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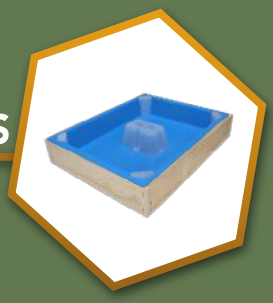

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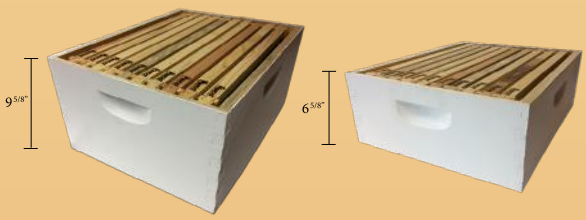


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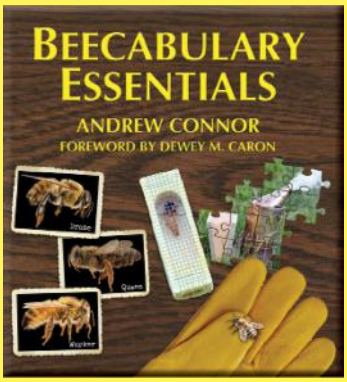


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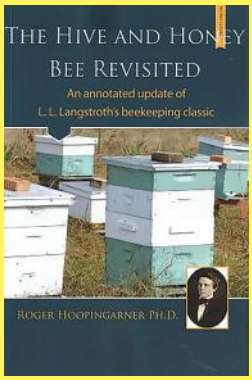


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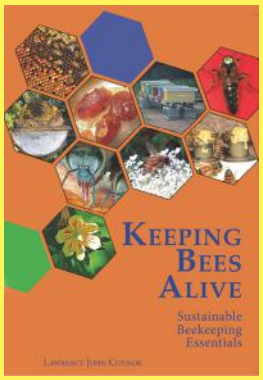


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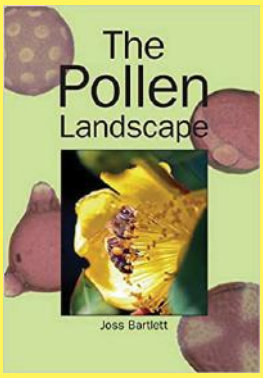


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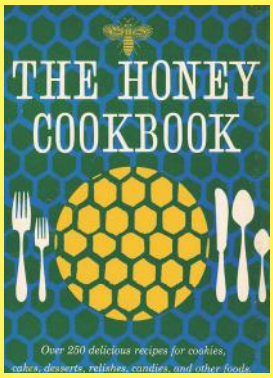


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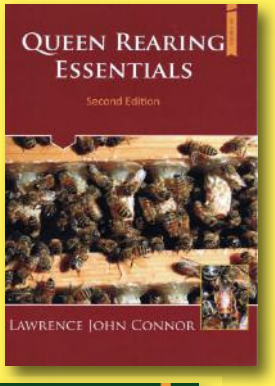


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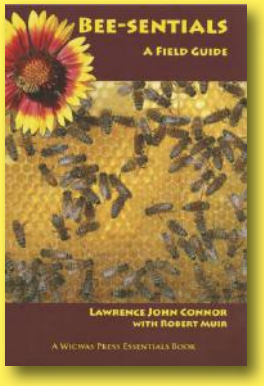


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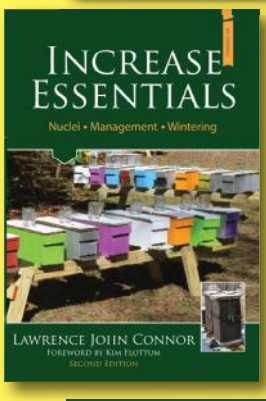


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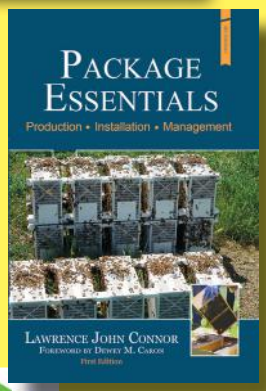


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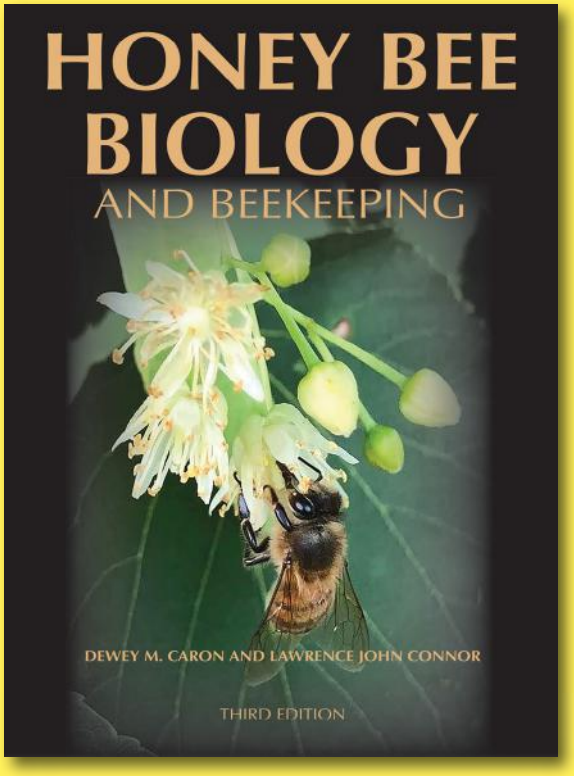


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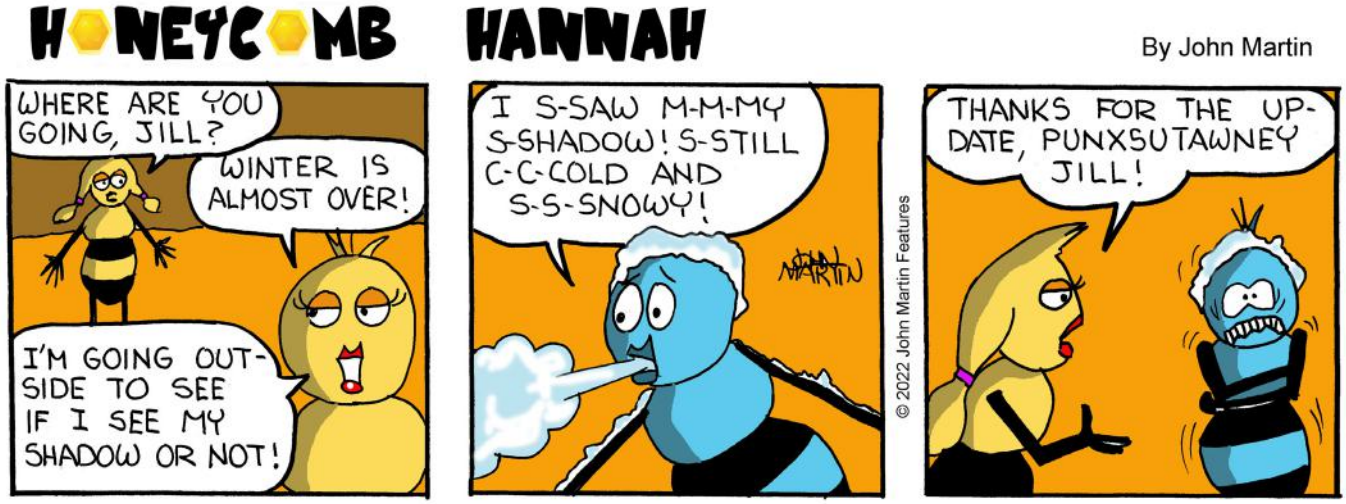
# Bee Culture's Best . . .



*Page 65*

**In Every Month –**





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# BUILD A MODIFIED DADANT HIVE BODY

Ed **Simon**

## *Part 2 – Build a Frame Side Bar*

Making a side bar for a frame can be challenging. But it doesn't need to be. I needed to build frames for a custom designed hive body (Modified Dadant hive body). This MD hive body had a height of 11¼" which required custom built frame side bars.

*Finished sidebar*

After watching multiple YouTube® demos, I combined two methods and rearranged some of the steps. The result was a method of creating side bars of any length desired that required only one unique jig to be made.

**Note:** "How to Make Beehive Frame Side Bars" from "Path of the Bees" was the primary reference I used. Thank you, Charlie!

**Reference:** The two YouTube® videos I liked best were:

- How to Make Beehive Frame Side Bars
  Path of the Bees – Charlie
  **https://youtu.be/YaF2G4lrafc**
  This video uses a planer, jointer and table saw to accomplish the task.
- Rodger's Shop – Bee to Z
  **https://youtu.be/Ccop0TEfqw4**
  This video uses only a table saw to accomplish the task.

**Parts - Frame bar side**

2" x 6" x ??' – with minimal knots and imperfections

**Note:** The width of the lumber is based on the width of a jointer available to you.

**Note:** Each "clear" section of your lumber will yield one side bar for each ½" of the width.

A 6' board with no knots will give you 144 side bars with a length of 10¾".

**Construction**

Please read the complete set of instructions and resolve any questions before starting the construction.

The following steps will make a side bar that is 10¾" long. This is the length of a side bar that is needed for a Modified Dadant hive of 11¼" height. The 11¼" height is based on the currently available 1" x 12" lumber in home improvement or lumber stores.

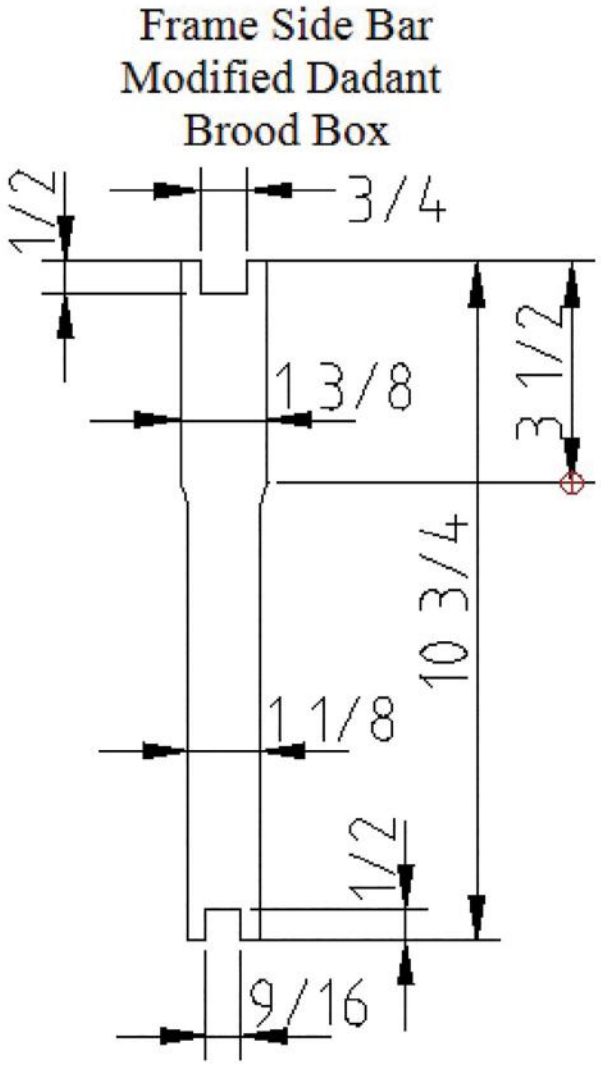
**Note:** A jointer and a planer were available for developing this article. Depending on the equipment available to you, you will have to modify steps to use the tools you have.

**Note:** If you need to calculate the length of a side bar for your specific hive body use the following information.

The total side bar length is ½" less than the height of the hive body. This length in conjunction with the standard ⅝" deep frame rest provides for the correct bee space above the top bar and beneath the bottom bar.

**Note:** The top portion of the side bar is 1⅜" wide and extends 3½" from the top of the bar where it then tapers to a 1⅛" width. The 3½" distance from the top of the bar is constant regardless of the length of the bar.

**Note:** This article assumes you will be using commercially available top and bottom bars for your frame.



**Note:** After setting up for a cut and cutting a test piece, use a commercially available side bar from the same manufacturer supplying your top and bottom bars, to double check your cut for correct saw settings.

**Step 1:** Check the measurements for the top and bottom notches.

Measure the top and bottom bars where the side bars join them. This is extremely important if you are making your own top and bottom bars. A ¾" x ½" deep notch for the top bar and a $^{9}/_{16}$" x ½" notch for the bottom bar will be used for this article. If your measurements are different you will need to adjust the provided measurements.

**Note:** All manufacturer's bar dimensions and even within a single manufacturer may vary slightly. I measured twelve top and bottom bars from the same manufacturer, and they varied in two of the dimensions. Choose a snug fit for whichever dimensions you use.

**Step 2:** Select the lumber.

Side bars are under significant stress when removing and handling the frames. Since you are going to invest time in making the side bars, select lumber that is knot free or lumber that has sections that are knot free for a minimum of the length of the side bars plus a couple inches.

**Note:** Knots and other imperfections can we worked around. After you slice the wood into the final side bar, reject the "bad" bars and use them for fireplace kindling.

**Step 3:** Size the lumber and square the edges.

Using a planer and a jointer smooth and square the lumber to a 1⅜" thickness.

**Note:** Depending on the lumber you choose the edges may be already squared.

**Note:** If you do not have a planer for sizing the lumber, use "Rodger's Shop – Bee to Z" video as a primary reference.

**Step 4:** Trim the lumber to length.

Cut knot free sections of the lumber into blocks that are the length of your side bar (10¾" for this example).

*Plaining wood*

**Note:** Depending on the size and location of the imperfections in the block, they can be worked around when slicing the block into its final thickness.

**Note:** Save the correctly sized (1⅜" wide) but unusable blocks of wood to be used for testing during the saw setup.

**Checkpoint**

You should now have multiple blocks of wood that are 1⅜" thick by 10¾" long. They need to be the exact length of your side bar. All the ends and edges should be square.

**Step 5:** Build a Frame Side Bar Notching Jig.

**Reference:** See "Build a Frame Side Bar Notching Jig", to create a jig/pusher for your saw. This jig (pusher) will hold a 1⅜" side bar block in the correct position for cutting the top and bottom notches.


*Cutting notches*

**Step 6:** Cut the top bar notch (¾" x ½").

Using the jig, cut the top bar notch in the block end.

**Note:** As a sanity check before making any cuts, check that the jig is positioned snugly against the fence and the center of the dado blade is centered on the jig reference line.

**Note:** Before making subsequent cuts, verify the cut by comparing it to a commercial side bar or a previously cut and saved block or side bar.

**Note:** Multiple cutting passes may be necessary to achieve a consistent cut depth. A wide dado blade tends to raise the material during the cutting operation.

**Step 7:** Cut the bottom bar notch ($^{9}/_{16}$" x ½").

Setup the saw for the bottom notch and cut a test notch and verify the setup. Then cut the bottom bar notches.

**Step 8:** Cut the ⅛" recessed sides (side bar bee space).

This step creates the unique profile needed by each side bar. By cutting the recessed sides with a jointer before you slice the block into individual side bars, you save a significant amount of time.

Attach a stop block on your jointer's fence at the finished end of wood so the jointer removes all but 3½" from the top edge of the block. The depth of the jointer cut should be ⅛". After cutting the first side, turn the block over and cut a matching recess on the opposite side.

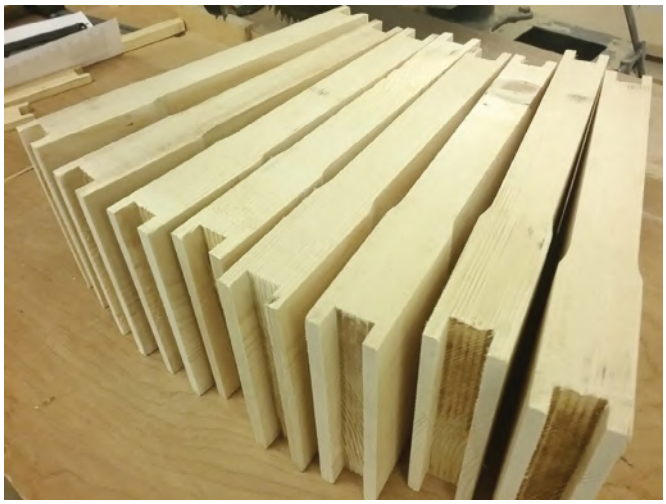
**Note:** The 3½" full width top of each side bar is the same regardless of the length of the side bar.

**Note:** If you do not have a jointer, review the video (Rodger's Shop – Bee to Z) for making a table saw jig that will perform the same function for a single side bar.

**Warning:** Be very careful. A jointer can be a dangerous tool if used incorrectly.

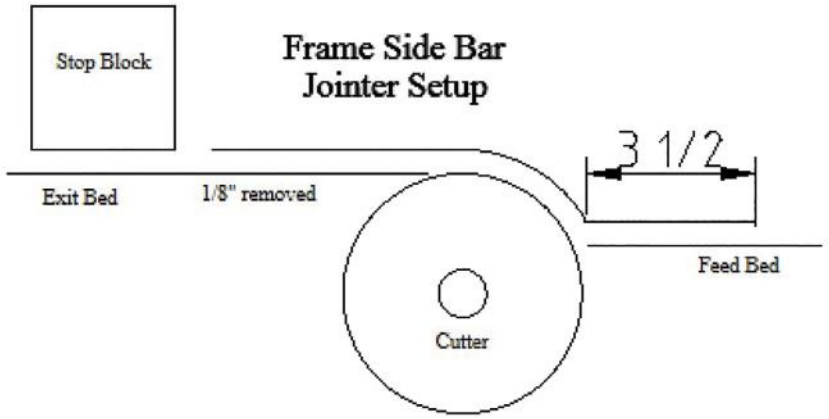
**Step 9:** Slice the blocks into ⅜" thick side bars.


*Using jointer*



*Above - finished blocks*

*Above - stack of finished side bars*




*Above - slicing sidebars*

Set your saw depth correctly with a ⅜" distance to the fence. Then slice individual side bars from the block.

**Warning:** Be careful and use pusher sticks.

Side bars are not difficult to make if you pay attention to details and measure correctly.

**Suggestion:** Make extra side bars. The setup for making any item takes time. Cutting extra items while the saw is setup is an inexpensive investment in material.

**Build a Frame Side Bar Notching Jig**

When using a saw to cut wood that extends above the saw fence the wood tends to drift from 100% contact with the fence. The result is an uneven cut. The Frame Side Bar Notching Jig will help correct this situation. If the notches are cut *before the bee space on the sides of the side bar are cut*, one jig will work for both the top and the bottom bar notches.

The difference between cutting the top and bottom notches is the width of the dado blade and the position of the saw's fence.

**Parts**

¾" x 10" x 10" – 2 pieces

**Construction**

**Step 1:** Cut the part listed in the part list.

Use the attached drawings to cut the jig.

**Step 2:** Glue the base pieces together.

Align the base pieces and glue them together.

**Note:** A 1½" thick jig is needed to keep the wood positioned against the fence correctly.

**Step 3:** Mark the center of the jig's cutout for blade alignment.

**Note:** This mark is used to align the blade center to the jig and position the saw's fence for both the top and the bottom notches.

Creation of the jig is now complete. This is the simplest jig I have ever made.

**Usage**

Place the correct dado blade on the saw. Then align the jig's centering alignment mark with the


*Finished notching jig*


*Blade centering line*

center of the dado blade. Snug the fence against the jig while keeping the centering mark aligned. Set the blade height to the correct height and test the cut.

**Step 1:** Install a dado blade (¾" - top).

**Step 2:** Calibrate the depth for the notch.

Using junk wood, adjust the dado blade to the ½" height. Keep adjusting the blade until the correct depth is achieved.

**Hint:** After setting the correct blade height, lower it to its lowest position while counting the revolutions of the height adjusting knob. Record the number of turns needed to achieve the ½" depth on the top of the jig. This information will help you replicate the notching with minimum of fine tuning.

*Finished block*

**Step 3:** Align the blade on the centering line**.**

Set the blade to the correct height and using the saw's fence, align the center line of the jig with the center of the dado blade. Then using a test piece of wood cut a notch to ensure everything is aligned correctly. Match the cut with a commercial side bar to double check the cut. Fine tune the positioning until you are satisfied.

**Step 4:** Cut the notch in one end of all the blocks of wood.

**Note:** Multiple cutting passes may be necessary to achieve a consistent cut depth. A wide dado blade tends to raise the material during the cutting operation.

**Step 5:** Change the blade to the other dimension ($^{9}/_{16}$" - bottom).

The top and bottom notch widths are not the same, therefore, the saw's fence needs to be repositioned to keep the top and bottom notch centers aligned.

Use the previous steps to position the fence and the blade height for this width of dado blade.

**Step 6:** Test the notch alignment**.**

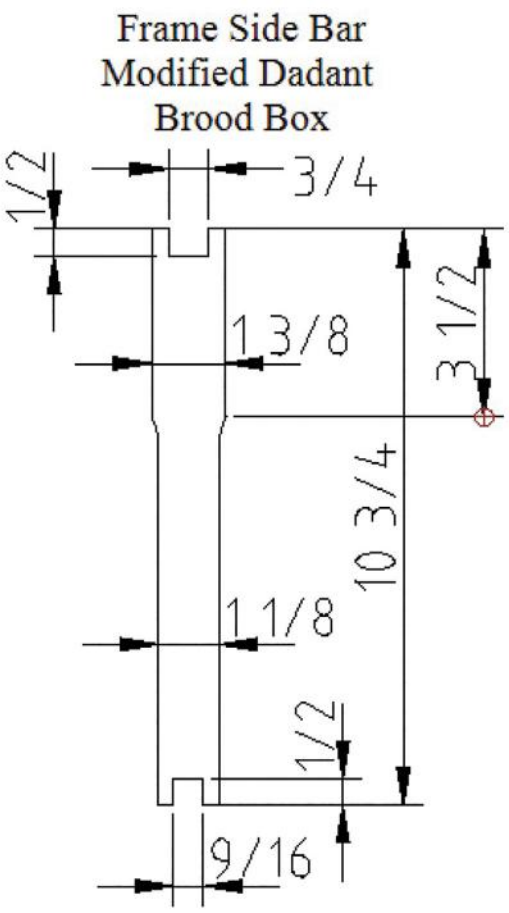
Double check the notch alignment, the centers of the notches should be aligned.

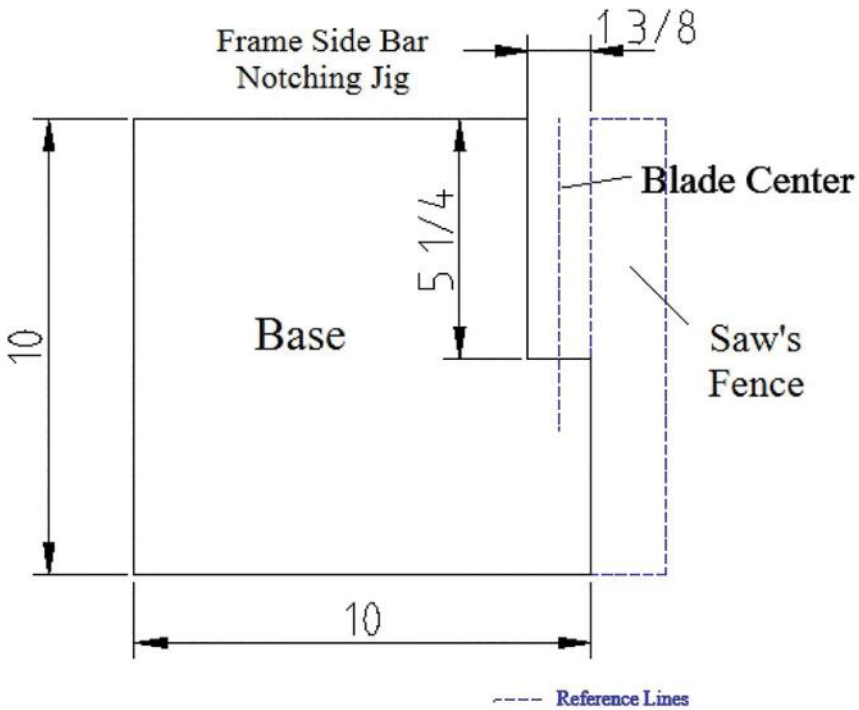
You can now cut top and bottom notches for your side bars with consistency.

