. The honey glows like cut amber. Seems like ..."

In that instant a hum started in my body. The sensation that spreads through you if you've ever been present when a colony is preparing to swarm. Electrical invisible presence rising, circling, communicating. An image popped into mind. At first the hair on my arms stood on end. There were no bees with us in the kitchen, but I felt exactly as I did when lifting the lid off a colony. Greeted at a sacred energy frequency; recognized as a friend with whom they could communicate. The message was as direct, simple and as clear as if spoken by a human. "Thank you. Do it. It will be the drop of honey heard around the world." The channel closed as smoothly as it had opened.

The next day I walked downstairs to the closest jeweler in the Grove Arcade, Michele Alexander, of Alexander & Lehnert and began the process of having a prototype of the first Life's Work Amulet created for Friends of Honeybees. The New Amber and Life's Work Amulet's journey had begun.

The simplest seeming things rarely are ...

*N'aan Harp is a bee loving philanthropist who is working to create a funding platform to highlight the artistry of honeybees symbiosis with their stewards. For info on how you can help further the Honey Heard Around the World and New Amber program, visit http://friendsofhoneybees.net/*