Setting up for making a side bar takes time but once the saw is setup many can be made in a very short time.

**Hint:** Cut extra side bars once you are setup and checked out. The setup time far outweighs the cost of additional wood when all you need is an additional two side bars.

## **Diagrams** - Frame Side Bar Notching Jig



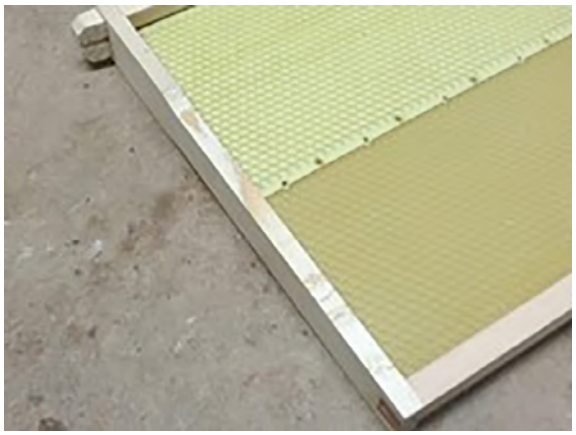



# BUILD A MODIFIED DADANT HIVE BODY

Ed **Simon**

## *Part 3 – Build a Uniquely Sized Plastic Foundation*

When you build a non-standard Langstroth hive body and you create non-standard frames, you are simply OUT-OF-LUCK finding commercially available foundation. This was our problem when we wanted to use plastic Rite-Cell® foundation by Mann Lake for the modified Dadant (19" x 19⅞" x 11¼") hive body that we were developing. This extra deep hive body used standard 1" x 12" board available at lumber yards or home improvement stores. After creating 10¾" frame sidebars to match the hive body, we needed to modify the plastic foundation to meet the extra height of these frames. Luckily, the length matched the standard foundation length. Two foundations (a medium 6⅝" and a shallow 4¾") needed to be joined to achieve the height needed (9⅞"). After joining the foundation, we will then cut it to the correct height.



*Finished frame with foundation*

**Design notes:** The melting/piercing method of attaching two sheets of plastic foundation was selected after four different attempts. Eventually a $6.00 pencil point soldering iron solved the problem. The following methods were tried and rejected:

1) Drilling holes and wiring was extremely time consuming, and the joints were still weak.
2) Stapled joints – I was unable to find a sharp staple that could consistently penetrate the two layered plastic foundation.
3) Super glue (gel form) required fast assembly and the removal of the beeswax coating.
4) Acetone for melting the plastic was dangerous and required fast assembly and the removal of the beeswax coating.

**Construction**

**Step 1:** Calculate the foundation size.

Use an assembled frame and measure the distance between the bottom of the top bar the top of the bottom bar. Then add ⅜" to this measurement. This is the total height of the foundation needed for this frame.

**Note:** Make one prototype foundation to verify your measurements before committing to production.

**Step 2:** Make compatible joints.

Overlap the bottom of one sheet of foundation with the top of a second. Then use a pencil point soldering iron to pierce the joint every two inches. Turn the combined sheets over and perform the same piercing/melting between the previous welds. The result is a slightly thicker foundation for the ⅜" where the overlap occurs.

**Hint:** Use a wood strip to mark the piercing positions and help keep the soldering point aligned when joining the sheets of foundation.

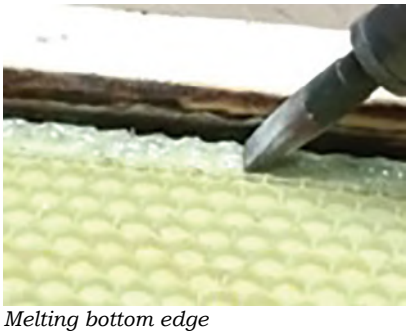
*Solder-melting joint*

**Step 3:** Cut the previous joined sheets of foundation to size.

Use a saw to cut the bottom section of foundation to size (9⅞" for this example).

**Warning:** Wear safety glasses when cutting plastic with a circular saw. Flying pieces of plastic are dangerous.

**Hint:** Cutting waxed foundation will leave bees wax on the saw's table. Use a heat gun and paper towel to remove the wax.



*Melting bottom edge*

**Step 4:** Melt the bottom edge to fit the bottom bar groove.

To allow the bottom edge of the foundation to slip into the bottom bar groove, you need to remove the raised cell design. Use a flat soldering iron to melt these cell impressions along the bottom of the foundation.

**Hint:** Position a piece of wood against the edge to be melted. Then use the wood as a guide for melting the bottom (or top) edge

Simple to make, a non-standard height plastic foundation is possible.

*Cell impression free bottom*

# What are the Keys to Successful Beekeeping?

John **Miller**

I don't pretend to replace well-written books, speakers, or podcasts. Here we are, well into 2022 – the Big Almond Pollination Dance is well underway. Take a moment to spool up – take about five minutes to read this piece.

I keep three beekeeping quotes handy. They've informed a lot of decisions over the years.

Jim Powers was fond of, 'Do what you should do, when you should do it.'

Bob Koehnen favored, 'Acting, not because you happened to think of it – but because you have a plan.'

Ryan Elison nails it for beekeepers: 'What are you doing today to get ready for 180 days from today?'

Three Keys to Successful Beekeeping spoken by three Beekeepers who know what they are talking about.

What are the Key Dates? In this industry, February 1 is the key date. This is the date, each year, year after year, when the **supply** of live colonies for pollination services is **smallest**. It coincides with the date, each year, year after year, when **demand** for live colonies for pollination services **peaks**.

When Ms. *Varroa* and her children arrived, this demand/supply dynamic changed, first slowly, then abruptly – when control measures no longer worked. Killing a bug on a bug is difficult if the idea is to keep the good bug and kill the bad bug. Pesticides make no distinctions between good bugs and bad bugs.

Beekeepers respond by making probably five million divides, annually. Think on that number for a minute. In the old days, annual mortality rates - an archive Dr. Mussen kept in U. C. Davis for many years - seldom exceeded 5%. The new normal is over 40% annual mortality, as documented by the Bee Informed Partnership. Over two million hives perish each year in the new normal; some years more; few years less. This is, in the words of Ron Spears, 'A Mess. And that mess follows you for months.'

Let's go a little deeper into that five million nucs number. I calculate that it takes eight to 10 hours of labor per nuc. From the time you bust the parent till that nuc is a rentable pollinating unit February 1 – you have eight to 10 hours invested in the nuc. 40% will die.

Why are Beekeepers making five million nucs a year? The idea is, for commercial guys: A thousand extra five frame nucs will keep the hive count up through February 1. 40% will die.

But! Those 600 rentable hives will generate $120,000.00 in February. Numbers Matter.

**Note*** If you happen to also make a honey crop, good; but honey production is a shrinking income base – and an unreliable income base. Beekeepers pivot to other beehive income-related streams. Additional crops are pollinated, frames of brood, bulk bees, five frame nucs, pollen collecting, propolis harvest, are all hive-related income potentials. All require labor.

Conditions may improve. I've long wanted better beekeeping tools. As previously written, I asked Dr. Mark Winston in 1986 for a chemistry graph on Queen Mandibular Pheremone; which he provided. Thirty-six years later –No QMP reader device - we still open up nucs, rummage around looking for a 'good pattern' – or – 'yup, I seen her' subjective decision by a beekeeper who might be having a really good day – or a not so good of a day. 40% of those good nucs will be dead in a year. We need better tools.

Conditions may improve. I'm a terrible teacher; but I hired people who are good teachers. I can run a business; but I lack the patience to teach someone who has yet to master the art of beekeeping. I knew I wanted to keep bees in spite of the stupidity of youth – I wanted to keep bees, and I Get Bees. A lot of other folks, 99% of the rest of us – Don't Get Bees. This is where the hired teacher/mentor can profoundly improve conditions. If you're smart enough to run a business, you're also smart enough to hire a good teacher. Don't waste that Key to Successful Beekeeping.

February 1 is the Key Date.

40% annual mortality is a Key Statistic.

Labor is a Key Expense.

Messes follow you for months.

Numbers Matter.

Acting, Because you have a Plan for 180 Days from Today - is Key Wisdom.

Honey Production is *not* Key.

What are we doing today – to get ready for September 1?

TABLE—2022 ADVERSE EFFECT WAGE RATES

| State | 2022 AEWRs |
|---|---|
| Alabama | $11.99 |
| Arizona | 14.79 |
| Arkansas | 12.45 |
| California | 17.51 |
| Colorado | 15.58 |
| Connecticut | 15.66 |
| Delaware | 15.54 |
| Florida | 12.41 |
| Georgia | 11.99 |
| Hawaii | 16.54 |
| Idaho | 14.68 |
| Illinois | 15.89 |
| Indiana | 15.89 |
| Iowa | 16.19 |
| Kansas | 16.47 |
| Kentucky | 13.89 |
| Louisiana | 12.45 |
| Maine | 15.66 |
| Maryland | 15.54 |
| Massachusetts | 15.66 |
| Michigan | 15.37 |
| Minnesota | 15.37 |
| Mississippi | 12.45 |
| Missouri | 16.19 |
| Montana | 14.68 |
| Nebraska | 16.47 |
| Nevada | 15.58 |
| New Hampshire | 15.66 |
| New Jersey | 15.54 |
| New Mexico | 14.79 |
| New York | 15.66 |
| North Carolina | 14.16 |
| North Dakota | 16.47 |
| Ohio | 15.89 |
| Oklahoma | 13.88 |
| Oregon | 17.41 |
| Pennsylvania | 15.54 |
| Rhode Island | 15.66 |
| South Carolina | 11.99 |
| South Dakota | 16.47 |
| Tennessee | 13.89 |
| Texas | 13.88 |
| Utah | 15.58 |
| Vermont | 15.66 |
| Virginia | 14.16 |
| Washington | 17.41 |
| West Virginia | 13.89 |
| Wisconsin | 15.37 |
| Wyoming | 14.68 |

# NEXT MONTH

**Region 1**
- Feed, feed, feed
- Bring home deadouts for clean up
- Add super of honey to light colonies
- Clean bottoms if break in Winter
- *Varroa* treatment during broodless period
- Put pollen sub on
- Check hive weight
- Feed fondant if necessary

**Region 2**
- Continue feeding pollen sub
- Feed one to one sugar syrup
- Add, super if colonies are growing
- Inspect colonies on warm day
- Get woodenware ready for splits
- Check food supply
- Is Queen(s) laying?
- Do mite check on day above 57°F
- Order bee supplies
- Split colonies
- Consolidate brood boxes
- Add more supers

**Region 3**
- Sample for mites, treat if above three mites per 100 bees
- Feed
- Check for swarm cells
- Make splits
- Make splits into nucs
- Add super
- Consolidate brood boxes

**Region 4**
- Feed one to one syrup
- Clean bottom board
- Put out dry pollen sub
- Feed as needed
- Clean deadouts
- Sample for mites and treat if over three mites per 100 bees
- Feed pollen sub patties
- Get ready for splits
- Assemble and paint new woodenware
- Pick up deadouts

**Region 5**
- Feed pollen sub
- Feed syrup
- Where do you want to place bait hives?
- Check Queens on warm day
- Feed, feed, feed
- Check hive weight
- Get ready for splits
- Clear hive entrance/exit

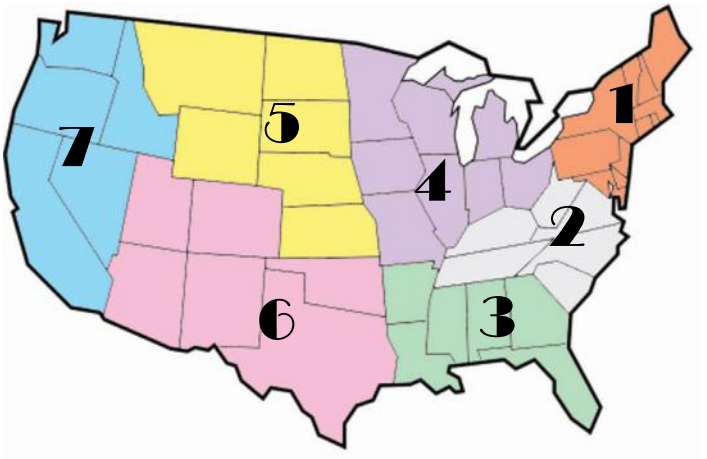
**Region 6**
- Feed and inspect
- Prepare for swarms
- Add boxes
- Check food supplies
- Order Queens
- Do inspections
- Check colony strength and growth

**Region 7**
- Feed and then feed again
- Sample and treat for mites
- Treat for mites before supers are added
- Feed to stimulate brood rearing
- Check feed and strength after almond pollination
- Split hives
- Clean up deadouts
- Check hive weight. Feed if needed

## Honey Reporters Wanted

We are expanding our Honey Reporter population and need new reporters in EVERY region. We ask that you fill in most of the wholesale or retail or both sections, most months, and our short survey on the back. We give you a FREE subscription for your service. So if you are interested fill out the form **https://forms.gle/EnZW531NHM7sbMUz8** OR send an email to **Emma@BeeCulture.com** and put REPORTER in the subject line. Include name, email, phone number and mailing address and we'll get you the next Honey Report form. Sign up today and be a part of the BEST Monthly Honey Price and Beekeeping Management Report in the industry.

*Scan this to go straight to the form online!*



# FEBRUARY – REGIONAL HONEY PRICE REPORT

| | REPORTING REGIONS 1 | 2 | 3 | 4 | 5 | 6 | 7 | SUMMARY Range | Avg. | $/lb | History Last Month | Last Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS** | | | | | | | | | | | | |
| 55 Gal. Drum, Light | 2.25 | 2.22 | 2.55 | 2.42 | 2.48 | 2.66 | 2.60 | 1.89-3.33 | 2.44 | 2.44 | 3.23 | 1.98 |
| 55 Gal. Drum, Ambr | 2.30 | 2.15 | 2.25 | 2.38 | 2.43 | 2.60 | 2.60 | 1.73-3.30 | 2.36 | 2.36 | 3.17 | 1.77 |
| 60# Light (retail) | 230.00 | 202.00 | 202.00 | 194.88 | 211.67 | 193.01 | 220.00 | 120.00-300.00 | 210.77 | 3.51 | 212.15 | 182.22 |
| 60# Amber (retail) | 225.83 | 195.00 | 202.00 | 188.00 | 230.00 | 189.76 | 222.48 | 120.00-285.00 | 209.98 | 3.50 | 208.63 | 190.55 |
| **WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS** | | | | | | | | | | | | |
| 1/2# 24/case | 102.73 | 99.00 | 112.81 | 86.80 | 61.20 | 96.00 | 112.81 | 61.20-194.90 | 97.57 | 8.13 | 102.53 | 106.15 |
| 1# 24/case | 162.11 | 162.27 | 56.00 | 122.08 | 152.50 | 96.92 | 144.00 | 45.00-300.00 | 143.77 | 5.99 | 143.50 | 117.68 |
| 2# 12/case | 150.59 | 181.25 | 104.00 | 113.85 | 75.92 | 108.00 | 156.00 | 40.00-264.00 | 137.04 | 5.71 | 136.79 | 110.14 |
| 12.oz. Plas. 24/cs | 126.31 | 157.40 | 87.00 | 104.58 | 96.48 | 107.88 | 108.00 | 72.00-240.00 | 117.37 | 6.52 | 111.98 | 83.66 |
| 5# 6/case | 160.93 | 190.03 | 180.92 | 122.17 | 113.16 | 116.00 | 180.92 | 90.00-330.00 | 151.85 | 5.06 | 162.73 | 105.45 |
| Quarts 12/case | 204.29 | 188.24 | 128.50 | 140.93 | 164.06 | 146.34 | 190.00 | 95.00-300.00 | 167.97 | 4.67 | 186.81 | 153.01 |
| Pints 12/case | 117.65 | 110.95 | 84.00 | 95.70 | 98.50 | 103.00 | 108.00 | 72.00-180.00 | 101.76 | 5.65 | 96.12 | 87.55 |
| **RETAIL SHELF PRICES** | | | | | | | | | | | | |
| 1/2# | 6.15 | 5.45 | 4.75 | 5.50 | 4.15 | 4.00 | 5.80 | 2.99-9.00 | 5.61 | 11.22 | 5.57 | 5.44 |
| 12 oz. Plastic | 7.46 | 6.81 | 6.00 | 6.75 | 6.54 | 5.50 | 5.90 | 3.56-12.00 | 6.90 | 9.20 | 7.03 | 6.29 |
| 1# Glass/Plastic | 9.47 | 9.30 | 8.98 | 7.98 | 8.74 | 6.25 | 9.00 | 3.00-17.00 | 8.93 | 8.93 | 9.22 | 8.39 |
| 2# Glass/Plastic | 15.45 | 14.88 | 16.75 | 14.63 | 13.86 | 11.49 | 16.33 | 2.00-30.00 | 15.31 | 7.65 | 15.23 | 14.53 |
| Pint | 12.50 | 11.45 | 8.30 | 11.68 | 10.68 | 10.50 | 11.87 | 4.00-22.00 | 11.35 | 7.57 | 11.69 | 10.34 |
| Quart | 23.34 | 20.58 | 15.83 | 19.12 | 19.41 | 15.67 | 22.37 | 8.00-40.00 | 20.34 | 6.78 | 20.31 | 17.88 |
| 5# Glass/Plastic | 35.67 | 36.60 | 36.15 | 27.65 | 28.10 | 23.00 | 35.82 | 14.94-60.00 | 34.17 | 6.83 | 31.66 | 29.99 |
| 1# Cream | 11.85 | 8.25 | 8.00 | 11.35 | 10.50 | 8.00 | 14.00 | 7.00-20.00 | 11.45 | 11.45 | 10.35 | 10.46 |
| 1# Cut Comb | 15.85 | 9.10 | 11.50 | 14.77 | 10.00 | 15.55 | 16.00 | 7.99-25.00 | 14.60 | 14.60 | 14.70 | 13.49 |
| Ross Round | 11.31 | 7.00 | 12.77 | 14.00 | 12.00 | 12.77 | 13.75 | 7.00-20.00 | 12.03 | 16.04 | 11.22 | 11.50 |
| Wholesale Wax (Lt) | 8.13 | 6.35 | 5.83 | 7.02 | 8.68 | 4.50 | 9.50 | 3.00-16.00 | 7.47 | - | 7.42 | 6.65 |
| Wholesale Wax (Dk) | 6.45 | 5.71 | 6.50 | 6.40 | 6.60 | 3.50 | 8.00 | 3.00-15.00 | 6.37 | - | 6.58 | 6.43 |
| Pollination Fee/Col. | 94.55 | 71.00 | 30.00 | 127.50 | 140.00 | 115.89 | 50.00 | 30.00-250.00 | 91.79 | - | 94.55 | 69.09 |

## HONEY MARKET FOR THE MONTH OF NOVEMBER 2021 IN VOLUMES OF 10,000 POUNDS OR GREATER, PUBLISHED DEC 23, 2021

UNLESS OTHERWISE STATED Prices paid to beekeepers for extracted, unprocessed honey in major producing states by packers, handlers & other large users, cents per pound, f.o.b. or delivered nearby, containers exchanged or returned

**CALIFORNIA**
Alfalfa Light Amber / Amber $2.27
Cotton Extra Light $2.27
Buckwheat Light Amber $2.27
Mixed Flower Light Amber / Dark $2.27
Orange White / Extra Light $2.27
Valley Extra Light / Light $2.27
**COLORADO**
Alfalfa Extra Light $2.27
**DAKOTAS**
Alfalfa White/Light Amber $2.27
Alfalfa Extra Light $1.90 - $2.27
Basswood White $2.27
Canola White/Extra Light $2.27
Clover White $2.27
Clover Extra Light/Light $2.24 - $2.27
Soybean Extra Light/Light $2.27
Spurge Light Amber $2.27
**FLORIDA**
Brazilian Pepper Light Amber $2.10
Gallberry Light Amber $2.10
Orange Light Amber $2.10
HAWAII
Lehua White $2.27
**IDAHO**
Clover White $2.27
**LOUISIANA**
Tallow Light Amber $2.1
**MICHIGAN**
Star Thistle White / Extra Light $2.27
**MINNESOTA**
Basswood White/Extra Light $2.27
Basswood Light Amber $2.27
Buckwheat Amber $2.27
Mixed Flower White/Extra Light $2.27
**MISSISSIPPI**
Mixed Flower Light Amber $2.05
**MONTANA**
Alfalfa Amber $2.27
Canola White / Extra Light $2.27
Clover White $2.27
Mixed Flower White / Light Amber $2.27
**NEBRASKA**
Alfalfa Light Amber $2.27
Clover Extra Light Amber $2.27
**NEW YORK**
Basswood Light Amber $2.50
**OREGON**
Alfalfa White $2.20
Mixed Flower White $2.27
Mint Light Amber/Amber $2.27
**TEXAS**
Clover White/Extra Light $2.24
**WASHINGTON**
Canola White/Extra Light $2.27
Canola Light Amber $2.27
Mint Amber $2.27
Mixed Flower White $2.27
**WYOMING**
Clover Light Amber $2.27

Prices paid to Canadian Beekeepers for unprocessed, bulk honey by packers and importers in U. S. currency, f.o.b. shipping point, containers included unless otherwise stated. Duty and crossing charges extra. Cents per pound. Mixed Flower White $2.15 - 2.59

Prices paid to importers for bulk honey, duty paid, containers included, cents per pound, ex-dock or point of entry unless otherwise stated.
**ARGENTINA**
Clover White $2.20 - $2.36
Clover Extra Light $2.17 - $2.36
Clover Light Amber $2.30
Mixed Flowers White $1.82 - $2.10
Mixed Flowers Extra Light / Light $1.80 - $2.27
Mixed Flowers Amber $1.90
**BRAZIL**
ORGANIC Extra Light $1.77 - $1.86
ORGANIC Light Amber $1.61 - $1.98
ORGANIC Amber $1.88
**INDIA**
Mixed Flower White $1.61
Mixed Flower Extra Light $1.19 - $1.69
Mixed Flower Light Amber $1.05 - $1.72
Mustard White $1.30
Mustard Extra Light/ Light $.96 - $1.30
**MEXICO**
Orange Extra Light $2.24
Mixed Flower Extra Light $2.16
Mixed Flower Light Amber $1.90 - $1.97
Mixed Flower Amber $1.90
**UKRAINE**
Sunflower Extra Light/ Light $1.50
Mixed Flower Extra Light $1.95
Mixed Flower Light Amber $1.92
**VIETNAM**
Mixed Flower Light Amber $.99 - $1.68
Mixed Flower Amber $1.49

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*It all started with a swarm of bees.*

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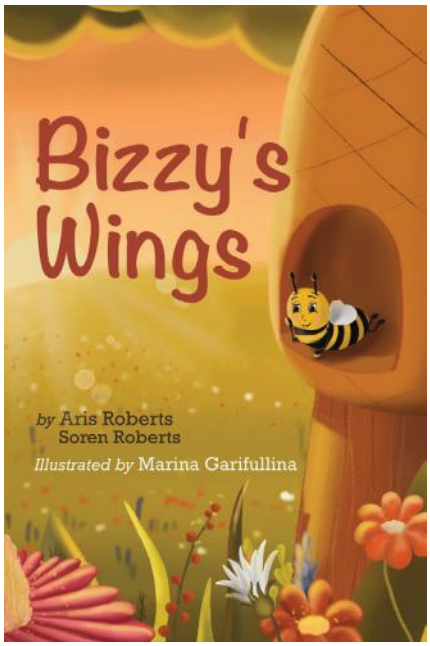
# Books for the Whole Family –




*Bizzy's Wings*, by Aris Roberts and Soren Roberts. Illustrated by Marina Garifullina. ISBN 9798985314717. 34 pgs, 10" x 7", color throughout, soft cover. Available from IngramSpark, Amazon and other outlets. $16.95.

Aris and Soren Roberts are teenage brothers, living with their parents, two dogs and several million bees near Middleburg, VA. They have been keeping bees on their farm just over three years, but have been interested in bugs in general since Aris brought home a bucket of crickets when he was five.

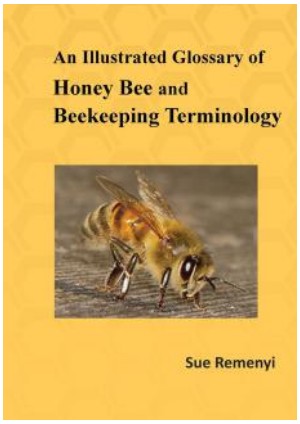
The idea for this story came to Aris when he learned of one the more nasty side effects of *varroa* – the presence of deformed wing virus. Being deformed is an issue with children, especially for the three to eight year old audience this story is intended for.

Bizzy isn't able to fly because of her stubby wings, which makes her stand out in a crowd of worker bees who can fly. Because she can't fly her life is destined to always be an inside bee, cleaning, feeding, caring for the queen, but never flying to flowers, gathering propolis, bringing water home, and even inside, never warming the hive or curing the honey. And they made fun of her wings and of her in general, calling her names and teasing her. A bee that can't fly isn't a bee they said. Needless to say, these attacks took their toll and Bizzy tried to hide.

But hiding where she went was a huge, monster wasp! Ready, willing and able to attack the hive and steal its honey. Bizzy tried and tried to vibrate her wings to warn the hive. And they Worked! The bees drove the wasp away, and Bizzy was forgiven. Even friends, with an Award from the queen.

The brothers goal for this book was to raise awareness of the plight of honey bees, but it does a good job of helping children who feel different, feel better about being that way. It works.

*Kim Flottum*




*The Illustrated Glossary of Honey Bee and Beekeeping Terminology,* by Sue Remenyi. Published by ACPI, Reading UK. ISBN 978-1-912764-84-6, 188 pgs., 6" x 8", color throughout, soft cover, $20.00 Amazon and most book outlets.

It's about time somebody produced this book. Although the author is from the U.K., and some of the terms here will definitely be of UK origin, all of the terms used in most of the rest of the world are here also. There are very few exceptions where only the U.K. term is used. For instance, our inner cover is called a crown board in the U.K. And inner cover isn't in the book. I found very few of these, but nevertheless, it is an impressive piece of work.

There are eight chapters, covering anatomy, biology, development, pests and diseases, castes, species, the actual practice of beekeeping both activity and equipment, flowers and pollen, honey and wax, and common and not so common abbreviations you will encounter in your pursuit of honey bee knowledge.

Many, many photos are included to further explain a term, and often, a reference to another term included in the book is shown to further explain the subject at hand.

And of course all topics are listed alphabetically so they are easy to find, and all photos or drawings are referenced by both chapter and figure within the chapter.

All told, there are more than 800 terms and definitions that are brief, but provide enough info to answer any question I could come up with. A Glossary is also provided within each section and a reading list for each section is provided so, if needed, you have more to explore. And at the end, there is an alphabetical index with page numbers to use to quickly find what's needed.

This book is perfect for a beginner, a teacher, or someone looking to better explain a technique or management tool. In fact, if I were teaching a beginner's class, I would strongly recommend it.

*Kim Flottum*

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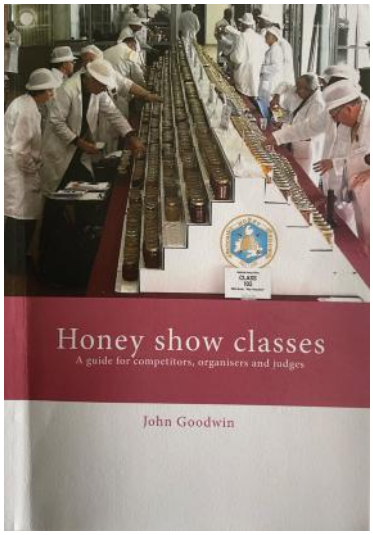
*A Comprehensive Guide To Preparing Exhibits For A Honey Show,* by David Shannon. ISBN 978-1-908904-81-2, 66 pages, color, soft cover, $17.50. And, *Honey Show Classes, a Guide for Competitors, Organisers and Judges,* by John Goodwin. ISBN978-1-914934-17-9, 145 pgs, color, soft cover, $43.00. Both published by and available from Northern Bee Books, UK, Amazon and other book outlets. Postage extra from U.K.

If you are involved in honey shows in the U.K. you probably know a lot more than most U.S. beekeepers when it comes to knowing what products to show, preparing those products, and how to show them. There are groups in the U.S. that follow the Welsh regulations which are essentially the same, but there are few references to guide a new beekeeper.

And even if you don't follow, and don't want to follow these very, very refined techniques, you can learn a lot about simply harvesting and preparing honey for sale. But there's far

more than honey that gets shown at these events, and all of the classes are covered, including honey, wax, confections, cosmetics, mead, slides, photos, labels, and many more that are not at all common in the U.S.


The first book, *Preparing Exhibits,* is all you'll need to know to prepare your exhibits, and all the classes are covered – liquid honey, creamed honey, cut comb, sections, confectionary, meads, and beeswax. It starts with liquid honey, and that chapter starts with a super full of honey and takes you all the way to the show bench and every step between so that a blue ribbon is almost guaranteed. A well-prepared product transcends borders.




The second book, *Honey Show Classes,* deals mostly with how to run a honey show, the right way. It too deals with the classes to be judged, but it looks at the details of running a show relative to each class. The duties of the person in charge, the Secretary, where to find judges and Stewards, and the training and experience needed to hold these positions.

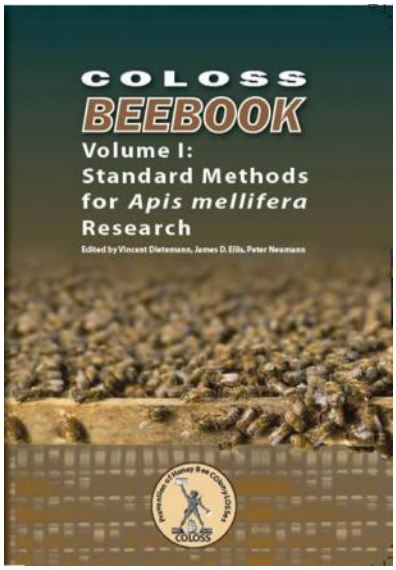
Then it deals with the venue, the place this is to be. Space, displays, what to do when bees from the observation hive demonstration get loose, scheduling the show, making sure it's legal to have mead on the site or can you burn candles in that room, and lots and lots and lots of information on judging. What equipment you will have to have ready for each of the classes, how to display them, how to display microscope slides and photos and more.

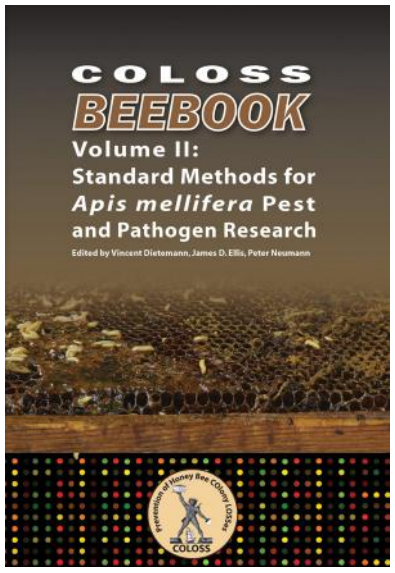
Together, these two books contain pretty much everything you could possibly want to know, no matter where you are. How to prepare, how to set up, how to judge and how to maintain a honey show. These two do it all.

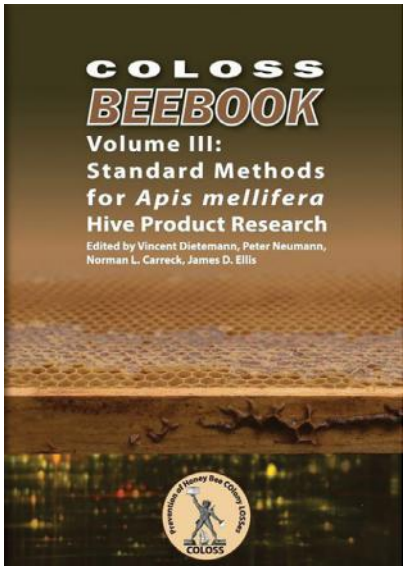
*Kim Flottum*

# A COLOSS-al Achievement

Mark L **Winston**




Let's start by giving praise where praise is due: the three volumes of *BEEBOOK: Standard Methods for* Apis mellifera *Research*, published by COLOSS, are now complete, and the series is indeed a colossal achievement.

COLOSS is a consortium of 1815 researchers from 105 countries, with the collective mission of improving the well-being of bees, particularly the western honey bee *Apis mellifera.* The group's logo specifically notes the "Prevention of Honey Bee **CO**lony **LOSS**es," which clarifies the name "COLOSS."

*BEEBOOK* (they seem to really love CAPITALIZING) is a set of three extensive volumes that present standardized research methods to study honey bees. The first volume focused on methods to study honey bee biology, the second on methodology for pest and pathogen research, and the third, just published, deals with techniques to study products of the hive. Hardcover copies are available for purchase from the International Bee Research Association and Amazon, but all three books can be viewed online and downloaded at no cost.

The breadth and depth of these three volumes is breathtaking, with 350 researchers from 35 countries contributing to 38 chapters, each chapter with up to a dozen or more authors. And what a range of methods are covered: anatomy and dissection to chemical ecology research, protocols for maintaining worker bees in cages to methods of estimating colony losses, sampling regimes for pests to ways of rearing *varroa* mites for study, techniques to study hive products from royal jelly to pollen, and a whole lot more.

It's an important series for the information it contains, and for what we can learn about the state of bee research today. *BEEBOOK* is first and foremost a compendium of research methods and strategies. It's invaluable just for that, especially for young researchers, as a one-stop shop to dip into when designing a new research project. And, the series is designed to standardize how research questions are addressed, so that projects across the globe can be more easily compared.

*BEEBOOK* also reveals a robust research community, one that interacts and collaborates around the globe. A rich wealth of approaches emerges in each chapter, indicating a healthy diversity of perspectives, increasingly critical as honey bee health continues to decline.

For beekeepers, and even scientists, reading this series cover-to-cover would be a tough slog. The writing is dense and filled with jargon, as you'd expect from a necessarily technical publication. But it's still worth a glance to get a sense of how research is done, and the abstracts in three languages that head each chapter provide a reasonably enlightening summary for those who don't want to head into the weeds of methodological detail.

One of the more readable chapters, on how to measure colony strength, provides a good example of what these volumes contribute. The authors (Delaplane, van der Steen and Guzman-Novoa) first describe why a researcher might want to measure colony strength, either to produce uniform colonies at the start an experiment or to measure responses to manipulations. Then they describe objective methods that use some type of measuring device, subjective methods using visual estimates, and computer-assisted digitized analysis. They conclude by describing indirect measures such as flight activity and comb construction. Taken together, it's a rich cornucopia of approaches for researchers to choose from as they design experiments for which colony strength is a good measure of the success or failure of colony management paradigms.

The immense variety and volume of research described in the hundreds of pages in these three volumes begs the question: with all this work, and so many approaches, over a time span of what's now getting close to a couple of decades, why are honey bee colonies still dying all around the planet? In the United States, for example, annual colony loss hovers between 35-45%, compared to typical losses of 5-10% back when I started in with bees in the 1970's.

If there's a benefit to these precipitous colony death rates, it's been in the rapid expansion of researchers and research funding to address this entomological and economic catastrophe. Research has certainly clarified

why bees are dying, due to a synergistic mix of pesticide impact, nutritional deficiencies caused by lack of floral diversity and abundance, and a perfect storm of pests, parasites and diseases. Still, honey bees keep dying, and it's fair to question whether research has done much to improve that situation.

Besides an increased understanding of why bees are dying, we've also learned a lot over the last 20 years about honey bees themselves, and the biology of the pests, parasites and diseases that afflict them. Research has led to some methods and some organic and synthetic pesticide tools with which to manage the biotic challenges faced by honey bee colonies, particularly *varroa*. Perhaps the best we can say, and it's not a small thing, is that, due to research, at least things aren't worse.

That's a pretty low bar, though. My purpose here is not to fault the research community for its myriad contributions. Rather, I suggest that types of research not usually conducted, and thus not covered in the *BEEBOOK*, might be necessary if we're to lower the rates of colony demise.

The lack of economic analysis in studies of honey bee colonies has always surprised me. The basic question begging for study is this: if you try Management Method X, be it a colony manipulation or a disease treatment, and add up all the costs and benefits of that management system, how much money will a beekeeper have in their pocket at the end of the season? Researchers sometimes go so far as to compare honey production, or colony survival, with different systems, but for commercial beekeepers those are indirect measures of what they really need to know: profit or loss at the end of the year.

For those interested in layering profit or loss into experiments, a good example can be found in *Punnett, E.N. and M.L. Winston 1989. Comparison of package and nucleus production from honey bee colonies. Apidologie 20:465-472.* In that study, we explored whether packages and/or nuclei could be produced in British Columbia, Canada in the spring, and determined the income from various combinations of package bee and nucleus production. The border with the United States had been closed in 1987 to package importations due to *varroa*, so our project was commercially important in exploring ways of providing beekeepers with a source of new colonies.

The least profitable system was the control, honey production alone ($50.51/colony, all figures in US 2021 dollars). The most profitable was producing two, two-pound packages and one four-frame nucleus ($106.55/colony) from each colony, followed closely by producing two nuclei per colony ($104.54). A beekeeper producing two packages and one nucleus would earn an annual income of $53,274 from an operation running 500 colonies. Note that those calculations are based on sale prices for packages and nucs in those days, and they sell for considerably more today, even correcting for inflation.

What is the best way to make a profit keeping bees today? Is it to run 10,000 colonies into California almonds each February, with all the associated costs and stressors on bees and beekeepers? Or, would stationary apiaries and an operation of 500 colonies, coupled with a value-added artisanal local honey marketing campaign, be easier on bees and their keepers, and leave you with as much or more money in your pocket at year-end? I often think of an Irish beekeeper I stayed with in County Mayo who has fewer than 200 colonies, and produces only 50-75 pounds of honey from each, but earns a terrific income because it's heather honey and commands a premium price.

Besides a dearth of research that investigates management systems, there's also a fundamental mindset missing in most applied honey bee research, which typically favors beekeeping rather than the bees. What if our research objective was to put the health and welfare of honey bees first, rather than conduct research through the lens of productivity?

There's a growing movement with many names, called Darwinian, organic, treatment-free, natural or sustainable beekeeping, with the objective of keeping honey bees in a style closer to natural wild honey bee nests. These beekeepers espouse little or no management, small colonies, no swarm control, few or no chemical inputs, no supplemental feeding and low colony density in stationary apiaries. Commercial operators would agree that the way we manage bees for profit today is not "natural," but they argue that the large colonies, swarm control, heavy chemical and feed inputs, apiaries with high colony numbers and moving colonies for pollination are what's necessary to make a living.

But there's been almost no research on if and how Darwinian beekeeping could become economic. There's no question that hobbyists can be Darwinian, enjoy their bees and produce a bit of honey, but could commercial beekeepers whose livelihood depends on scale and profit manage colonies that way?

I led a research lab for almost 30 years, and stepped away from that to do other things (if you're interested in where I disappeared to, visit the Morris J Wosk Centre for Dialogue), so no longer have the resources to study questions like this. Still, I'd like to throw out the challenge to today's researchers, who are easily as good or better than my generation, to put together large-scale economic studies that discern the healthiest ways to keep bees that can also yield a decent income for the beekeeper. And there won't be just one best way, but many different approaches. And my instinct, informed by those many years of studying bees, is whispering that there are profitable ways to manage colonies that aren't as harsh on our honey bees as the current systems.

And here's a request for the next edition of *BEEBOOK*: there's got to be something better than losing close to half our colonies every year. A book that explores research methods focused on bee-first management paradigms for commercial beekeepers would be a welcome fourth volume of this already-stellar series.

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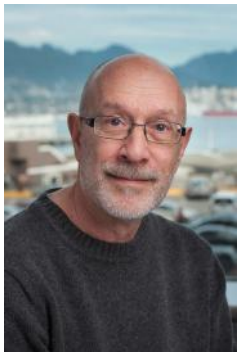
**Mark Winston** is a Professor and Senior Fellow at Simon Fraser University's Centre for Dialogue. His most recent books have won numerous awards, including a Governor General's Literary Award for *Bee Time: Lessons from the Hive*, and an Independent Publisher's Gold Medal for *Listening to the Bees*, co-authored with poet Renee Sarojini Saklikar.



# Application now open for Mann Lake Eastern Apricultural Society (EAS) Youth Scholarship

**A great opportunity for learning, networking, and having opportunities to speak with some of the best known bee authors and researchers.**

This is a competitive scholarship open to young people ages 18-25 (at time of the conference- August 1-5, 2022), Ithaca College, Ithaca, New York.

Veterans ages 18-30

It pays for most of the one week EAS conferrence expenses.

***Applications are due by April 30, 2022.***

*For info and application: Go to the Eastern Apicultural Society*
**https://easternapiculture.org/programs/master-beekeepers/master-beekeepers-scholarship/**

*Go to the Eastern Apicultural Society webpage, click on "Master Beekeepers," and click on "scholarship"*

# FOUND IN TRANSLATION

## *Honey Bees, an Origin Story*

Jay **Evans**, USDA Beltsville Bee Lab

A long time ago, in a treehole far, far, away, our honey bee heroines started a journey that would plant them throughout the globe. For generations, scientists have puzzled over the timing of all this and the location of that treehole, or treeholes. Kathleen Dogantzis, Amro Zayed, and colleagues have applied their expertise and the latest genomic technologies to address this puzzle in the most complete way yet. Their paper, "Thrice out of Asia and the adaptive radiation of the western honey bee" was just published in the journal *Science Advances* (Vol 7, Issue 49, and freely available at **DOI: 10.1126/sciadv.abj2151**). In this study they sampled the entire genomes of 251 honey bees collected from the historical range of *Apis mellifera* (the 'western' honey bee, the species that is dominant among managed honey bees). Amidst these sampled genomes are bees from Europe, Africa, the Middle East and Asia, all places vying to be the source of *A. mellifera.*

So how does a genome sequence solve genealogies of this sort? First, there are millions of single variants (mutations that have survived time and selection) in the 230 million nucleotides that define the honey bee genome. There are four possible nucleotides at each of these 230 million slots, giving ample space to build up differences. Many of these variants differ within individual bees, while many more differ within populations and subspecies. Still others are distinct for individual subspecies. The latter class of variation is especially useful for studies like this one, where the goal is to find signals that unite subspecies and tie them to a common past.

And how does one find and use these sequences? Genome sequences for bees, and all of life, really, are housed at the U.S. National Institutes of Health 'Genbank' resource (**https://www.ncbi.nlm.nih.gov/**). If you want all of the genome sequences used for this study you will soon find them at this site, alongside hundreds of other honey bee genomes including the 'original' honey bee genome sequence published in 2006. To tease apart differences between genomes, scientists align new sequences to a reference genome, head to tail along each of the 16 honey bee chromosomes. Mapping the genomic history of *A. mellifera* is helped by the fact that the genome of the Asian honey bee *A. cerana*, a close relative, is also known. Thanks to *A. cerana*, it is possible to 'root' each *A. mellifera* sequence to a long-gone bee that unites these two current species.

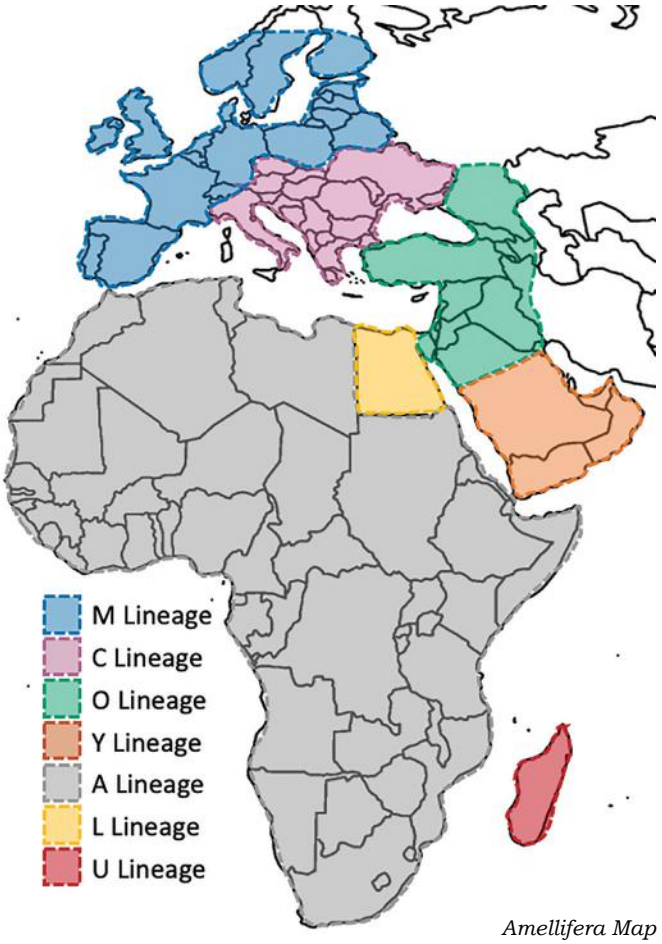
With buckets of data and this 'root' it should be easy to track the history of *A. mellifera* in the seven or so million years since this shared ancestor. Sadly, three facts obscure the honey bee family tree. First, evolution can happen in fits and starts and for much of the histories of the currently recognized subspecies *not much happened*. If new and informative lineages evolved, they either died out or have evaded scientists and their genome sequencing machines. In contrast, *a lot* happened in the world of *A. mellifera* in the past million or so years. If you picture the tips of the *A. mellifera* tree, they look like a palm tree with lots of branches right near the top, instead of an apple tree where important branches peel off lower on the trunk. Or, as argued by these authors, a three-tipped palm tree. This is really cool, because it shows that something really 'clicked' with *A. mellifera* more recently, allowing adaptation to diverse environments and climates and new dominance in the pollinator world (even prior to the human assist). We humans have caused a second bit of confusion in tracing the history of *A. mellifera*. For centuries, we have mixed and crossed otherwise solid subspecies, scrambling some of their unique histories. For one, European subspecies of *A. mellifera* have been returned to Asia under human management and have already shared genes with some of the Asian *A. mellifera* bees sampled in this project. Even the revered Middle-Eastern honey bee, *Apis mellifera syriaca*, shows a blend of distinct genetic codes reflecting admixture of other bees from close and far. Finally, there are large parts of the world where scientists have not scrutinized local honey bee stock, including areas where bees do not generally move around. To overcome these challenges, Dogantzis and colleagues combined an ambitious amount of collecting with the latest genomic toolkit to make sense of it all for us.

The title of their paper gives away the punchline. It appears from this new effort that *A. mellifera*, like *every other honey bee*, got its start somewhere in Asia. Based on current populations this is likely western Asia, from which the 'western' honey bee moved west in waves to populate Africa, the Middle East, and Europe, long before we humans helped it move the rest of the way around the globe. Scientists had proposed this Asian origin before but it was challenged by data suggesting that the founding mothers of *A. mellifera* first leapt to Africa and then radiated out

to the North and East from there. In the current paper, a first exodus from Asia led to the recognized African lineages of *A. mellifera*, while a second eventually gave rise to 'carniolan' and 'Italian' western subspecies, in sisterhood with 'caucasian' and 'anatolian' lines. A third lineage appears to have remained in Asia for millions more years before its own exodus, leading to the European 'Spanish' and 'dark' subspecies, *A. m. iberiensis* and *A. m. mellifera*. Each of these three branches can be tied to an Asian 'root', bolstering claims for an Asian origin of *A. mellifera*. The authors admit that ambiguities remain (science is great) and it will take heavier sampling, especially from Asia and ideally from 'new' lineages that are closer to the root of the tree, to build confidence in these results.

Along with solving an origin story that has kept at least a handful of you up at night, this study gives practical insights into bee subspecies and races. The authors confirm the overall integrity of 10+ western and African subspecies, while bolstering several that were less solid, including a subspecies from the large island of Madagascar and key subspecies that remain viable in Asia. They also show 100+ specific genes that consistently pop up as evolving fastest on diverging honey bee branches. These genes are great candidates for understanding how managed bee lines react to climate, food, and perhaps even chemicals. It is apparent that many key genes are most active in worker bees as opposed to queens. This likely reflects the great range of environmental exposure found by workers across their lifetimes, from temperature extremes to close exposure to pollen and nectar chemicals. It might also reflect the larger behavioral repertoires of worker bees; dancing, defending, mapping, provisioning, etc., when compared to their own mothers. For queen breeders, these genes should be watched as markers for local adaptation, colony life histories and behaviors, and perhaps even responses to localized pests, pathogens, and chemicals.

Honey bees continue on an epic and important journey. The fate of *A. mellifera* is in large part tied to humans currently, but a better understanding of its past struggles and successes should give new hope for ways to battle current forces and challenges. BC




*Amellifera Map*




*Photos by: Amro Z*

# STUDY HALL


**What Kind of Beekeeper Are You? The Survey**

A state of the art psychoanalytic and psychodynamic assessment prepared by known beekeeping scholars with guidance from.... The Editor

**Swarms and Swarm Control**

**A** I never lose a swarm because I breed non-swarming bees and use the all swarm control techniques and technology possible.

**B** I will not lose a swarm this spring. I have put a queen excluder between the brood chamber and the bottom board. I'm ready.

**C** Swarming is a natural biological process. I will not try to stop it.

**D** As long as ALL the colony doesn't leave at once I am in good shape.

**Learning**

**A** This year I will complete and Pass my Master Beekeepr examination.

**B** I am planning on beginning the Florida Master Beekeeping Program if I have time. I do read *Bee Culture* though, when I have time.

**C** I don't believe in Exams. Learning by trail and error is a much better way to learn. I will be buying more package bees this spring but I am getting better

**D** I have decided to take an online class in woodworking. Does that count?

**Disease and parasite ID and treatment**

**A** I can find, recognize and ID every honey bee disease and symptom. I get at least a dozen texts everyday from State Bee Inspectors from most of the nation.

**B** I do all the *Varroa* sampling stuff. I don't use the 'gas'. It made me cough and eyes burn. I saw something that looked like AFB once but it was just dark stringy honey.

**C** I am a natural beekeepr and don't believe in inspecting my colonies, or using medications on them. A happy bee is a healthy bee.

**D** I tried inspecting my colony for the first time last year. It took too long to look at each bee.

**Inspections**

**A** I inspect my colonies weekly at 10 am and 3 pm on Saturday. I use my own ten point scale grading system for assessing food stores, brood temperature, temperment, humidity, wind speed and transfer the data into an Excel spread sheet.

**B** I inspect every week. Well mostly every week if I have time and the weather is OK. I keep notes. I will try to keep notes this year.

**C** I don't need to inspect. I can tell how the colony is doing by putting my ear against the side of the hive and listening.

**D** Sometimes I have my neighbor come over and take a look.

**Local Association Memebership and Participation**

**A** I am a member of several local, regional and State Associations--- it gives me more chances to second guess them.

**B** I am a member of my local association and help out if I really have to. I usually pretend I have a cold.

**C** Actually, I think my local association is a little bit blue collar. I have my own WhatsApp group and we tend to do our own thing. I still use my local association when I have a problem though.

**D** There's a local association?

**Honey**

**A** I don't bother entering my honey in honey shows as it wouldn't be fair to the other entrants.

**B** I wish I could enter. Next year, definitely

**C** I make wax wraps, cosmetics and soaps for my friends. I buy Manuka Honey directly from New Zealand.

**D** Last time I entered my honey the judges complained about picking small pieces of wax out of their teeth after tasting.

**MAINLY A** Congratulations!! You are the Obi-Wan Kenobi of Beekeeping. May I have your autograph? Seriously, go through the questions one more time and answer honestly this time.

**MAINLY B** You are the real McCoy. Lifes a journey right?

**MAINLY C** You are a NATURAL beekeeper. That's not the same as being a natural beekeeper.

**MAINLY D** You are to beekeeping what Arnold Schwarzenegger is to ballroom dancing. Have you ever thought about going into politics?

**I got the idea and direction for this from BeeCraft magazine and Brood Box contributing writer Peter Smith. They are both Great!

From The Editor –

# A Closer LOOK

## QUEEN'S REPRODUCTIVE SYSTEM

Clarence **Collison**

*The reproductive system of the honey bee queen consists of paired ovaries . . .*

"The reproductive system of the honey bee queen consists of paired ovaries connected by calices (cuplike cavity or structure) to paired lateral oviducts, which merge to form a median oviduct connected dorsally to the spermatheca and caudally to the terminal portion of the reproductive tract (i.e. genital chamber and bursa copulatrix with lateral pouches). The spermatheca is connected to the median oviduct via the spermathecal duct. Paired spermathecal glands are connected to the spermatheca via the common duct. The calyx is a funnel-like structure on the caudal aspect of the ovaries that facilitates the transfer of eggs from ovarioles to the lateral oviduct. The calyx is composed of simple to the bi-layered tall, columnar, densely packed epithelium along a basement membrane (Kozii et al. 2021)."

"The lateral oviducts extend bilaterally from the calyx and unite ventrally toward the spermatheca, to form the median oviduct. The oviducts are lined by cuboidal epithelium on a basement membrane with a thin, outer layer of longitudinal muscle. The luminal side (central cavity of a tubular structure) of the epithelial lining is covered by a thin, chitinous intima that has numerous cteniform (comb-like) spines pointing caudally. The lining epithelium is attenuated (reduced in thickness) when the oviduct lumen is distended by an egg (Kozii et al. 2021)."

"The median oviduct is a short, muscular tubule that joins both lateral oviducts. It is posteriorly defined by the valve fold, which also constitutes the transition point of the median oviduct into the genital chamber. On the ventral surface, the median oviduct has two lateral folds connected to sphincter muscles. It is lined by epithelium similar to that found in the lateral oviducts, but instead of cteniform spines, it is covered by a thin intima that thickens posteriorly along the genital tract (Kozii et al. 2021)." "The valve fold is a tongue-like structure which can close the passage between the vagina (genital chamber) and the median oviduct of the queen (Eckert and Shaw 1960)." "The valve fold is a deep transverse epithelio-muscular inward projection on the ventral aspect of the posterior median oviduct. The stalk of the valve fold is composed of loosely arranged muscle and is covered by a single layer of cuboidal to columnar epithelium with multiple invaginations. The epithelium of the valve fold is covered by a thin intima, similar to the median oviduct (Kozii et al. 2021)."

"The valve fold in queens is an "oak leaf-shaped" structure, located on the ventral side of the vagina lumen, on the side opposite to the opening of the spermathecal duct. A few muscle fibers are attached to the ventral outer layer of the valve-fold. In previous studies, the function of the organ was presumed to be as follows: 1) assist sperm migration into the spermathecal reservoir (spermatheca) after mating and subsequently prevent sperm loss by closing the genital chamber and 2) arrest of spermatozoa to expose enough spermatozoa into the micropyle of the anterior side of the egg during fertilization (Sasaki and Obara 2002)."

"The spermatheca, spermathecal duct and the spermathecal glands are accessory organs of the reproductive system of the honey bee queen. The spermatheca is located craniodorsally over the median oviduct at the level of the 5$^{th}$ sternum. It is round, 1.2-1.3 mm in diameter, a sperm recepticulum (Tarpy et al. 2011). The spermathecal glands secrete proteins into the spermatheca via the common duct to replace the fluid lost from the spermatheca with sperm during fertilization (Klenk et al. 2004). At the base of the spermathecal duct, the muscular sperm pump provides a constant sperm volume necessary for the fertilization of a single egg (Baer et al. 2016) (Kozii et al. 2021)."

"The spermatheca is a spherical structure containing all of the spermatozoa that will be required during the queen's life of egg laying. These spermatozoa may need to be stored for several years. The spermatheca is richly supplied with tracheal branches to provide an oxygen supply, and also has two glands, the spermathecal glands, to provide other necessary secretions to maintain the health of the spermatozoa. The two spermathecal glands are long round structures that snake over the surface of the spermatheca. They meet and join the spermathecal duct close to the point where the spermathecal duct has its opening into the spermatheca itself. Around this

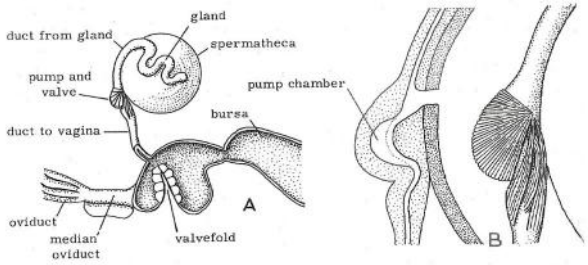



*Figure 1*
*A. The spermatheca and genital chamber (vagina) with adjoining organs of a honey bee queen.*
*B. The spermathecal valve and pump in section and external view showing muscles. (Dade 1962)*

junction are sets of muscles believed to be responsible for delivering spermatozoa down the spermathecal duct for fertilization (Stell 2012)."

"The posterior portion of the genital tract comprises the genital chamber, bursa copulatrix, and bursal pouches. During copulation, the chitinous plates of the drone endophallus attach to the bursal pouches (Camargo and Mello 1970; Woyke 2011) and sperm is ejaculated into the lateral oviducts where it then travels backward via the spermathecal duct to be stored in the spermatheca within the next several hours. The valve fold is thought to regulate the backflow of sperm into the spermatheca by preventing its retrograde flow into the posterior genital chamber (Laidlaw 1944). However, since sperm consistently escape backward into the bursa copulatrix after mating, the efficacy of regulation of sperm flow by the valve fold has been questioned by Camargo and Mello 1970 (Kozii et al. 2021)."

"The total volume of semen acquired by a queen during her visit to a drone congregation area greatly exceeds what she will store for use throughout the rest of her life. Each drone injects about 11 million sperm into a queen and the total number of sperm received on a mating flight is some 87 million. Yet a queen typically stores only about 5 million sperm in her spermatheca. Although it is not clear just how randomly a queen samples from among the 87 million sperm in storing away her five million sperm, the way in which the sperm are processed before being stored suggests that a great deal of mixing of the different drones' gametes can occur. During mating, the sperm are received into the queen's lateral oviducts. Upon returning to her nest, the queen forces the sperm into her vagina by muscular contractions. The valve-like fold stops much of the semen from flowing back out, and instead directs the sperm into the spermathecal duct and thence into the spermatheca. The excess semen pushes out past the valve fold and out of the queen in the form of thin threads which are removed by the workers (Seeley 1985)."

"Each ovary consists of densely packed clusters of ovarioles which are thin chains of eggs that widen posterior, representing sequential, linear maturation of the oocytes and trophocytes. Each ovariole has four distinct regions which are: a short terminal filament, a germarium of intermediate length, and a long vitellarium which ends with the ovariole pedicle, all encased within an epithelial sheath. The terminal filament is composed of undifferentiated stem cells embedded between dis-

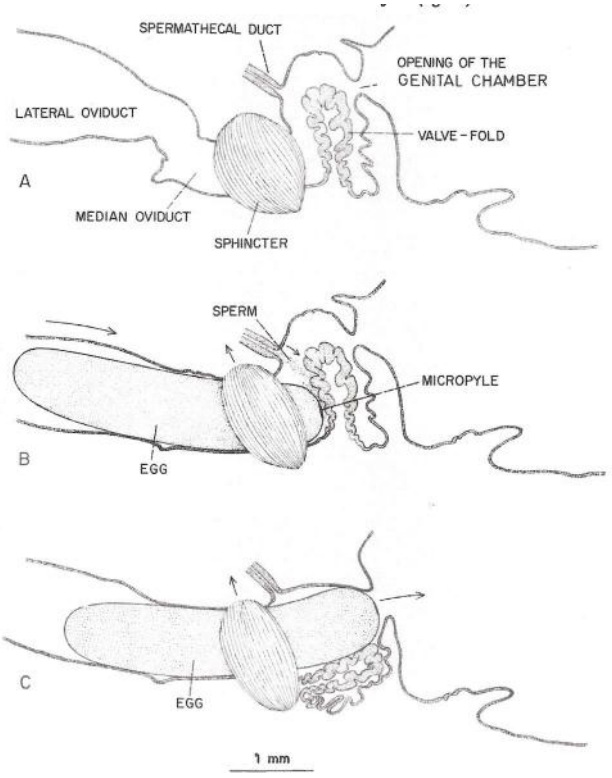



*Figure 2*
*The process of an egg being fertilized within the queen's median oviduct. The egg micropyle in contact with the valve fold (Camargo and Mello 1970)*

coid cells; the stem cells have large nuclei and poorly stained cytoplasm. The germarium contains germline cells (cystocytes) clustered into rosette-like structures. In the distal portion of the germarium, the oocytes become arranged into a single row, separated by nurse cell chambers, which constitutes the transition to the vitellarium. Somatic cells are haphazardly arranged in the proximal germarium but form a distinct follicular epithelial lining around an oocyte and its corresponding trophocytes in the vitellarium. In the centro-caudal portion of the ovariole, the ovum is almost completely covered by simple cuboidal somatic epithelium with a central nucleus, densely stippled chromatin, leaving only a narrow opening on the anterior side, the trophic stalk which allows access of nutrients from the trophocytes or nurse cells. There is a distinct germinal vesicle within individual oocytes. At the late stages of vitellogenesis, the epithelium of the ovum is blunted (cuboidal) and subsequently becomes attenuated. As they move posterior along the ovariole, the trophocytes increase in size and eventually undergo degeneration. Small median follicular cells, previously described as intertrophocytic median follicular cells, are occasionally observed in between trophocytes within the nurse chamber (Kozii et al. 2021)."

"Mature eggs produced from a pair of ovaries are stored in the lateral oviducts until the queen begins an oviposition. The micropyle (a small opening in the egg through which spermatozoa can enter) was observed on the anterior pole of the egg. The micropylar area of an egg consisted of a dense network of canals of various shapes and sizes. The center canals are perpendicular to the margin of the micropylar area, whereas the outer canals generally slant toward the center. The surface of the cho-

rion at the posterior end of an egg was smooth without any radical structure or canals (Sasaki and Obara 2002)."

"Fertilization of an egg takes place in the median oviduct. It is believed that the valve fold, together with the median oviduct sphincter, slow down the egg when it passes through the median oviduct and pushes the micropylar end of the egg against the opening to the spermathecal duct to facilitate fertilization. The valve fold is also thought to regulate sperm outflow from the spermathecal duct during fertilization (Camargo and Mello 1970)."

"Gotoh and Sasaki (2021) histologically examined the developmental process of the internal reproductive organs including spermatheca, valve-fold in the vagina, semi-circular muscle surrounding the common oviduct, and abdominal ganglia in honey bee queens and workers. During the pupal stage, queens showed an increased spermathecal reservoir, development of the tracheal network surrounding the spermathecal reservoir and elongation of the spermathecal gland. Compared with queens, these developmental processes were never observed during the pupal stage in workers. Moreover, development of the valve-fold and semi-circular muscle was aborted, and they became rudimentary at the middle pupal stage in workers. Morphological caste differences in the abdominal ganglia were observed from the prepupal stages, showing that the most posterior ganglion was fused with the anterior ganglia in queens but not in workers."

"Ratnieks and Keller (1998) investigated the precision with which queens can control the fertilization of the eggs they lay. Because males and workers are reared in different-sized cells, it is possible to know which type of egg a queen "intends" to lay. Eggs were collected from both worker and drone (male) cells from four colonies. Ploidy of the embryo was determined using polymorphic DNA microsatellites. All 169 eggs taken from worker cells were heterozygous at least one microsatellite locus showing that the egg was fertilized. All 129 eggs taken from drone cells gave a single band at the B124 locus, strongly suggesting haploidy. These data show that queens have great, and quite possibly complete, ability to control the fertilization of the eggs they lay."

"Baer et al. (2016) quantified the number of sperm that queens use to fertilize eggs. They examined sperm use in naturally mated queens of different ages and in queens artificially inseminated with different volumes of semen. They found that queens are remarkably efficient and only use a median of 2 sperm per egg fertilization, with decreasing sperm use in older queens. The number of sperm in storage was always a significant predictor for the number of sperm used per fertilization, indicating that queens use a constant ratio of spermathecal fluid relative to total spermathecal volume of $2.364 \times 10^{-6}$ to fertilize eggs. This allowed them to calculate a lifetime fecundity for honey bee queens of around 1,500,000 fertilized eggs. Their data provide the first empirical evidence that queens do not manipulate sperm use, and fertilization failures in worker-destined eggs are therefore honest signals that workers can use to time queen replacement, which is crucial for colony performance and fitness."

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# Honey Production Value Report for Canada

Rod **Scarlett**

Statistics Canada recently released the 2021 Honey Production and Value report and it was a surprise to many of the pessimists out there. Unlike the doom and gloom story that often is produced internationally, both bee numbers and the value of honey production have reached record highs in Canada. According to the Government of Canada website:

"*Canadian honey producers harvested 89.8 million pounds of honey in 2021, up 8.0% from 2020. The number of colonies increased by 6.0% from a year earlier to 810,496 in 2021, which contributed to the higher production. The total value of honey sold increased by 39.4% to a record-high $278.0 million in 2021. Lower production and less supply since 2017 contributed to higher prices and value for honey in 2021.*

*The number of beekeepers grew to 13,105 in 2021, as 1,111 more beginner beekeepers started their honey-making journey this year. Honey exports were down by 13.3% during the first three quarters of 2021 to 12.4 million pounds. Sales from honey exports climbed up by 4.3% to $33.1 million. Over 90% of Canadian honey is exported to the United States and Japan.*"

Just ten years ago, over 75% of our export market was to the United States. In 2021, Japan is now our largest customer, and an increased emphasis is being placed on further diversifying our export markets.

A major surprise was the dramatic increase in the number of colonies. Colony numbers were up by over 50,000 over 2020 with the province of Alberta having the greatest increase with over 32,000 colonies. The increase in numbers occurred in spite of the fact that packages from Australia, New Zealand and Chile all but stopped over the last two years because of Covid related transportation issues. While the cost of production continues to rise, it is good to know that for at least this year, losses may not out-strip profit.

For associations, while there was the expectation that everything would return to "normal" after the fourth wave of Covid-19 hit, such was not the case. Many provincial associations held their respective Annual General Meetings this fall and winter and in most cases, it was done with a mix of in-person and virtual participation. However, it did not dampen enthusiasm as the number of participants was seemingly not affected. British Columbia, Alberta, Saskatchewan and Ontario all held their AGM's with the remaining provincial associations scheduled to have theirs in early 2022. Bee health, stock replacement and labour continue to be issues and will surely be addressed when the Canadian Honey Council has its AGM on February 7, 2022 in Edmonton.

Canadian Honey Council

# Apiary Inspection Georgia

Jonathan **Nixon**

The Georgia Department of Agriculture, Plant Protection Division has eight inspectors that work within the apiary industry. We are busy year-round with honey bee inspections and services. In January and February we are inspecting shipments of bees headed to California for almond pollination. We inspect at least 200 shipments to California each year. Because of our mild Winter season, many northern beekeepers overwinter colonies here. Spring and Summer brings inspections for migratory beekeepers leaving Georgia to go back North (Maine, Massachusetts, Vermont, New York, Pennsylvania). From August to November we are performing annual inspections on our queen and package producers, while also collecting samples for the USDA Honey Bee Survey. We have a large number of beekeepers in the state, most of which are hobby beekeepers, but we have a significant number of package and queen producers also. Many of those commercial producers have been in operation for generations in southeast Georgia. The southeast part of the state has many native honey plants and some beekeepers specialize in comb honey production, while the north Georgia Mountains are home to sourwood and basswood honeys. Georgia is an important and unique contribution to the apiary industry of the U.S. There has not been any recent changes or amendments to Georgia's laws regarding honey bees. As the Lead Apiary Inspector, I schedule annual inspections for licensed apiaries, coordinate the collection of samples for the state's USDA Honey Bee Survey, investigate pesticide complaints involving honey bees alongside our pesticide division, assist beekeepers with any issues that may occur throughout the year, and perform inspections for interstate movement of colonies. BC

*Commercial Apiary in Georgia*

# All The Buzzzz in...

Happy Valentine's Day!

Your Friend,
Bee

Bee B. Queen Challenge

Create bee themed valentines for your friends.

## Famous Beekeepers Match Up

These famous people are beekeepers or support honey bees by placing hives on their farms or in their yards. Can you match the description with the person?

___ A. The real life nun and governess from the Sound of Music kept bees on her Vermont farm.

___ B. This actor converted his 124-acre Mississippi ranch into a bee sanctuary in 2014.

___ C. This book character retired from detective work to putter around with bees.

___ D. The former soccer star living in England got into beekeeping and plans on producing and selling honey.

___E. This super star said, "I found healing propeties in honey that benefit me and my children. I've even got hives on my roof!"

___ F. While serving as First Lady, she kept a beehive in her organic White House vegetable garden.

___ G. The head of the Catholic church keeps bees at the farm of Castel Gandolfo.

___ H. This musician has raised bees on his organic farm in New Jersey for years.

___ I. This musician has beehives along with green houses for vegetables, his orchard, and his collection of goats and chickens.

___ J. This actor built his own hives for his garden in Los Angeles.

___ K. The actress was given bees for a wedding gift.

1. Beyoncé

2. Bruce Springsteen

3. David Beckham

4. Ed Sheeran

5. Leonardo DiCaprio

6. Michelle Obama

7. Morgan Freeman

8. Pope Francis

9. Scarlett Johansson

10. Maria von Trapp

11. Sherlock Holmes

# ooo Bee kid's corner

Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
February 2020

## A Special Valentine for You

Dobby, the furry house elf, wanted to send a special valentine to you. Can you think of a way to make your own valentines using a photograph?


Here are some other possible valentine captions:

Doggonit.
Bee My Valentine.

Furry, Furry.
Read all about it!
I want to be your valentine!

No bones about it.
Bee My Valentine.

## Beecome a Bee Buddy

Send two self-addressed stamped envelopes and the following information to: Bee Buddies, PO Box 117, Smithville, TX 78957.

**Name**
**Address**
**Age**
**Birthday Month**
**E-mail (optional)**

We will send you a membership card, a prize, and a birthday surprise!

Send all questions, photos, and artwork to: beebuddiesclub@gmail.com or mail to the above address.

## Beekeeping Presidents

On Monday, February 21th, we celebrate Presidents' Day.
Solve the puzzle to discover two presidents who were beekeepers.

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 27 | 12 | 23 | 3 | 20 | | 6 | 4 | 7 | 17 | 11 | 5 | 25 | 10 | 12 | 15 | | | |
| 10 | 17 | 12 | M<br>1 | 4 | 7 | | 8 | 27 | 9 | 9 | 20 | 23 | 7 | 12 | 30 | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 23 - 22 = 1 = M | 19 - 12 = S | 12 + 18 = N | 30 - 24 = W | 28 - 11 = H | 15 + 5 = E | 24 - 13 = I | 4 + 5 = F | 27 - 12 = N |
| 26 - 23 = G | 70 - 60 = T | 13 + 14 = E | 11 - 6 = N | 17 + 8 = G | 2 + 2 = A | 25 - 17 = J | 16 + 7 = R | 24 - 12 = O |

Photo Credits: 1 Alex Johnson, 2 kyonokyonokyono, 3 Luke Rauscher , 4 Eva Rinaldi Celebrity Photographer, 5 Presidencia de la República Mexicana, 6 Gage Skidmore, 7 John Mathew Smith & www.celebrity-photos.com, 8 ThiênLong, 9 Gage Skidmore

A10, B7, C11, D3, E1, F6, G8, H2, I4, J5, K9

# Protectabee™: An All-In-One Adjustable Hive Entrance

Erica **Shelley**[1,2] **&** Tasmin **Brown**[1] **&** Aparna **Karthikeyan**[1] **&** Nicole **Gauvreau**[2] **&** Peter **Kevan**[1]

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[2]Best for Bees Ltd., Kitchener, Ontario, Canada

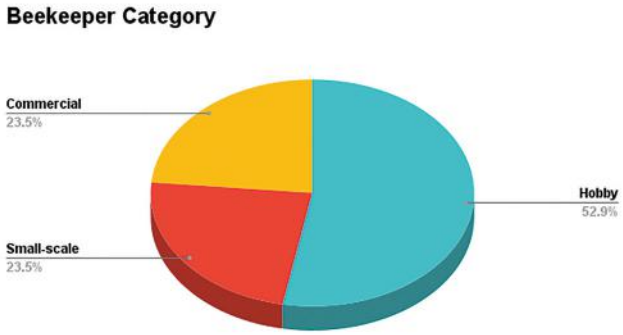
What do Play-Doh, chocolate chip cookies, microwaves and penicillin all have in common? They were all accidentally invented while trying to develop something else.

The Protectabee, the patent-pending adjustable hive entrance, can be added to that inspirational list (although we will admit it is not chocolate chip cookie good!). We never intended to make a multi-functional bee product. In fact, it wasn't until we were close to the end of our two-year project and testing with beekeepers that we understood the wide range of applications for the Protectabee.

In this month's *Bee Culture* article, "Bee Vectoring with the Protectabee," we outline the invention and functional testing of a device for delivering powders into a beehive with the ultimate long-term goal of improving bee health.

Integrating a new product into beekeeping requires more than functionality; it must also be easy to use. We posted on the Southern Ontario Beekeeper Facebook group to recruit a few beekeepers to test the Protectabee. To our surprise, within twenty-four hours, we had over 200 volunteers! Seventeen hobby, small-scale and commercial beekeepers field-tested the Protectabee in their apiaries, answered follow-up questions online and in an interview (Figure 1).

*Figure 1*




Overall, the beekeepers said they would likely purchase the Protectabee and found it very easy to use (Figure 2). As the Protectabee was built with the intention of bee vectoring, and powders are not currently sold, we were shocked when several beekeepers asked to keep the device after testing. The beekeepers found that the Protectabee decreased robbing by wasps and deterred skunks, among other advantages (Figure 3).

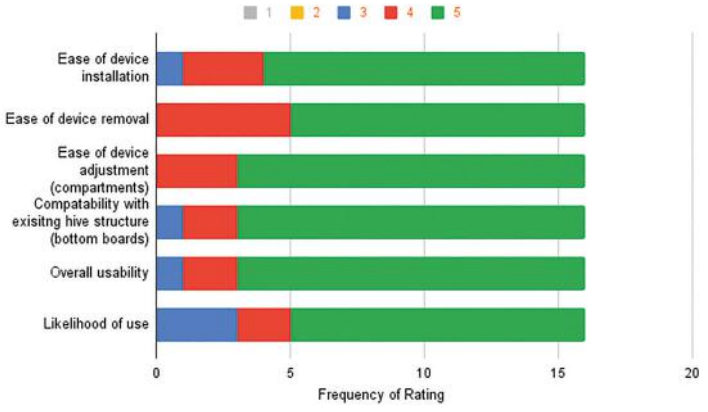



*Figure 2*
*Questionnaire responses.*
*1 lowest rating – 5 highest rating.*

The Protectabee removable insert design allows the beekeeper to slide the cone inserts in on either side (Figure 4). Feedback from several beekeepers was that additional inserts could be designed to act as robbing screens, entrance reducers, closing up the hive and trapping small hive beetles. In fact, we received so many recommendations for the Protectabee that we realized we had an all-in-one device that could go to market immediately before bee vectoring powders were available.

Currently, we have designed four different inserts to be delivered with our first Protectabees to be sold in February 2022 on Indiegogo: Cones, solid, and two sizes of entrance reducers. Both inserts and the drawers can be removed to allow maximum bee traffic while leaving the casing on the hive (Figure 5).

**CONE INSERTS:**

A. The cone inserts (Figure 6) can be used for **robbing prevention**, and in fact, similar cones are used to trap wasps into soda pop bottles. With the cone inserts,


*Figure 3 (above)*

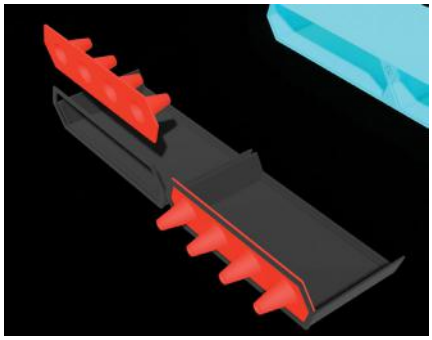


*Figure 4 (above)*
*Inserts can be easily slid in and out of the drawer*

*Figure 5 (below)*

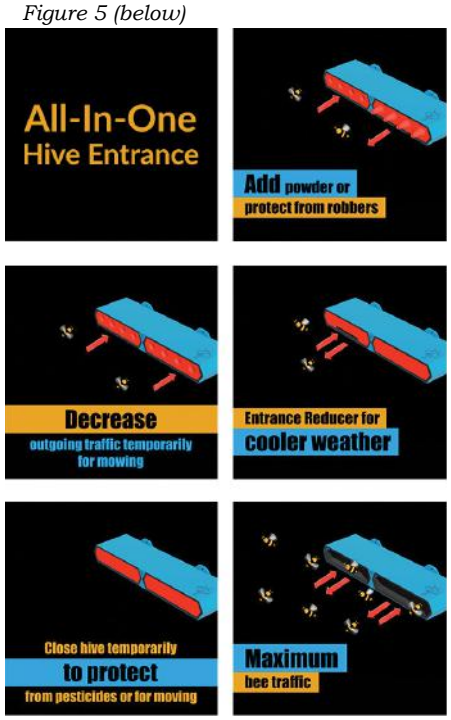



*Figure 6*
*A bee exiting a cone*

the bees can easily defend their entrances. Powders can also be used with the cone configurations, and as powders are approved for bee vectoring, they will be made available to beekeepers.

B. Another option with the cones is to turn both cone inserts "in" to **reduce outgoing traffic**. This "double in" configuration would only be used for a short time, but it can be helpful for mowing or other activities near a hive that can agitate the colony. It's important to note that the bees can go in the small end of the cone, so not all outgoing traffic is blocked (Figure 7).

**ENTRANCE REDUCERS:**

A. The Protectabee currently has two entrance reducers with the exact dimensions as those found on standard wooden entrance reducers. The drawer only needs to be slid out a small way to add in the entrance reducer. The entrance reducer can be combined with a solid insert for a single entrance, or two entrance reducers can be used on either side for two smaller openings.

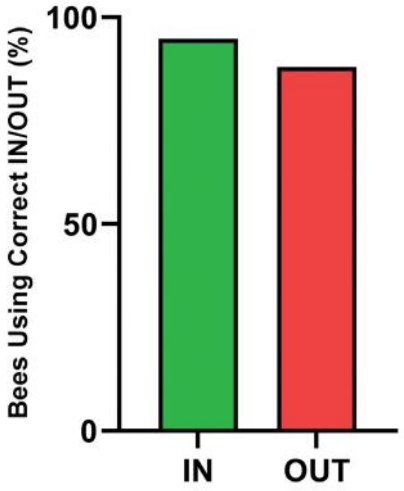



*Figure 7*
*Average bee traffic in and out of cones was measured over three minutes. Correct usage would be entering the wide end of the cone or exiting the small end of the cone viewed from outside the hive.*

**SOLID INSERTS:**

A. The solid inserts can be combined with the entrance reducer. Pollen patties or supplements can also be added to the drawer without disturbing the colony.

B. Two solid inserts can be used to close up the colony. This can be useful for moving or if pesticides are being sprayed nearby.

The Protectabee is currently compatible with 10-frame Langstroth and seven frame Flow hives.

To follow our journey or be notified when the Protectabee is available for purchase, please visit our website at **bestforbees.com**.

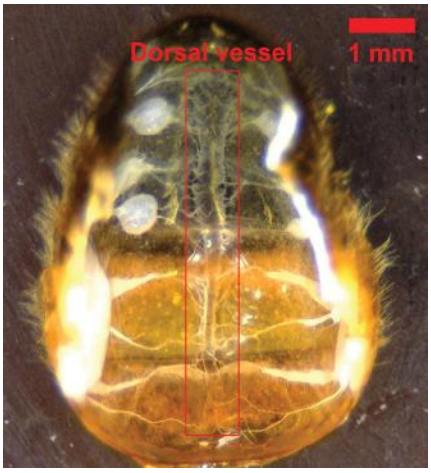
# Minding Your Bees And Cues

## Bee Mine

Becky **Masterman &** Bridget **Mendel**

Did bees invent Valentine's Day? No, they did not. The holiday was in fact established by Pope Gelasius in AD 495 in honor of a Christian saint by the name of Valentine. But that doesn't mean you can't utilize the holiday to promote pollinator-friendly actions at every turn, unprompted! Below are eight activities that will let your sweetheart know, "I love you, but I love pollinators more."

1. Pivot the conversation from romantic sentiments to cold hard facts. The fact is, Saint Valentine was the patron saint of beekeepers.
2. Use the holiday to promote pollinator diversity! Stick a note in that box of chocolates, letting your new lover know that not all pollinators are bees. In fact, a small, humble fly called a midge is responsible for pollinating chocolate.
3. When presenting a single red rose to your crush, make sure to clarify that bees need flowers way more than they do. Keep their attention by explaining that not all roses are equally attractive to bees, and that bees prefer open, wild roses over highly cultivated ones that do not provide nectar and pollen. Furthermore, stem-nesting bees like to make homes in rose stems. In fact, you may want to take back that rose as you could just as well use it to create a solitary bee house.
4. Surprise your spouse when instead of your usual Hallmark card that says "Bee Mine" on the front, you enclose a very long, hand-written explanation about how and why honey bee hearts function. Explain that bees have an open circulatory system that moves hemolymph (insect blood) via a dorsal tube. Their heart, or dorsal aorta, is in their abdomen and moves hemolymph from their abdominal cavity, through the thorax to their heads while serving their immune system, transporting hormones and nutrients while facilitating thermoregulation. Honey bees are able to forage at relatively high and low temperatures due to the temperature regulation provided by their circulatory system.
5. When your special someone surprises you with a candle-lit dinner, use the opportunity to talk about pesticide contamination in beeswax. While it may ruin the mood, your partner needs to know that there are probably dozens of different chemical contaminants in those candles. The wax cappings from honey supers contain fewer pesticides than wax from the brood nest. Also, researchers are working on a process to remove most of the pesticides from beeswax (Calatayud-Vernich *et al.* 2019).
6. Comment on the fleeting nature of love by making your Valentine's Day cards on flower seed paper. Your love may fade away, but your valentine card can be buried in the earth and sprout seeds as early as May or June, providing food for bees.




*A dissection of a honey bee showing the position of the dorsal vessel (heart) in the abdomen. While hemolymph flows freely in the body cavity, it is circulated from the abdomen to the head via the dorsal vessel (O'Neal and Anderson, 2016).*
***Photo credit: Scott O'Neal***

*Honey bees have an unusual connection to the heart filled Valentine's Day as St. Valentine was the patron saint of beekeepers.*
***Photo credit: Rebecca Masterman***

To stay on message, check out the 'bee a little punny Valentine's Day card' blog post referenced below for a tutorial on making the perfect card for the occasion.

7. While dropping off a box of bees on somebody's doorstep is not always interpreted as merely whimsical, in some cases, surprise bees are appreciated. Show your love to a total stranger by giving them the gift of honey bees! With apicultural programs in Honduras, Nicaragua, Peru and Guatemala, Heifer International promotes and supports sustainable community development. Supporting beekeeping via this non-profit will help small scale farmers add additional revenue streams through sales of honey and wax.
8. If you don't have a Valentine this year, you may consider baking. It's self love in the best way. And don't forget, even if it's all about you, it's also about the bees. Promote local beekeepers by adding honey to everything you bake, or don't bake (Sioux Honey has five no-bake honey goodie recipes that will save precious time that you probably need to spend on your bees).

**References and Resources**


**More about St. Valentine**
**https://www.history.com/news/6-surprising-facts-about-st-valentine**

**Learn about bee hearts and their circulatory systems**
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**Where to buy bees for others**
**https://www.heifer.org/blog/st-valentine-patron-saint-of-beekeepers.html**

**Make Punny Beekeeper Valentines**
**https://breakingaverageblog.com/2021/02/07/bee-a-little-punny-valentines-day-card/**

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Calatayud-Vernich, P., VanEngelsdorp, D., & Picó, Y. (2019*). Beeswax cleaning by solvent extraction of pesticides. MethodsX, 6*, 980–985. **https://doi.org/10.1016/j.mex.2019.04.022**

**Valentine treats made with honey**
**https://siouxhoney.com/5-valentines-day-treats-made-with-honey/**



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**Authors**
Becky Masterman led the UMN Bee Squad from 2013-2019. Bridget Mendel joined the Bee Squad in 2013 and has led the program since 2020. Photos of Becky (left) and Bridget (right) looking for their respective hives. If you would like to contact the authors with your Valentine's Day success stories or other thoughts, please send an email to **mindingyourbeesandcues@gmail.com**

# BEE VET

## When Considering the Data

Dr. Tracy **Farone**

If I asked you, "What is normal human body temperature?", what would be your answer? Most people (and maybe even some health professionals) would say 98.6 degrees Fahrenheit (or 37 degrees Celsius). You may have solidly believed this your whole life. However, this data point is based on one, single, now highly disputed study performed by a German physician, Dr. Wunderlich, in the mid-1800s, taking axillary (armpit) temps with a questionable thermometer (1,2,3). In psychology, they refer to this as the "illusory truth effect" or if something "is repeated enough times, the information may be perceived to be true even if sources are not credible."(4).

As a veterinarian for over 20 years now, I always wondered about this single, 98.6, human number because, as vets, we were not taught single values for normal animal body temperatures but ***ranges of normal***. For example, normal horse temps are from about 99-101.5F with anything over 102 raising our eyebrows. Cattle average about 101.5 with anything over 103 considered to be a fever. Cats and dogs fall into a 99.5-102.5 range, but with freaked out cats coming into a clinic, I'm not surprised by a 103 or even higher given the situation. As thermoregulators, even our honey bees are capable of a wide range of "body" temperatures within their hives. Brood and winter core clusters temps range from 90-95°F, with outer parts of the winter cluster being much cooler, with ranges from 81°F to the mid-40s (5).

Body temperature *ranges* make sense because body temperature is a ***variable*** that can vary and change within a *normal homeostatic range* depending on host and environmental characteristics. Body temperature in individual animals and humans can be affected by many things, including age, height, weight, activity, gender, stage in reproductive cycles, pregnancy, and the time of day.

The accuracy of measuring this variable also depends on the use of *proper instrumentation and methodology in our data collection.* With body temperature, internal testing methods, rectal and oral thermometers, are the most accurate for measuring body temperature (we tend to use rectal thermometers in young children and animals and oral in older children and adults). External, non-contact thermometers, which are now popular due to convenience and perceived safety, are less accurate. We also need to be sure our method is correct. Remember mom saying, "be sure to put it under your tongue"? She was right. Improper placement, inadequate testing time, and being outside, exercising, eating or drinking before using an oral thermometer will affect its accuracy (6).

The current scientific consensus involving many more recent studies on human body temperature, (which managed some main stream press coverage in pre-pandemic 2019), now considers humans to have a normal range of body temperature somewhere between 96-99.5°F, with an average of about 97.7°F. Most doctors agree that 100.4° or above is definitely a fever (personally, I'm wiped out by anything over 99°F). Does this surprise you?

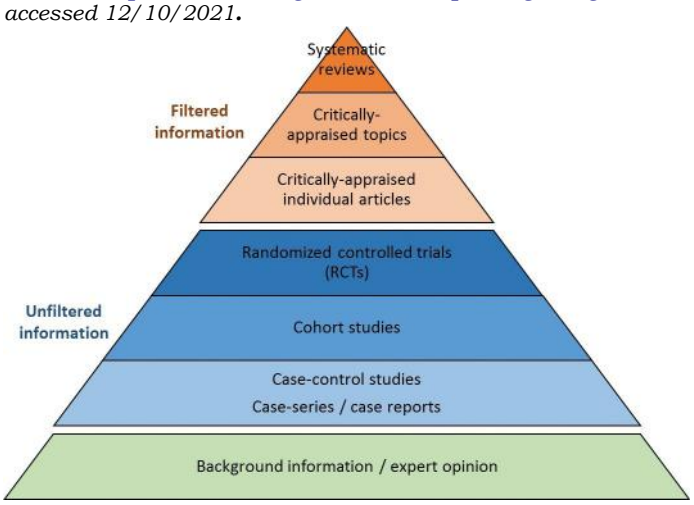
I present to you this "temperature check" to illustrate that in any science, it is very important to not just know the "facts" or data presented, but to be able to fully ascertain the what, how, when, where and why in the generation of the information. Once information is elevated to "facts", this information becomes what we based our beliefs and actions on. It is also important to accept that for many things there may not be a single, yes or no answer but a range of "correct" answers affected by many variables. Much of what I presented above is analogous to how we should evaluate data used in beekeeping decision making.

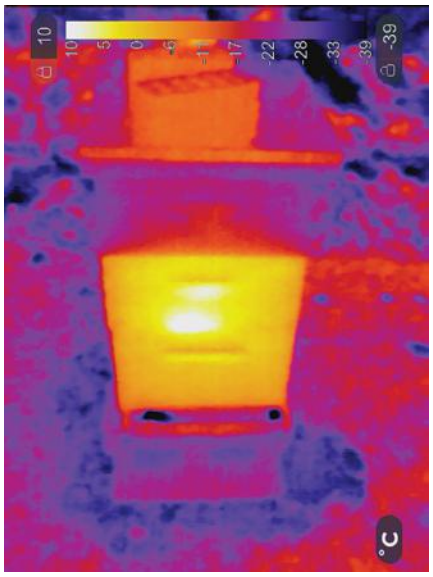
Recently, I was asked to speak at a local beekeeping club on small hive beetles. I enjoy the opportunity to speak with beekeepers because I try to not be the only talking head in the room and give the group the opportunity to share their thoughts as well. It gives me great food for thought when listening to other people's perspectives and you never know what others are thinking unless you ask. At this particular meeting, I was asked, "Are (all) treatments for *Varroa* mites effective in treating for hive beetles?... Yes or no?!!"

The short answer to this question is, "No."

The label is the law. Miticides for use on honey bees are not formulated, intended, or labeled to kill an insect like small hive beetles. But I believe this bee may have been wanting me to say, "yes", because we know

*The data pyramid demonstrates the hierarchy of information.*
***Source:*** ***https://latrobe.libguides.com/ebp/study-design*** *accessed 12/10/2021.*






*Thermal camera image showing temperature differences in and around a bee hive.*

that many chemicals (insecticides, pesticides, fungicides, herbicides, miticides) can potentially have negative, even if sub-clinical, effects on insects, like our bees, so why not small hive beetles? Maybe we could *assume, believe,* that there is some effect on hive beetles, too…? I suppose if you'd put a hive beetle or just about any other living creature into a vat of amitraz, oxalic acid, or thymol for a time, it would not be promotional to their good health, but this of course, would not be anything we would do in practicality or be backed by any scientific study that I am aware.

However, after the meeting, I got to thinking. While the technical answer to the posed question is, "No", the IPM answer to the question is – Yes! If beekeepers are properly using an effective *Varroa* treatment program and controlling mites in their hives, they are doing one of the most important things beekeepers can do to keep their hives strong with effective immunity. And keeping strong, healthy hives is one of the best preventions in fighting small hive beetle infestations. So, yes….the range of "correct" answers depends on your perspective.

Everyone likes to be correct…to know what they are talking about. But science and beekeeping has continued to teach me to be diligent in considering questions and answers, the credibility of data resources, and to understand that there are *many variables* going on at the same time, particularly in the field with wild animals such as honey bees. Additionally, if one investigates just about *any* topic beyond a typical "Google" search, you'll shortly find that even for "experts" in a particular field, we're honestly just a few questions away from, I don't know….much is unknown… the data is changing… or more research is needed before we can jump to any one-size-fits-all conclusion. BC

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*OA vaporization treatment for* Varroa *mites.*

*Is this really normal?*

Source of data pyramid: **https://latrobe.libguides.com/ebp/study-design** Accessed 12/10/2021.

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# Electromagnetic Radiation

## And Honey Bee Health - Part 1

The potential for harmful impacts from electromagnetic radiation to bees first came into the general public's consciousness shortly after the emergence of Colony Collapse Disorder (CCD). It was the result of reports of a study in which cordless telephone base stations that emitted 1900-MHz electromagnetic field (EMF) radiation were set in hives and found to decrease comb building and increase the duration of foraging trips. (Kimmel et. al. 2007) The study was poorly designed, had a small sample size, and there was the small issue that beekeepers do not typically place mobile phone base stations used by cordless landline phones in their hives. As a result the idea of electromagnetic radiation harming bees was quickly discredited and became the subject of jokes and ridicule. I certainly wrote it off as inconsequential. This was an unfortunate situation because I have since found that when you look at the studies on the subject with an independent mind, there just happens to be enough peer reviewed research to suggest that there may in fact be cause for concern. The collective evidence drawn from scientific studies of the adverse health and biological impacts of artificial electrical field exposure from sources such as cell phone towers, cell phones, smart meters, power lines and WiFi routers may be jeopardizing the health of our bees and more.

**What is EMF and EMR?**

An electromagnetic field (EMF) is produced when electric and magnetic charges radiate energy (aka radiation). Electromagnetic radiation (EMR) is a kind of energy that includes radio waves and visible light. Even solar wind generated from the sun creates an electromagnetic field as it hits the earth which means that all life on earth is in the presence of electromagnetic fields. EMF radiation in wireless communication only works because the transmission is more powerful than the natural background radiation. These man-made sources of electromagnetic radiation greatly increase normal background exposure. Common sense suggests that biologically based scientifically sound public exposure standards be developed to protect the health and well-being of people, bees and other wildlife. Unfortunately, such standards do not exist for pollinators and wildlife, and studies suggest that even the human standards that exist are outdated and inadequate.

Electromagnetic radiation is measured in hertz (Hz) which represents the cycles per second of the wavelength. One hertz represents a single time that a analog sound wave or digital pulse repeats each second (e.g. one cycle per second). Kilohertz (kHz) measures thousands of cycles per second, Megahertz (MHz) refers to millions and Gigahertz billions of cycles per second. It is well established that EMR has the ability to seriously impact living organisms and that EMR of 900 MHz is highly bioactive causing significant changes in the physiological function of living organisms. (Aday 1975)

Radiofrequency electromagnetic fields (RF-EMF) are emitted from the wireless communication devices we use daily: radios and televisions, satellite communication systems, WiFi systems and wireless mobile phones and cell phones. RF-EMFs emit non-ionizing radiation. This differs from ionizing radiation of nuclear power plants in that while non-ionizing radiation has enough energy to excite the electrons in molecules and atoms (moving the electrons to a higher energy state) they do not knock electrons out of their orbits around atoms like ionizing radiation does.

The agency responsible for regulating the wireless communications industry is the Federal Communications Commission (FCC). Unfortunately, FCC radiofrequency (RF) safety guidelines have not been updated since their implementation in 1996. This is significant since these fields are about to get significantly stronger with the current roll-out of the fifth generation technology standard (aka 5G) for broadband cellular networks. Today no-one, including the Federal Communications Commission (FCC) knows whether 5G is safe or not. Even wireless carriers have to admit that they are not aware of any independent studies on 5G safety. When asked during Senate hearings what research has been done on the safety of 5G technology, the answer was "none". (Blumenthal 2019)

Meanwhile, the public is consistently told that there is no need for anything to worry about concerning the rollout of this new technology that the FCC is pushing and if current plans come to fruition has the potential to result in over 800,000 new antenna installations throughout the U.S. providing fast 5G internet service to many Americans by the end of the decade.

**Effects on insects**

There is a growing body of evidence of harm from wireless non-ionizing radiation such as from cell phones, cell towers, WiFi, and smart meters can harm insects. A 2013 review of 113 studies that found that 70 percent of papers analyzed reported a significant impact of RF-EMF on birds and insects. This suggests an urgent need for more research and repetitions of studies given the fast pace of cellular telephone technological progress. (Cucurachi et. al. 2013)

Lab studies on insects show negative effects of EMR on reproductive success, development, and naviga-

tion abilities. However, the impact of widespread mobile telecommunication antennas on wild pollinator communities in field-realistic conditions is still largely unknown. In one trial, beetle, wasp and hoverfly abundance **decreased** with EMR, while the abundance of underground-nesting bees and bee flies **increased** with EMR. This cries out for additional research to understand the ecological impacts of EMR on wild pollinators and the subsequent effects on plant diversity, crop production, as well as human welfare. (Lázaro et. al. 2016)

In 2012 Sivani and Sudarsanam published a paper that states: "Based on current available literature, it is justified to conclude that RF-EMF radiation exposure can change neurotransmitter functions, blood-brain barrier, morphology, electrophysiology, cellular metabolism, calcium efflux, and gene and protein expression in certain types of cells even at lower intensities. The biological consequences of such changes remain unclear." The authors further noted that short-term studies on frogs, honey bees, birds, bats and even humans are scarce and long-term studies are non-existent.

A review of the literature published just this past year came to the conclusion that there is sufficient evidence to support claims of damage caused by electromagnetic radiation. The study's author goes on to state that "…electromagnetic radiation should be considered seriously as a complementary driver for the dramatic decline in insects, acting in synergy with agricultural intensification, pesticides, invasive species and climate change. The extent that anthropogenic electromagnetic radiation represents a significant threat to insect pollinators is unresolved and plausible." (Balmori 2021)

*Honey bees and wild pollinators like this sweat bee pictured, are among the many insects that can be negatively affected by man-made sources of electromagnetic radiation.*

Up until recently, the range of frequencies used for wireless communication has not risen above 6 GHz (2G, 3G, 4G, and WiFi). The impending deployment of the new and highly anticipated 5G technology utilizes a signal of 120 GHz. Research on insects showed that as the power density of frequencies above 6 GHz increased, the power absorbed by the invertebrates studied increased from three to 370 percent (Thielens et. al. 2018) making the importance of being able to understand the potential threat to pollinators from electromagnetic radiation all the more urgent.

*Cell phones and the towers use to transmit their signals are just one of many sources of man-made electromagnetic radiation.*

**Worker Bee Exposure**

While lots of research documents the impacts of EMF on insects generally, some studies have looked at the impacts of electromagnetic radiation on honey bees and the majority of the papers have found potential cause for concern when honey bees are exposed to EMFs. Such exposure has been shown to cause significant cognitive impairment and behavioral changes. These include reduced locomotion activity, impaired homing and orientation abilities, fewer foraging flights and short-term memory loss. (Harst et. al. 2006; Warnke 2007; Kimmel et. al. 2007; Sharma and Kurmar 2010; Shepherd et. al. 2018; Lopatina et. al. 2019; Shepherd et. al. 2019) Many of these studies, and others, document increased aggression when bees are exposed to EMR. (Mixson et. al. 2009; Halabi et. al. 2014).

Meanwhile, in 2017 researchers found that DNA damage in honey bee larvae increased significantly when exposed to modulating EMR fields. Exposure levels during the trial were much higher than what honey bees in nature could reasonably be expected to encounter but the results suggest the need for further intensive research on all stages of honey bee development. (Vilić et. al. 2017)

**Cell Phone Towers**

Cell phone towers have been a focus of additional research, but unfortunately the few studies that have looked at the effect from cell phone towers suffer from small sample sizes.

Some studies have concluded that the effect of cell tower electromagnetic radiation on colonies placed directly under cell-phone towers is insignificant. (Mall and Kumar 2014, Patel and Mall 2019) However, these researchers placed colonies under the transmission antennae at the base of the tower where the radiation broadcast angle approaches zero degrees resulting in little-to-no radiation exposure.

One of the more realistic studies that looked at the impact of electromagnetic radiation (EMR) on hives exposed to cell phone tower emissions was done on the Eastern honey bee *Apis cerana*. (Taye 2017) Foraging behavior was observed in colonies placed at distances of 100 meters, 200m, 300m, 500m, and 1000m from a cell phone tower. Researchers documented significantly reduced colony foraging activity in the hives closest to the radiation source. Clearly more research is needed on impacts of cell towers before firm conclusions can

be drawn on exactly how and under what circumstances cell phone towers may be harmful to bees and other pollinators.

Next month in part two of this article, we will look at the effects of RF-EMR on queens and share some ideas on what we as beekeepers might do to help reduce exposure to our bees and ourselves.

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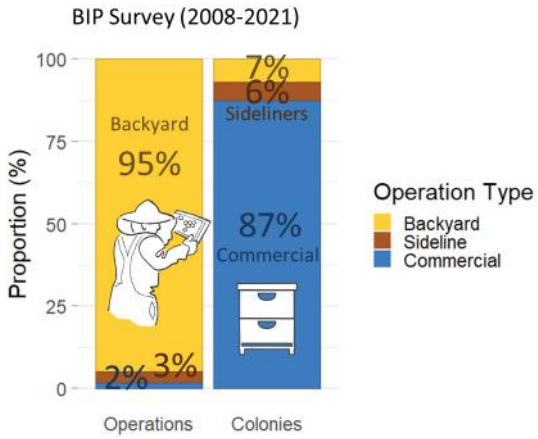
# BIP Bits:
# Beekeeper Stories

Anne Marie **Fauvel &** Nathalie **Steihauer**
Bee Informed Partnership

Bee stories abound and are as colorful as some of the keepers that tell them. Differences in operation sizes, circumstances, philosophies and opinions are what makes this group so interesting. So, who are the beekeepers and what role do they play in honey bee colony health? At the Bee Informed Partnership, we use data to tell bee stories.

*Figure 1*
*Proportion of beekeepers of each type of operation (left) compared to the cumulative number of colonies managed by each size of operation (right).*




In the BIP National Colony Loss & Management survey, we group beekeepers by operation type, based on the number of colonies they manage. We define backyard beekeepers as those keeping 50 or fewer colonies, those keeping between 51 and 500 colonies are classified as sideliner beekeepers and those managing 501 or more colonies are considered commercial beekeepers.

According to the last 14 years of the BIP survey data, backyard beekeepers represent the vast majority of beekeepers (95%) but account for only 7% of colonies managed (Figure 1). Conversely, commercial beekeepers represent only 2% of the operations, but manage most of the colonies represented in the survey (87%). We have good evidence to show that this ratio is a fair representation of the US beekeepers thanks to the NASS Census of Agriculture, despite the fact that only operations that qualify as "farms" are counted in the Census. According to NASS Census, operation types rank at 93%, 4% and 3%, and colonies number at 6%, 9% and 85% for backyard, sideliner and commercial beekeepers respectively (special tabulation provided upon request by NASS).

Back to the BIP survey results, in the U.S., backyard beekeepers have a median of three colonies, sideliners have a median of 100 colonies and commercial beekeepers have a median of 2,000 colonies, with some of the larger operations tallying 50,000 colonies or more. Interestingly, the level of beekeeping experience for each group varies significantly. Figure 2 shows an average of five years of beekeeping experience among backyard beekeepers compared to 18 years for sideliners and a whopping 37 years of experience for commercial beekeepers.

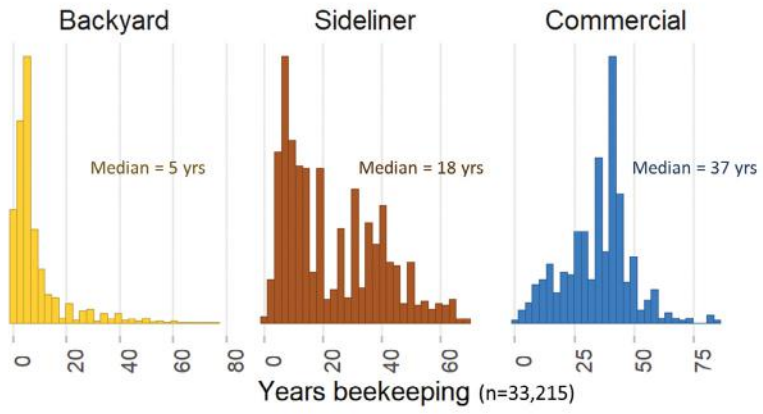
Separating the responses by operation size also provides an interesting look at seasonal and annual losses.

Figure 3 shows that over the full 12-month season (red), backyard beekeepers experience greater annual losses than commercial beekeepers. A potential explanation for the lower annual losses by commercial beekeepers can be seen by looking at the *Varroa* management practices across operation sizes shown in Figure 4.

Nearly all (>95%) commercial beekeepers treat for *Varroa* and over 75% both monitor and treat for *Varroa*. These practices are less prevalent among backyard beekeepers with about 60% reporting that they treat for *Varroa* and less than 50% performed both recommended practices (monitoring & treating).

In addition to higher annual losses, backyard beekeepers tend to have a higher proportion of losses occurring in the Winter (October through March) than in the Summer (April through September), which contrasts with commercial beekeepers who tend to lose their colonies more equally between the two seasons. This might result from commercial beekeepers being more likely to abide by the old adage "take your losses in

*Figure 2*
*Years of beekeeping experience for backyard beekeepers (yellow bars on the left), sideliner beekeepers (red bars in the center) and commercial beekeepers (blue bars on the right).*



the fall" and combine weak colonies before the Winter. For commercial beekeepers, it is often not worth the time, energy, or resources necessary to attempt saving weak or small colonies when they can combine colonies to have a better chance of being viable pollination units in the spring.

So, keeping in mind the different types of beekeepers, their level of experience and how this all translates into *Varroa* monitoring and treating practices and colony losses, what type of beekeeper are you?

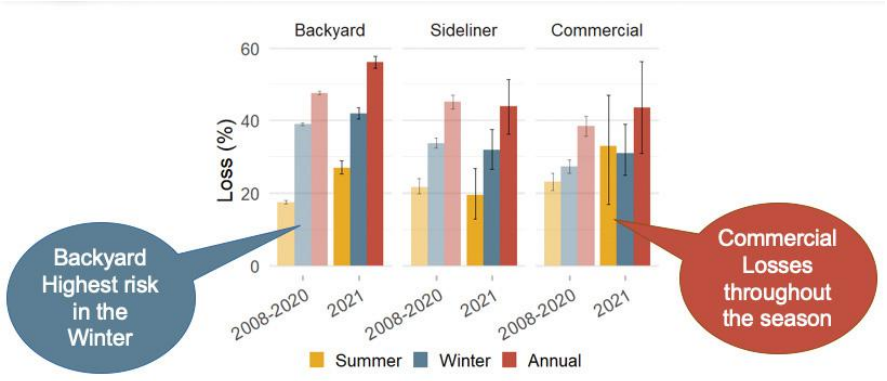



*Figure 3*
*Average historical colony loss percentages for summer (yellow), winter (blue) and annual (red) for 2008-2020 (light colored bars) compared to 2020-2021 beekeeping season (brightly colored bars) for backyard beekeeper (zero to 50 colonies), sideliner (51-500 colonies), commercial (501+ colonies).*

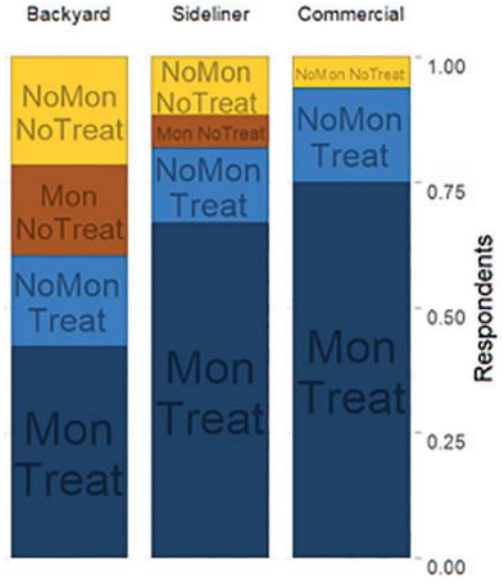



*Figure 4*
*Proportion of respondents for each type of operations, backyard (left), sideliner (center) and commercial (right) beekeepers who do not monitor & do not treat (yellow), do monitor & do not treat (red), do not monitor & do treat (light blue) and do monitor & do treat (dark blue).*

- *NoMon, NoTreat*
- *Mon, NoTreat*
- *NoMon, Treat*
- *Mon, Treat*

# Drawn Comb

## *Our Most Valuable Resource*

Dewey **Caron**

Empty bee boxes, all too common with *varroa* mite enhancement of virus epidemics in our bees, need bees. In those boxes our bees need drawn comb. Drawn comb is the most valuable resource for the bees and also for the beekeeper.

A good time to produce additional drawn comb is when establishing new colonies. Depending upon which hive we use and our beekeeping philosophy, we might use pure beeswax foundation, plastic frames with the comb template, empty frames or top bars with a leading edge to obtain more drawn comb. The bees may cooperate and draw the foundation orienting their comb within the frame or they may adopt their own (different) cross- comb orientation.

The best condition for comb building is an intense nectar flow. Good weather for forager flight and crowded hive conditions likewise helps. We can stimulate the bees to build comb by feeding bees or by hiving a swarm. Newly started colonies need comb fast and can be good comb builders as they are intent on raising brood. Once colonies grow a larger population, they need to continue to draw comb to store incoming nectar.

Started colonies need drawn comb fast. But if you add a second box too soon, outer combs of foundation not yet drawn may be ignored as the bees naturally prefer to move upwards. Positioning of foundation frames is critical to obtain the best comb. You can re-position frames – switch frames from outside toward the middle - but like everything else in beekeeping, timing is critical.

**Starting a package**

New beekeepers starting bees from a purchased package most likely means starting new frames lacking drawn comb. In advance of package arrival, you need assemble boxes then frames to position in the boxes. Next you secure the foundation in the middle of the frame. This is the most natural means. Assembly will take some time and positioning the sheets of foundation properly takes practice. Some beekeepers like to add only a starer strip (approximately one inch), rather than use entire sheets of foundation to save costs.

Use of plastic frames that have the six sided cell template will be an easier lift. Plastic frames with holes simulating cells are also available. Prices are comparable. Preassembled plastic foundation frames may require assembly of a wooden frame and then position of the plastic frame template. Others made entirely of plastic mean no assembly required.

*Natural comb with mostly drone cells*

Alternately you can purchase knocked down frames and assemble them and allow the bees to draw comb cells in the frame (foundationless). Warré hives have such frames. Top bar hives like the Kenya Top Bar hive feature just a leading edge to the lower surface of a bar at top that encourages bees to build their comb from the lower edge.

However you start, it is critical that bees draw their comb, whether from six-sided cell template foundation or top bar or foundationless frame, within the frame outline. You might have to cut comb built otherwise. This will waste their time and effort and be frustrating for the inexperienced starting beekeeper.

**Making more drawn comb**

Bee colonies started as nucs or splits/divides will include some drawn combs from an existing colony. Nucs, smaller versions of starter colonies, mean you will purchase someone else's drawn comb (usually three to five frames). Splits/divides are the same except the drawn comb comes from your donor colony. When the bees expand, you transfer the original nuc/divide frames into a standard eight or 10 frame box. At this transfer you will need to add additional frames of foundation unless you have drawn comb in storage to use.

Positioning the new frames on the outside of the drawn comb at time of transfer might be sufficient to get good drawn frames but the bees might ignore the foundation or only slowly add beeswax to draw the foundation. If weather is good and nights remain above 60 degrees, you can put the new frames right in the middle, positioning the drawn frames on both sides. There is danger of chilling brood with this division.

Alternately you can intersperse the new foundation frames among the drawn combs. One management option is one or two drawn combs, then a single foundation frame, then drawn comb. You sandwich the foundation frames between drawn frames.

*Parallel drawn natural comb*

You can also position two to three foundation frames together. If warm enough the bees will draw combs faster than putting the foundation frames on outside.

Whatever method used you can reposition foundation/foundation-less frames as the bees draw the new comb.

Paul Kelly of the University of Guelph has an instructive video on drawing of comb. View it at: **https://www.youtube.com/watch?v=Q-8j5UExrg2o**

When using foundationless or top bar hives, you will need to monitor progress of the bees drawing comb. They may not follow the desired outline. If you have some drawn comb, you can sandwich the foundation-less frames between them helping ensure the bees stay within the frame outline. Top bar frames are a different challenge as comb can be built at any angle and may wander off within a single top bar. After the bees start two to three combs new top bars can be positioned between the combs being drawn to achieve desired results.

**Culling older drawn comb (and producing newly drawn comb)**

Early Spring is a time to cull some of the oldest frames, especially those of the bottom box once the bees move upward. New foundation frames are best drawn at the middle of the top box (where heat and bees are concentrated). Some of the capped brood can be moved to middle of lower box and the new replacement frames put in the middle of top, either as group or sandwiched between brood frames. At time of movement of frames down, the frames to be culled can be removed. Since bees will be in upper box you do not need to cull them immediately – move them to outside edge of the lower box and mark them so you remember which ones you wish to replace.

If you divide a strong colony, replace the frames removed with foundation or foundationless frames. Put these new frames to be drawn in the middle of the top. If the nectar flow is not strong, feed the colony sugar syrup at the top. You want the bees to give immediate attention to drawing comb. They must need the comb cell space.

The longer it takes to construct new comb, the greater the chances you will not obtain top quality comb. Ideally a foundation frame should be attended to within a matter of days by the bees. With foundationless or when using only a starter strip of foundation, you may get combs that have considerable drone sized cells. Since you are seeking "natural" some drone comb should be expected.

Why will bees delay drawing foundation? Perhaps the foundation is not close enough to the middle warmth of the colony. Or the colony is just not strong enough to need to expand their brood rearing area. Or the weather is too cool and the foragers are not able to get enough nectar or pollen to push colony expansion. Or you are seeking to draw foundation frames at a time other than the spring time when daylength is increasing (meaning bees are not in an expansion model).

If foundation is not being drawn ask a neighboring beekeeper, preferably a more established beekeeper in your club (via club message board, forum or during a meeting) for suggestions. There is no one right way to drawn foundation. If you ask three beekeepers you might get six responses and all of them might be correct.

**Drawing comb for honey storage**

If you are asking the bees to produce comb for nectar storage, the same conditions are applicable. Bees must be strong, there must be incoming nectar, brood or previously stored honey occurs in the majority of cells of brood boxes and weather allows the foragers to get at nectar-secreting plants. We super above (hence the name). Early in the season we recommend oversupering, using more super space and as the nectar flow is winding down to undersuper so bees can consolidate their stores.

Getting good drawn comb for honey might involve use of a queen excluder, or not. Some colonies are reluctant to move through an excluder -- some term them honey excluders. It is good practice to "alert" the bees when you add a super. Let them know you added space. Challenge them by adding more space than they might initially need (oversupering).

If boxes are the same size, moving a frame from a lower box on which the bees are storing honey is one way of advertising your addition. Creating a mess by dribbling scented sugar syrup or honey on some of the frames is another way. Using previously used drawn comb helps too. If you don't have enough, try mixing some foundation frames into boxes with some drawn comb.

After adding the initial supers, the same strategy will apply to adding more supers. Move a frame from existing super up into added super (bait the super), make a mess in the added super to draw the bees into it to clean up or you can bottom super – add the newest super below existing supers in which the bees are using to store honey.

**Troubleshooting**

Make sure you have your frames arranged so that they are tight up against each other when drawing foundation or they are tightly sandwiched between drawn combs. Do not leave any extra bee space - frames are designed with bee space in mind.

*Frame to cull*


*Foundation frames (new wood) interspersed between drawn comb*

With top bar hives or foundationless frames, the bees might not follow the orientation you desire. If the spacing is wrong bees will start building comb as they please. You don't want bees building across two frames rather than within the frame outline. If left uncontrolled, it can lead to more problems and you will basically end up with a cross comb hive. Your hive no longer will have comb that is removable. You will not be able to continue inspecting/removing comb with such a hive.

Sooner or later all of us forget a frame and discover that the bees have built frameless comb in the space. If filled with honey remove it and cut the comb to let the honey drain from the cells. If it contains brood, turn it into a foundation-less frame, keeping it until the brood emerges. Or simply cut it out and get rid of it. Most of us will attempt some salvage considering the time and effort the bees went through to cover which hive we use and our beekeeping philosophy.

**Level hive**

Kanoe Reidel in **https://www.beepods.com/why-level-hives-are-so-important-for-you-and-your-bees/** asserts gravity plays a big role in how bees build comb. She points out that "Bees naturally build comb in line with the pull of gravity. So, when a hive is level, they create that ideal comb structure." Good drawn comb begins in a level hive.

Ms Reidel asserts that when a hive isn't level and leans in one direction or another, "the bees are thrown off. "Instead of building a vertical comb, they might "build their comb in an asymmetrical or undesirable shape." The comb drawn in a hive that is not level might then "encroach on adjacent frames, creating a... significant source of frustration for beekeepers that requires a lot of work to fix." This can mean cross combs built outside the frame outline Note to self: level hives when drawing comb.

**Burr comb**

Burr comb, sometimes termed brace or bridge comb is wax comb which bees have built to fill in spaces greater than bee space. It usually is considered a nuisance for beekeepers because it bonds hive parts together and can interfere with frame inspection**.** Burr comb isn't an uncommon occurrence, so we try to remedy the situation that gave rise to the unwanted comb building.

Burr comb can make a beekeeper's life more complicated. In an ideal world, honey bees would build nice, neat frames of comb, and nothing else. But, given a chance, bees will bridge gaps with wax comb. If a space is too small bees plug the gaps with propolis to keep their hive clean. Anything bigger and you get burr comb.

So what can a beekeeper do to prevent burr comb, and what should you do when it (inevitably) appears? One approach is to remove any superfluous beeswax that is built in unwanted places. The bees have spent time and energy building comb that you don't want and means you spend time removing it and the bees waste more time cleaning up behind you.

Our Langstroth hives and all other contemporary hives are designed with bee space dimensions in mind. Bee space is often taken into account below the bottom bars but also above the top bars. Bees can't jump from one box to another, so they build burr comb as ladders. We remove it and they then replace it. If we use equipment from several manufacturers, the dimensions are slightly different, and bees do what bees do – fill the "extra space."

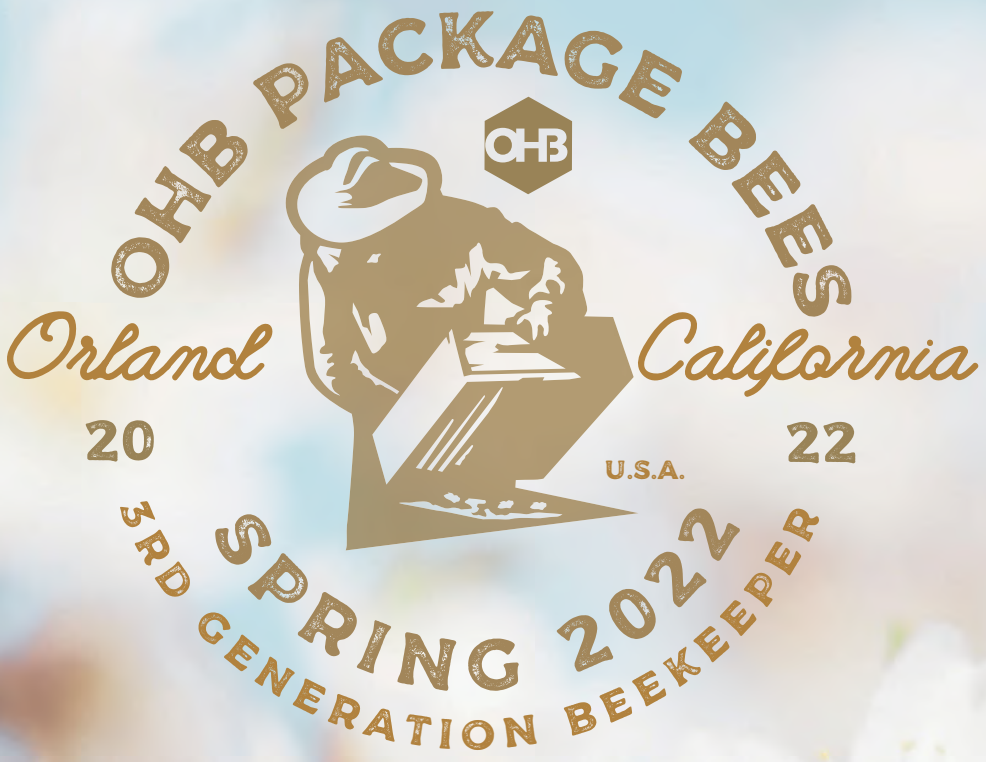
Alternately we add a spacer – say for Apiguard use - and then we forget it. This is extra space and if conditions are right the bees will fill it. Or we put a feeder on in the spring and then an empty chamber to contain the feeder. When we forget it, the bees begin to fill it with comb. Alternatively, if we don't space the frames correctly, the bees will build between two frames, which makes removing the adjacent frames complicated.

It's generally recommended that we remove burr comb. But that creates a disturbance and if there is brood or honey in some of the constructed cells it will create a mess. Bees that don't get out of the way are squished. Unless you have container for the scrapings, such as a plastic pail with a lid, you then have to contend with the bits and pieces. Some beekeepers leave the burr comb on top of the inner cover or inside an empty hive box so that bees can recover any nectar and wax. Don't throw it on the ground or you might attract skunks or step on it and track it into a vehicle or your home. It might even begin robbing in the apiary.

A word of precaution. When you remove burr comb or cut out "extra" beeswax comb make sure the queen isn't on the piece that you take out of the hive.

Building comb. Basic to our bees and a good management practice we can "play with" to help make beekeeping fun and profitable. How do you build drawn comb? For best results work with your bees. BC

*Warre cross comb*

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# I Told You So

Stephen **Bishop**

It only took 97 needles in my back for an allergy doctor to confirm I've made poor life choices. And I'm not sure what was worse—the 97 pricks or the intense itching afterwards.

ALLERGIST: "Where do you work?"

ME: "At my local agriculture office, but I spend about half my time in the field working with farmers."

ALLERGIST: "You picked the wrong profession."

ME: "Well, I like working outdoors."

ALLERGIST: "You may like it, but your immune system doesn't. It looks like you're allergic to the whole grass family. To be honest, I'm surprised you've survived this long."

Normally, I don't profess to have psychic powers, but as the allergist continued to examine the welts on my back, each corresponding to a prick infused with a different contagion, I had a strong premonition, namely that of my wife's delight in uttering the words, "I told you so." Don't you hate when medical professionals confirm what your wife has been saying for years?

For years, she had been telling me to ask a doctor for an Epipen because I keep bees. Of course, my rebuttal was that I wasn't allergic to bee stings, so that was stupid and a waste of money. But here's the thing I've learned the hard way: Life is full of irony.

Yes, it's a little ironic that I chose agriculture as a profession when I've had a lifelong allergy to hay and grass, which the allergist confirmed in the skin-prick test. But I wasn't there because I was worried about sneezing and watery eyes from hay fever. I was there because my favorite food rebelled against me. For decades, my shrimp intake rivaled that of a krill-gulping whale. But that was before an insurgent shrimp infiltrated my stomach through a bowl of shrimp and grits and convinced my white blood cells to try to strangle me from the inside out. That's why I was at the allergist.

The doctor confirmed that I now have a severe shrimp allergy and that if a shrimp ever got anywhere near my gullet, I'd likely go into anaphylactic shock. She said that it wasn't uncommon for adults to suddenly develop a severe allergy, even to something they've been exposed to often. At this point, I mentioned that my wife was worried I might suddenly become allergic to bee stings.

"Absolutely, it could happen with bee stings," the doctor said. Of course, I pretty much knew this because it happened to a beekeeper I knew. After decades of keeping bees, he got stung once while catching a swarm and a few minutes later he was crawling on his hand and knees gasping for breath. His wife just happened to be with him on that occasion and was able to call 911. He was fine after receiving medical care, but soon thereafter, he was selling all his hives on orders of his wife.

The doctor said that, given my allergy history, I shouldn't work with bees without an Epipen nearby.

ME: "You mean, I should listen to my wife?"

ALLERGIST: "Exactly."

So, I guess the moral of this story is to be careful out there. I'm not saying you need to run out and ask your doctor for an Epipen, but at least carry some Benadryl in your truck's glovebox and keep your cell-phone charged and with you if you're working hives alone. Also, don't tell my wife this, but it doesn't hurt to listen to your significant other, especially if he or she delights in the words, "I told you so." BC

# Self-Pollinating Almonds Need Our Bees

Abbas **Edun**

Globally, pollinators are on the decline; several factors have contributed to this dramatic and disturbing trend. They include the use of pesticides, climate change, and habitat fragmentation. The spread of pathogens, parasites and predators has also added to the dilemma. And, the number of managed honey bee colonies is not keeping pace with the agricultural demands for pollination.[1] Because of these trends in availability, the breeding programs of many crops which are dependent on honey bees have concentrated on reducing the need for so many of them.

Almond is the name applied to the fruit as well as the tree of *Prunus amygdalus*.[2] Americans consume more almonds than any other nut. [3]Their per capita use grew 200 per cent from 0.8 pounds in the season August 2000 – July 2001 to 2.5 pounds in 2020/2021. Production in the U.S. has grown steadily as demand, both domestic and foreign, has risen. California is the world's leading producer of the nut; it grows more than three quarters of the world's supply. In 2020, production was over 3.1 billion pounds, valued at $5.6 billion.

Nonpareil, one of the top ten standard varieties, is the cultivar that is most widely planted in the state.[4] It is one of many self-incompatible[5] crops that cause commercial orchards to include a pollenizer.[6] However, there are some types of trees that do not require pollen from others; they are self-fertile.

There has been much interest in recent years in the planting of self-compatible almond varieties. They are seen as a way to decrease pollination and other production expenses. Dr. Craig Ledbetter, in collaboration with the Almond Board of California (ABC), has been working on the development of a new line of such trees.[7] It provides growers with an alternative to traditional bee-pollinated ones.

Although self-pollinating almond trees can produce a crop with only wind pollination, they are not entirely independent of pollinators. The conclusion of a study published recently is that pollination by honey bees significantly increases the fruit set and yield of self-fertile almond varieties.[8] Farmers who are planning to grow any one of such varieties, are therefore advised to continue using honey bees in the pollination of their orchards.

The ability of a new cultivar to produce an abundant harvest without the need of a pollinizer makes it very important to California's almond industry. It is the most important crop in the state; the blooming period of its flowers is the earliest and one of the shortest. It begins early in February and continues until the middle of March.

The total amount of hives permanently located in the state is about half a million,[9] but there are nearly 250,000 orchards.[10] Such a large number requires at least two million hives, two-thirds of the nation's commercial supply. Almond farmers therefore have to rely on the help of migratory beekeepers for pollination services.[11]

The arrival of the itinerant beekeepers–mainly in five counties of the Central Valley (C.V.)–marks the start of a brief spell of turbulent activity.[12] It is the world' s largest annual pollination event,[13] and the main one in the beekeeping industry of the state.

Self-fertile varieties require fewer pollinators in the orchard because the pollen has to move only a short distance from one blossom to another on the same tree rather than from that of adjacent pollenizers.[14] Such cultivars may be grown in blocks of the same variety, allowing for more efficiency at harvest time. They are also part of the almond industry's efforts in dust reduction. The equipment does not have to go through the orchard twice in order to harvest the nuts.

Self-fertile almonds are not new; a variety called Tuono has been around for a very long time.[15] But it has few of the other characteristics that have made California almonds so popular. The main problem is that, unlike Nonpareil, Tuono's outside seed coat has a hairy texture, and it has a very thick shell, making only 32% of the kernel edible, compared to 65% for Nonpareil.

Tuono is reliably self-fertile, so it was imported from Spain and used as the pollen-donating parent when Ledbetter began to breed a new almond in 1996; he crossed it with California-adapted almond cultivars and selections.[16]

One selection was eventually named Yorizane.[17] It was very successful; it has Tuono's genes for self-fertility along with almost all of the traits of Nonpareil. With a high yield in production, excellent vigor and quality, it is the top contender for purchase by farmers who wish to increase the size of their orchards.

Therefore, some growers will have a reduced number of hives in their orchards.

Farmers who are planning to grow any one of such varieties, are therefore advised to continue using honey bees in the pollination of their orchards.

*Editor's note: Because pollination is so incredibly important for almonds, in general, and so many colonies are brought in (approx. two million +) many almond growers of 'self-fertile' almond trees get 'free pollination' that enhances their yield as honey bees forage widely in many areas.*

**References**

[1]Pollination is the transfer of pollen from the male part of a flower, the stamen, to the female part, the pistil.

*Honey Bees in Self Pollinating Almonds*

[2]For a description of the tree, see Edun, A. 2008. *Herbal Remedies*. Bee Culture. 136(12): 33 & 34. It was brought to California from Spain in the 18th century by Franciscan priests.

[3]They are very nutritious, have a lot of health benefits, and are used for a wide variety of food ingredients and consumer goods. See **Herbwisdom.com**, a website that provides articles on many plants.

[4]It was first introduced in the 1880s. There are approximately 7,600 growers and the majority of their farms are family-owned. About 40 per cent of them have Nonpareil; it ripens in September.

[5]Self-incompatibility is the general name for several genetic mechanisms by which certain plants recognize and reject their own pollen, thus forcing out-breeding.

*Honey Bee Pollinating Almond*

[6]See van Wyk, B. 2019. *Food plants of the world.* CABI. A pollinizer is a tree with different genetic characteristics. It provides abundant, compatible, and viable pollen at the same flowering time as the plant to be pollinated. The best ones for Nonpareil are the Ne Plus and the All-In-One trees.

[7]Craig is a scientist in the Crop Diseases, Pests and Genetics Research Unit of the Agricultural Research Service (ARS). The latter is the U.S. Department of Agriculture's chief scientific in-house research agency. Plant breeding is a branch of applied genetics. New cultivars can only result from a genetic re-organization that causes improvements to the existing varieties in particular characteristics.

[8]Sáez, A. et al. 2020. *Bees increase crop yield in an alleged pollinator-independent almond variety*. Scientific Reports. 10(1):3177.

[9]California's coastal, desert, foothill, and mountain areas can only support about a half million colonies on a year-round basis.

[10]In the middle of the nineties, California almond trees covered less than 500,000 acres. In 2020, their orchards cover more than one and a quarter million acres.

[11]Migratory beekeepers are those who move their hives around the country to pollinate two or more different crops during the year. They are subject to the Department of Food and Agriculture quarantine regulations of California that prevent the entry of colonies contaminated with *varroa* or tracheal mites harmful to bees.

[12]The C.V. is a broad, elongated, flat valley that dominates the interior of California. Fresno, Kern, Madera, Merced, and Stanislaus are its leading almond-producing counties. They accounted for 73% of the total bearing acreage in 2020. Their Mediterranean weather and ideal soil are excellent conditions for the trees.

[13]Bjerga, A. et al. 2019. *California Almonds Are Back After Four Years of Brutal Drought.* Bloomberg.

[14]The yield potential of orchards with self-fertile trees old enough to produce fruit is maximized by stocking them with one colony per acre. However, two colonies are the average for traditional varieties.

[15]Flores, A. 2010. *Self-Pollinating Almonds Key to Bountiful Harvests.* Agricultural Research. Tuono is the classic variety that is productive without a pollinizer. Many home gardeners have sought a tree that produces nuts when grown alone.

[16]The basis of all plant breeding is selection, or the choice of plants with the best combination of agricultural and quality characteristics from populations with a variety of genetic constitutions.

[17]It is the surname of those who originally owned orchards on 138 acres that is now home of the ARS San Joaquin Valley Agricultural Sciences Center. It wanted to honor the persons who maintained the property. Yorizane is identified as Y116-161-99 in the ABC report. It is a public self-fertile variety released by the USDA as of January 2021, and has no royalties or other fees; any nursery is able to propagate and sell it.

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*Joy is a decision, a really brave one, about how you are going to respond to life. -Wess Stafford*

# THE LONG DAY

Peter **Sieling**

"Sorry, I don't want any adventures today. Thank you!" —Bilbo Baggins

"Yesterday, when it was tomorrow, it was too exciting a day for me." And, "You never can tell with bees." —Winnie the Pooh

In the nightmare, I was delivering a van load of nuc hives to beekeepers in New York's North Country, the region north of the Adirondacks bordering Canada. I swerved to avoid a deer, the van careening sideways into a ditch. The nuc hives burst open. Bees were crawling all over me and stinging by the hundreds. I woke up sweating at 3:00 AM, an hour before my alarm clock. I dressed and made coffee. In my head I could hear the kind of music they play in movies just before the hero walks into a trap or just before the deer jumps in front of a van loaded with nuc hives.

Outside, Jupiter stared down balefully at me. The expressway is busy at 4 AM with early morning people—third shifters, murderers, herds of deer, migratory beekeepers, and other shady characters. I got off at the first exit and took progressively smaller roads, then turned in at a long gravel driveway. The house and barns were dark, but a tiny gas light flickered in the woods above. I squeezed the van between the clothesline and house and parked near the bee yard. Joe was waiting for me. He had hired me to deliver nucs to Amish or plain people scattered over the North Country of New York, from Watertown to the Canadian border. His itinerary arrived in my mailbox the day before, too late to back out. My wife plotted out the trip on the computer. It would take 14 hours, not including stops. My cargo van is 14 years old. It has a hiccup in the engine that no mechanic has successfully diagnosed. Plain people don't own phones, but they knew their bees would arrive today. I had a zero margin for error. What could possibly go wrong?

*34 nuc hives ready to deliver*

While Joe sorted nucs and closed entrances, I loaded the van. Halfway through loading, one nuc started leaking bees. Joe swapped it out, but I now had a few hundred loose bees in the van. I started north in the predawn light toward Interstate 90, the New York State Thruway.

Heading east on the Thruway, the rising sun blinded me for the next 50 miles to Syracuse. I drove north across the Tug Hill region, known for lake effect snowfall measured in feet rather than inches. Every now and then a bee came to the front to visit me, but they mostly flew up and down the rear windows. Two and a half hours from home I made my first delivery.

*Stop 1 nucs waiting to be transferred to their new hives*

**Stop 1—Williamstown, NY, 126 miles**

I drove up a steep dirt driveway, past a saw mill, a mountain of sawdust, and some sheds for sale. A man stepped out on the porch and looked at me like I was a space alien or maybe a revenuer.

"I brought your bees!" I called.

"Oh…he'll be right out," he answered. I waited. Two empty hives sat on the stoop of a shed. I began to wonder how much time I would have to wait at each stop when the son came out. When he found out I was also a beekeeper, not just a delivery service, he peppered me with questions. He had first bought bees the year before and they died. He saw Joe's ad in the *Busy Beaver*, or maybe *Plain Interests* magazine. He was surprised that I was driving around with bees loose in the van—wondered if I got stung.

**Stop 2—Lowville, 60 miles**

I drove through the biggest wind turbine farm I've ever seen—hundreds of them, and ended up at a farm.

A girl was weeding in a giant garden. She didn't look up until I got out and said, "Your bees are here."

"They just left," she said shyly and ran to the other end of the barn, looked out the back door across the field and came slowly back. She didn't know what to do.

"I can just set these two nucs on the north side of the house for now. And then I need, um, something for delivering…" She disappeared into the house and brought out her mother, who paid me.

"You've got bees flying around in your van!"

"Those are extras. If anyone's nucs are light, I brush them out."

*Stop 3 A North Country farm*

**Stop 3—Woodville, 42 miles**

I drove through a large tract of deer infested state land. Rather than bulldozing straight through the forest, the road builders wound and twisted the road around the trees. Almost every culvert and bridge was inhabited by families of Canada geese lounging on the road shoulder.

There is no Woodville on my map, but I had to drop the next three nucs somewhere. The zip code and street matched Hendersonville so I took the chance. No one was around, so I walked into the mud room just as a girl and her mother stepped out. When I told them I had their bees, they gave me big smiles. Mother ran down the driveway and flagged down her husband, who pulled up in a pickup truck. He put the nucs into the truck to take to his bee yard, saying that the planting could wait.

**Stop 4—Watertown, 26 miles**

My map app wanted me to drop the next four nucs off in a swamp, but a couple hundred feet back was an Amish farm with a produce stand out front. I drove up their driveway and was greeted by three or four little boys. Mom came out as I was showing them the bees' tongues sticking out of the screen. Father was out in the field so I set them in the shade.


*Stop 5 A typical road stand with an interesting selection: night crawlers and comb honey*

**Stop 5—Evans Mills, 6 miles**

The stones in the driveway were sharp. I once slashed a tire on an Amish road. Stones don't bother steel wheels. Thankfully I didn't pop a tire. I knew I shouldn't take photos of people, but different communities have different rules. At the first few stops I asked permission to take photographs. One man said, "Well, if I don't see you take the picture I won't know…" Others were obviously uncomfortable with the request, even with photographing the buildings, so after a few reluctantly granted photos, I stopped taking pictures.

**Stop 6—Gouverneur, 26 miles**

Jacob's first two hives had died over the Winter. He was worried about American foulbrood. One person told him the hives were all right to restock, but he wanted to make sure before putting his new nucs into infected hives. When he found out I was a beekeeper he asked me to check his hives. We walked back behind the corn crib and I looked at a couple dead brood frames. I showed him how to stick a straw into a cell and draw out ropy

*Stop 7 Subduing a vicious guard dog*

stuff. It didn't look like foulbrood. "Well, I'm glad to get a second opinion," he said.

**Stop 7—Hammond, 27 miles**

Two dogs came running and barking toward me. I didn't want to be eaten so I pointed to the ground and said, "Sit!" The poor dogs looked confused, sat, and then in case that wasn't enough, lay down. "Good dogs." They were probably bilingual. A boy around 12 years old and his older sister came out of the house. The boy said his parents had gone to Louisiana and wouldn't be back for four days. We carried the nucs to the back of the barn where four empty hives stood in a row. I told him the nuc frames ought to be transferred as soon as possible. He'd helped his dad with the bees and was already getting out the smoker and veil when I left.

**Stop 8—Heuvelton, 20 miles**

Ben got a free nuc because the one he ordered the year before didn't survive. Did you know that most Amish farms have roundabout driveways? I guess it's hard to put a horse in reverse, so they just make a loop. It was handy for me—no backing out. I may make a loop around our house, if I get home alive.

**Stop 9—Ogdensburg, 23 miles**

The father wasn't home so three teenage boys took the three nucs to the back of the barn. The rest of the family came out to watch. I wish I could have taken a photo. A pregnant mom stood with the rest of the children lined up by height. From left to right I'd estimate their ages at eight, seven, six, five, and four years old. "You've got bees flying around in your van! Do they sting?" the mother asked.

"Not yet, but there seem to be a lot more than when I started this morning."

**Stop 10—North Lawrence 56 miles**

This was a long drive for a single nuc. When you use a map app on your phone you don't get a good sense of where you are going. It is all small roads with twists and turns: "Turn right for 8.6 miles. Turn left for 2.3 miles, right for 8.03," and so on, 116 turns altogether on this trip. I didn't realize until this stop that each one took me closer to the Arctic Circle.

The husband was down the road sawing lumber. His wife was talkative. Two dogs were chewing on empty honeycombs. "Where is Joe? Way down near the Pennsylvania border! Well!" I asked how they found out about Joe's bees. "We saw an ad in the *Busy Beaver*." At this point I was almost in Canada. "Here come our son-in-laws. They'll know what to do with the bees." At the same time the husband came running from the mill, happy to see his bees.

"Where's your next stop?" he asked.

"Constable."

"Never heard of it."

"Me neither, until yesterday," I said, entering the address in the map app.

**Stop 11. Last stop—Constable, 27 miles**

As I pulled into the driveway a line of children formed. I opened the van door and saw one of the hive covers had pulled up and bees were coming out. I quickly pushed it back down, but judging from the quick movements behind me, Melvin had just been jabbed. We loaded his four nucs on a steel wheeled skid steer. His two year old bare foot daughter came over and plunked herself down on top of the last nuc. The kids all waved at me as I drove away.

*Stopping along the St Lawrence Seaway, but "I have miles to go before I sleep."*

**Stop 12—Back to Joe's, 281 miles**

My route took me south along the St. Laurence Seaway, to Interstate 81. I waved at Canada. She didn't wave back. Three hours to Syracuse, west on the Thruway with the setting sun in my eyes, then south through Geneva, then Bellona (the official site of the original Ontario County Beekeeping Association, which, in the late 1800s, published an official document with a series of "Wherefores" and "Be it Resolved" that the federal government should introduce the giant Asian honeybee to the USA).

I stopped at Joe's house to let him know how it went. All was pitch dark, then a single light shone in the window. Joe came out and I returned his map (loaned in case I lost cell service) and checks for those who hadn't paid ahead.

**Stop 13, my lucky number—Home! 12 miles**

I made one last stop for gas and cleaned the bugs off the windshield. I reached Home Sweet Home at 10:30 PM, after driving 732 miles, burning $102 dollars of gas, total time 19 1/2 hours with zero stings: A good day's work.

# Feeding Pollen Patties

## Without Fear of Raising Small Hive Beetles

Eric **Talley**

Keeping honey bees alive in today's environment becomes more challenging each year due to pests, diseases and available nutrition, among other problems associated with beekeeping. Honey bees need protein acquired from various sources of pollen to feed larvae. Pollen is the only available protein source for honey bees. Winter bees need pollen to build fat reserves, called vitellogenin, to survive during the winter and raise brood in late-Winter and Spring. The health and survival of the entire colony is dependent on the vitellogenin reserves of the Winter nurse bees.

Without adequate amounts of pollen to feed larvae the future bees that hatch may be smaller and not as healthy caused by lack of nutrition during the development stage. Some areas of the country where bees are kept and managed lack sufficient available pollen producing plants, are over stocked with too many colonies, or the colonies are placed in mono-floral situations during a pollination contract. With the lack of sufficient natural pollen for honey bees to collect, beekeepers are resorting to feeding pollen substitute in the Spring to assist in colony build up before the natural pollen is available.

*Dry pollen feeding station*
*Photo by Eric Talley*

Pollen substitutes are available both in a dry powder form or in the form of commercially produced pollen patties. Dry pollen substitute can be fed dry by use of a feeding station outside of the hive, or mixed into pollen patties and fed within the hive body. Small colonies that need the pollen substitute to feed developing larvae are not always strong enough to forage for sufficient amounts to fulfill the requirements of the colony. Feeding dry pollen can become a problem when Spring weather changes from day to day. Rain or cold temperatures confine the bees to the hive body making dry pollen substitute located in a feeding station outside the hive useless. Feeding pollen substitute in a patty form within the brood area allows the nurse bees access even when the weather has the foragers confined to the hive body.

Small Hive Beetle (SHB) adults are not destructive, and can live in the hive in large numbers for an extended time without causing problems. Large populous colonies are able to keep SHB's in check better than small weaker colonies that have too much space to protect. SHB's have developed the ability to stimulate the mouth parts of worker bees with their antennae, in this way tricking the bee to feed them. SHB's are known to over-winter within the cluster, and SHB's love pollen patties. Honey bees cannot remove adult SHB's from the hive cavity because of the hard shield-like shell, and you may see bees chasing adult SHB's. When SHB's find a space that they can get into that is too small for the bees to get to them (or combs containing pollen, nectar or honey that are not protected), the SHB will lay eggs. Within 24 hours, these eggs hatch into very small larvae that begin to feed immediately. The larvae feed on the honey and pollen stores, including the pollen patties that are laying on top of the brood frames.

**The problem**: Pollen patties are designed to be placed or "laid" onto the top of the brood frames above the developing brood. When pollen patties are placed directly onto the top-bars there is no bee space left between the pollen patty and the top-bar allowing the SHB's to push their way into this area between the top-bar and the pollen patty and lay eggs. The eggs hatch into larvae that then feed on the pollen patty before moving on to feed on, and destroy, valuable resources within the hive. SHB's are becoming a greater problem every year, especially in warmer climates, and yet feeding pollen substitute may be a life-saving step to keeping a colony alive in early Spring and help the colony to build up.

*Above: Pollen patty on top bars*
*Photo from Google Images*

*Above: Small Hive Beetle larvae in pollen patty that was placed onto the top-bars.*
*Photo from Google Images*

**The Solution**: The pollen patty feeder that I have designed, built and used when feeding pollen patties suspends or 'floats' the pollen patty above the top of the brood frames and allows the bees to access all sides of the pollen patty and keeps SHB's from having a place to lay eggs.

*Hive body taken out of service due to rot, ripped on the table saw to use for pollen patty feeders*
*Photo by Eric Talley*


*Pollen patty on the feeder*
*Photo's by Eric Talley*

This feeder can be built from new wood or a cut-off piece of an old hive body that has been taken out of service. There is very little expense either way. When cutting an old hive body take caution not to cut where it's nailed and wear safety glasses.

The feeder needs to be 1½ to 2 inches in depth, and sized to fit 10-frame, eight frame or five frame hive bodies. Wooden cross bars for suspending and attaching the ¼ inch hardware cloth need to be raised ¼ inch up from the bottom to make sure bee space isn't compromised between them and the top-bars of the brood chamber. Suspending ¼-inch hardware cloth allows the bees to transition through it and keep SHB's from staying in one place long enough to lay eggs. Using 1/8-inch hardware cloth does not allow bees to transition through and is not recommended. Place finished feeder directly above the brood chamber where the nurse bees have access to the pollen patty. Ensure the pollen patty is not touching the wooden cross members.

Care should be taken to remove the pollen patty feeder before the major nectar flow begins as the excess space within the feeder will be filled with comb and brood, pollen or nectar and honey. Most beekeepers don't feed strong colonies pollen in the Spring and concentrate on weaker/smaller colonies that need a boost to assist build up. Nucleus colonies expand very rapidly when fed pollen patties since they are small and have less foragers; remembering to be sure the pollen patty isn't placed on the cross bars. Small colonies have fewer foragers and fewer bees available to chase and keep small hive beetles in check.

Not every beekeeper has the tools or ability to build items like this. Maintaining membership, and attending monthly meetings, in a local beekeepers association can provide a mentor and possibly a contact to a beekeeper who has the tools and ability to assist you in constructing one or more pollen patty feeders for your use. BC

*Note the spacers under cross members, raising them ¼ inch*
*Photo by Eric Talley*

**Author's bio**

Eric is a North Carolina State Beekeepers Association Master Craftsman Beekeeper who lives and raises honey bees on the coast. Eric started beekeeping in 1973 as a Future Farmers of America project. Four years later he joined the U.S. Marine Corps and didn't keep bees for the next 30 years. Eric got the bug back and started keeping honey bees again in March 2008. He raises nucs and VSH queens during the summer for his use and sale to other beekeepers in the area.

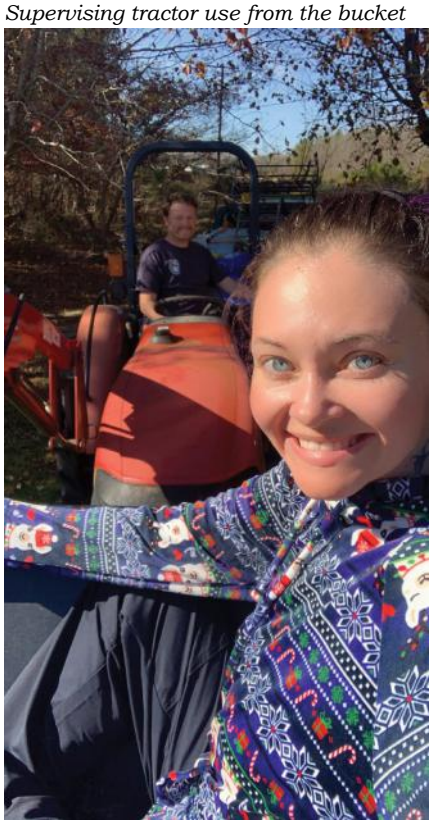
# BIGGER PICTURE

Jessica **Lawrence**

## Long-term Investments

Beekeeping is one of those hobbies (or jobs) where planning for the future is a necessity, or you have wasted a lot of money. You need to know what equipment you have, what you will need, where your bees are going to live, how you are going to feed them, what sort of interventions you will use, and what your plans are for your bees. It also seems that most beekeepers are more environmentally aware of their surroundings than the average person. You might always be on the lookout for a pollen or nectar source, tracking bloom periods, or just identifying local flora. Some people are dedicated to conservation of native plants, or re-introduction of natives. I have a cousin (I use this term loosely as most everyone here is related) who is fantastic at local plant identification and spends a lot of time trying to plant native grasses and trees. This is a neat long-term project that will be beneficial several years from now and hopefully his children will have the same appreciation he does (they're all girls so poor guy might need some outside time). It's not as important to me if it is native or introduced as long as it's controllable and it has some sort of value.

*Supervising tractor use from the bucket*



I've been loaning my time and tractor to help plant American Chestnut trees that are about a year old. Beamon planted all of the trees from seed in pots and they range from one to four feet tall while being the same age. To be honest, I can't even remember how many there were, but the previously planted ones didn't take very well so they have some reinforcements now. The chestnuts planted this year are on several different tracts of land. Hopefully these will take a little better since the holes were dug by an auger, and the soil was amended during planting with sand, garden soil, and moss. We all know that American Chestnuts have been almost eliminated due to the chestnut blight brought in around 1904, but there have been multiple attempts at establishing new populations. The trees we've been planting are original American Chestnuts, not genetically modified or hybridized with the Chinese Chestnuts.

If you check out Honey Plants of North America, you will find chestnuts distinctly in the pollen section, as the catkins give off a substantial amount of pollen, but there's not really nectar to be had for the bees. There is a little description about Chinquapins (internet spelling is now different than the book's spelling in some places) as they are basically dwarf chestnuts but produce nectar and are described in detail in the honey section. These plants also seem to have dwindled away in our area, but perhaps others have more. Often times, it seems like pollen is overlooked as an important food for bees and everyone focuses on nectar. I am hoping that having bees around will help these trees produce nuts more efficiently. Chestnuts cannot self-pollinate and need a minimum of two additional trees nearby to successfully set fruit. They can also start producing nuts as soon as four to five years old, typically before the blight starts doing significant damage.

Chestnut blight is caused by a fungus called *Cryphonectria parasitica* and is difficult to control. In a forest setting it is almost impossible because chemical treatment is required on a semi-annual basis and would be cost prohibitive. The fungus can cause galls and will kill chestnuts while not killing other tree species but using them as vectors to spread spores. Once it infects a tree, it will kill the cambium and create a canker. The canker releases oxalic acid that reduces the pH to toxic levels and ends up girdling the tree and killing it.

Since these chestnuts are being planted in an area where there are virtually no other chestnut trees, they may be able to stay clean for a little longer. It is not feasible in a forest setting to try chemical control of the blight, but in this case it may be possible. It has only been recently that any fungicides could offer much control of chestnut blight, especially without near phytotoxic levels of injection. It would be so irritating to try to medicate your tree and then kill it with the medication. There have been some combinations of fungicides that seem to be able to control the blight, but only for a few seasons at most. Chestnuts are known for fast growth and high reproduction, so it would not be difficult to imagine that they would quickly outgrow the application from months prior. My only concern at all is that there's not a lot of research on how much residue from the fungicide treatments would end up in the pollen, but typically trees don't transfer in the same way that a crop would (for multiple reasons) and fungicides concern me less because they're not

*Running the auger while Beamon does the hard part*

going to really be dangerous to bees. If you're looking for treatment ideas, copper oxychloride and carbendazim or copper oxychloride and benomyl have shown to offer some protection, as well as epoxiconazole and Agrifos when combined with Pentrabark.

In addition to these trees, we threw out some camellias since the auger was already running. These shrubs are essentially the opposite of American chestnuts in that they are definitely not native, super showy, produce a lot of nectar, and are very low maintenance. All of the camellias are different varieties or species, which includes a *Camellia sasanqua* (var. Yuletide which is burn-out-your-eyes red), a non-reticulata hybrid (night rider, almost black flowers), and a *Camellia sinensis* propagated from the Lipton tea factory in Louisiana. The other camellias are variegated flower varieties. There is a lot of extremely varying information on camellias and their relationship with bees. It seems that in some areas, they will strip the anthers bare and not use the flowers for nectar, while in some places they seem to only collect nectar. There are some forms that don't have anthers at all and they are obviously not going to give your girls much in the way of pollen. The varieties that do have pollen are reported to have high protein and nutrition content, but I was not able to find proof of this or a quantified amount of protein.

Camellias are useful for honey bees because they bloom at times when nothing else is available. The *sasanqua* and *sinensis* species usually blooms first, starting in mid-fall and runs through part of Winter. The more common Camellia of the *japonica* species usually starts blooming mid-Winter and lasts through early Spring. They also tend to like shady spots in the summer and get planted in areas that normally don't house the showy Summer and Spring flowers. They like moist spots and mulching but don't like to be compacted in the ground or have a lot of mulch around the trunk. A wide spread of mulch that thins at the base is better for camellias. They also need a little space from other plants because they tend to get large and being crowded can give them diseases.

Beamon also bought all the leftover butterfly bushes from Lowe's because they were steeply discounted at the end of the season. They were mostly purples and blues and I have read that sometimes these aren't as attractive to honey bees as other butterfly bushes. I added to his purchase with two golden ball butterfly bushes, which are reported to be a fan favorite of honey bees, and two bicolor butterfly bushes that are supposedly easier for bees to see in their color spectrum. Butterfly bushes in general have a lot of available nectar, and will at least support other pollinators if it doesn't attract honey bees. These are a little different as far as maintenance because they will get massively out of hand if you do not cut them back every year. Some of these bushes will be used for privacy screening down

*Planting butterfly bushes*

*This American Chestnut may never be found again*

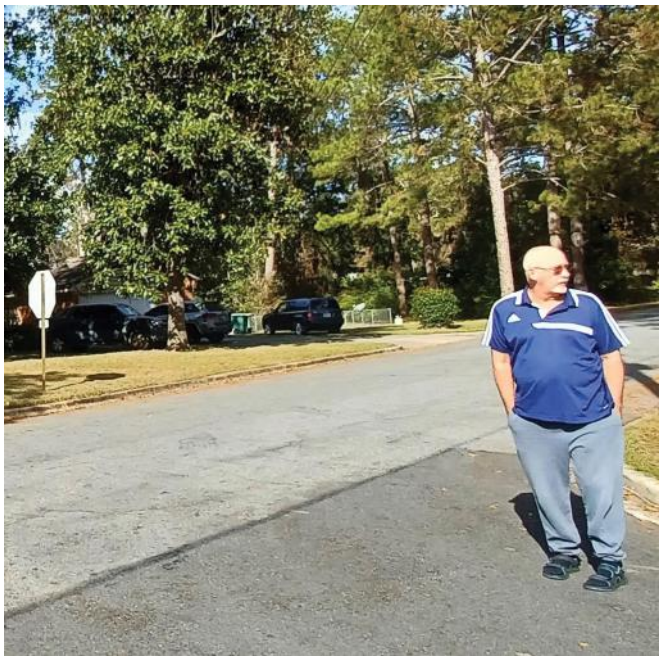
fence lines and roadsides and will be better off not being cut. They have potential to reach around fifteen feet across and well over ten feet tall.

The issue that a lot of people have with butterfly bushes is that they are non-native to America. Butterfly bushes originated in Asia, but were intentionally introduced rather than accidental. They have what is estimated to be around 40,000 seeds per flower spike and have an 80% germination rate once dispersed. Any stalks that break off have the ability to root as well. They can be spread by water or by wind because they are winged, and can still germinate up to five years after being in the soil. They are so easily reproduced that they outcompete native bushes and cause food scarcity for caterpillars and butterflies that depend on those native plants. Butterfly bushes can also be difficult to remove once established, although if you're planting them on purpose you're not likely to dig them up.

While it is always important to focus on native plants to improve the natural landscape, non-native plants can be beneficial when planted with purpose and maintained within your parameters. Beamon is planting to feed bees naturally while also trying to repopulate native trees. The most important thing is to do your research before you start spending money on plants so you know that you can meet their requirements and that the plants can meet your design needs. BC

# Save the Honey Bee and Our Ecosystem

James **Howard**



*We sacrifice pollinators for pretty lawns which have no value to the ecosystem*

The honey bee has become my friend. I say this for they produce that sweet honey that not only tastes good but has many medicinal uses. I use honey most every day, and I am concerned for the sustaining of the bees life. While doing research I found that the honey bee is endangered more each day.

There are 50 million acres of suburban lawns with many heavy in toxic pesticides that are detrimental to bees including carbamates, synthetic pyrethroids, organophosphates, and many others. These chemicals affect the honey bee by killing them off thereby causing serious hive problems. With ninety percent of all plants requiring pollination to kill off the honey bee population effects the whole ecosystem.

Herbicides used in right of ways, in fields, and in lawns affect pollination and thereby cut down on the supply of honey. With these environmental poisons sprayed into the air and on plants the pollinators are facing a crisis that becomes worse as more suburban areas are being built.

When buildings go up down go the wildflower counts and therefore food for the honey bee. When warehouses and businesses are built, up goes the asphalt count. There are 48 million acres of asphalt in the U.S. That is a disaster for the chain of ecology and the honey bee. We are killing off our natural food chain and health.

With 98 million acres of lawns, asphalt, pesticides, and herbicides the honey bee is in real danger. When the honey bee is in danger I am endangered for if I can't buy honey then my use of it for health purposes declines. But there is hope with community action. One person can accomplish much, and when that person joins others in a chain of resistance, the killing off of the honey bee and ecosystem slows.

There is a middle school in my town that is planting flowers that attract honey bees. These young people are being taught the importance of preserving nature's way of life. They are being taught the individual responsibility each person has for their part in preserving, not killing off the pollinators.

There are certain towns that have wildflowers gardens that attract the precious honey bee and other pollinators. The more gardens that are planted with wildflowers the more the ecosystem and honey bee production rises. I believe more and more cities need to invest in the future of the honey industry.

Each person reading this can make a difference in many ways. We all have friends, and we can speak with them about being a contributor to the life of the honey bee and the ecosystem. When we enthusiastically show our friends the importance of planting flowers and plants that draw honey bees they are contributing to the welfare of honey bees and hives. They can in return tell all their friends about the issue and a chain of great things can begin and bring the acreage count of bee friendly plants up significantly.

Another way to help is to speak with our neighbors about using alternative, organic herbicides, and pesticides. This will greatly reduce the poisons spray upon the yards and on plants. I used habanero peppers chopped and I mashed the juice out and added water to dilute it. I then sprayed it on my garden. It isn't good to use this spray on wildflowers as it kills the honey bee, but I kept my vegetables from having harmful chemicals applied as they grow.

There are natural ways to keep pesty insects away from plants without hurting the plants and also not

*Asphalt, the death of the bee pollinator.*

harming honey bees. There are organic means to keep honey bees safe and also protect plants from fungus, and harmful insects. These should be brought to the attention of our friends and neighbors.

In the past I've contacted my legislative leaders about issues of concern, and I will be contacting them about passing laws restricting many of the detrimental chemicals. The EPA does a bit of work in this area, but more is needed, and our voice needs to be heard. I don't own honey bee hives, but the more I study this subject the more I am fired up to act.

My local plan is to speak with city leaders and find out what can be done to help alleviate the decline of honey bees in my area. I see many properties around the city that are vacant and could be used for planting plants that attract honey bees. It will add more color and beauty to the area and be one more place that helps the count rise for support of the pollinators.

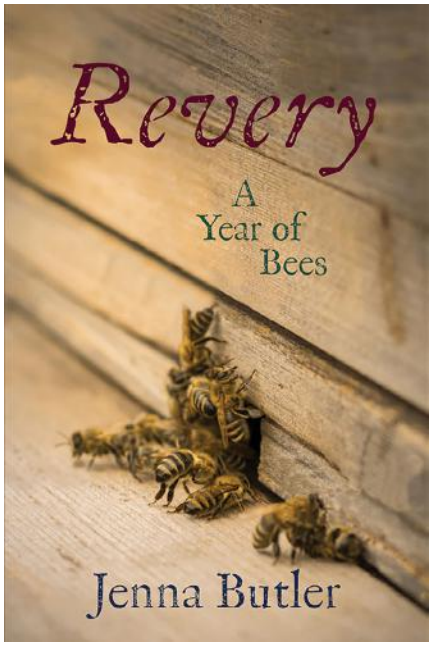
My library has areas I could use to hold meetings to make the community aware of the decline of the honey bee. Many people benefit from the use of honey, and this can be a call to action. That is the focus of this work, a call to action. Many times one person has advocated strongly about issues in life and had laws passed to protect whatever their cause is, and we as lovers of honey and honey bees can reach forth to a better day in the world of the honey bee. BC

*Mrs. Annie Barbas, Master Gardner for Valdosta Schools tending pollinator firendly garden at school.*

# Revery: A Year of Bees

Mark **Winston**

**Review for BeeScene**




As a staunch reader and a lover of language, I maintain a book of quotations into which I copy out those stellar phrases and sentences that jump out from the pages with startling clarity. Here's one that just about leaped into my quotation journal on its own, from Jenna Butler's remarkable new book *Revery: A Year of Bees*, referring to the myriad afflictions managed and wild bees are facing these days:

"*Just because bees* can *scrape by in these adverse conditions, that absolutely doesn't mean that we can let ourselves off the hook . . . We need to start asking ourselves whether* keeping bees going *is good enough, or whether we truly need to think about bees* thriving."

Butler is a writer and ten-hive beekeeper living on an off-grid organic farm in central Alberta, where she also is a professor of creative writing and eco-criticism at Red Deer College. Her book is indeed a revery, the condition of being lost in thought.

It's an unusual blend of reflection, practical insights into bee management and thoughts about changing climate, all woven tightly together with memoir of personal trauma and a life lived on and with the land. And, it was short-listed this October for the prestigious Governor General's Literary Award for Nonfiction, indicating the quality of her writing and suggesting it's a book of interest well beyond the beekeeping community.

*Revery* is in that rare but fine tradition of writing about bees from the heart, going back thousands of years. Writers such as Virgil, Butler, and Maeterlinck have enriched us with details about bee biology and management that anchor their love of bees with practical insights, coupled with awe and wonder at the marvelous adaptations manifested by social and solitary bees alike. Jenna Butler's book is the latest in this lineage, placing bees in the larger context of the environment with which they interact and the lessons we humans can learn from these marvelous creatures.

The book's format follows honey bees throughout a calendar year on her farm, beginning with January Winter and ending in December. Each chapter provides more than just clear writing about that season's typical colony condition and management. She delves into deeper issues about how we manage honey bees today, how that is shifting and should continue to shift, and what honey bees as well as wild bees are telling us about climate change and other environmental conundrums.

Much of *Revery* is about healing, of the land we live on, the way we practice agriculture, the terrible tragedies of bee loss afflicting honey and wild bees alike, the lack of diversity in beekeeping, and Butler's own journey from trauma. But what's remarkable about her writing is that she is not strident or politically correct, but rather simply a person speaking from the heart with compassion and clarity about the challenges faced by bees, people and the land.

For bees, she is direct and clear about how interactions between monocropping, pesticides, poor nutrition and pests are decimating managed and wild bees. But she also writes with respect around the remarkable innovations that Alberta beekeepers have made over a couple of centuries keeping bees in a harsh climate, and speaks with sympathy about the economic challenges faced by commercial beekeepers today. Rather than divide, she writes with hope that we all can work together to create economically viable beekeeping in which bees as well as beekeepers can thrive.

She also writes about the changing nature of beekeepers in Alberta, with many younger beekeepers coming on the scene, including women and beekeepers of color becoming more prominent in both hobby and commercial operations. She is a great champion of diversity, agriculturally, environmentally, and socially, recognizing that diversity cushions us against change and provides a wealth of responses to draw from when challenged by new situations.

Butler explores the many ways beekeepers seek healing through bees, going well beyond the expected apitherapy treatments. She notes how some seek economic healing, hoping for financial independence and security, others find spiritual growth through bees, "*creatures whose very existence . . . cause the humans tending them to monitor their own hearts carefully to avoid causing distress to the hives.*" She simply but eloquently summarizes how her time with bees has helped her manage deep hurt and pain in her own life: "*Beekeeping forces me to learn how to handle my own weather.*"

*Revery* is a fine, fine book, and I encourage you to run, not walk, to your nearest independent bookstore and order it, post-quick. It really is that good.

Mark Winston's most recent book, *Listening to the Bees*, co-authored with poet Renee Sarojini Saklikar, was awarded an IPPY 2019 Gold Medal Independent Publishers Book Award. This review first appeared in *Bee Scene*, the quarterly magazine of the British Columbia Honey Producers Association.

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# The Varroa Mite Conundrum

## Consistent Success or Consistent Failure

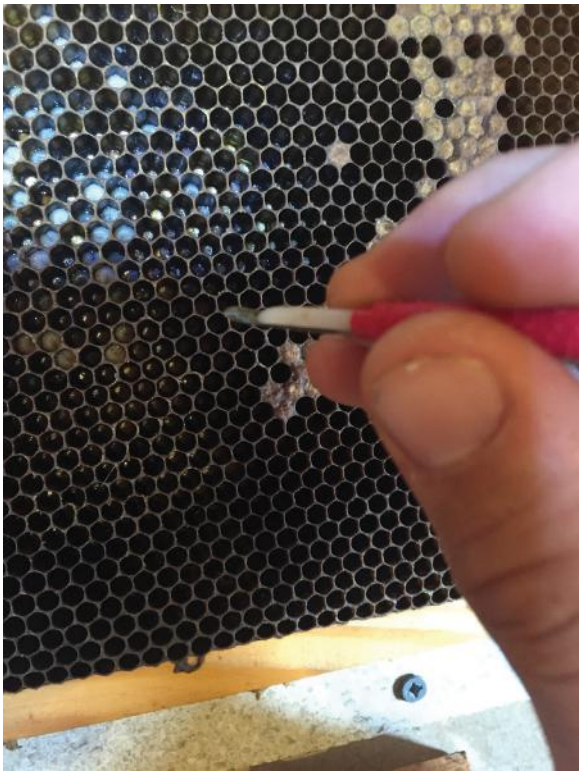
Devon **Paderewski**

Most beekeepers would agree that *varroa* mites are the biggest challenge facing modern apiculture at this point. Virus vectored by the parasitzation of the mites often lead to the demise of a colony. I was lucky enough to be part of a stakeholders group assembled by Dr. Robyn Underwood of PennState University to assist in the formulation of principles to be carried out in a large multi state study comparing conventional, organic and entirely chemical free beekeeping. The first task of our large group of experienced and successful beekeepers was to identify an entire spectrum of beekeeping from full on commercial beekeeping with any legal chemical on the market to non intervention beekeeping with zero chemical inputs and every stage in between. The resulting document created was published by Dr. Underwood and released in many arenas including The American Bee Journal.

The impassioned perspectives of many beekeepers made this prove to be quite a challenging task but together we did accomplish it. I myself have been both passionate and ambivalent about this topic. I know why people are so fiercely divided on this topic but don't believe that it has to ultimately stay this way. The single reason being that we literally all want the same outcome, to have some bees to play with in the spring. It really is as simple as that.

Maybe you want to count mites, maybe you don't. It's easy to know what to do if you don't want to count them, nothing. If you are on the other side of the fence, I believe the 300 bees in an isopropyl alcohol wash is a simple and reliable method of doing so. I have completed so many mite washes in my beekeeping journey to date, I could practically do it in my sleep. There was a time not that long ago that I was quite often paid by employers to do mite washes on their bees and never would think of performing them on my own. It wasn't that I was so evolved as a spiritual creature that I thought it was inhumane to sacrifice them this way. I was letting colonies die by the dozens every season due to mite infestations. I simply didn't want to be worried about them and perhaps be influenced into doing something about it. Some people said I was burying my head in the sand and called me a bad beekeeper. Good thing for me I was raised to care very little of what others thought of me in general as long as I believed that I was doing the right thing and could live with my choices and be happy. I always had some bees left alive in the Spring in various stages of health and strength, so I went on this way as I pleased. Then one day I listened to Dr. John Kefuss on Solomon Parker's treatment free beekeeping podcast. It was the most exciting beekeeping podcast my ears had ever heard. When he explained his mite black hole concept I literally fell in love. I had been being accused of creating mite bombs with my bees for years because I let them collapse and didn't count mites and do the "responsible" thing and frankly I resented it.

I was looking for those resisting colonies and had to have some method of sifting through the genetics and natural selection seemed to be good enough for all other life on earth so it was good enough for me. I did already have some basis for resilient stock because my bees were mainly propagated from bee removal bees I had been doing for several seasons. When I learned of the work of John Kefuss something about his approach and methodology just resonated with me and I decided to pursue it wholeheartedly the following spring with my bees. I guess a few factors were at play to lead me to this point. Mainly I just wanted to speed up my results. Letting my bees just live or die was not expanding my apiary as fast as I would like and my high losses were preventing me from doing that. I was



very tired of people telling me I didn't know what was going on with my *varroa* populations. And I had also come to terms with the fact that my small apiary was not the same as population wide natural selection, especially since I was surrounded by mostly beekeepers that treated their bees for mites. I love science and data so I think I was ready for a change, as they say change can be good.

So there I was, armed with a methodology and a somewhat stable population of bees showing productivity and survival characteristics. The following spring I began the work of assigning every colony a number on the outside of the box performing monthly alcohol washes and counting mites. Honestly the first round was kind of shocking and I had several surviving colonies with medium to very high mite counts per 300 bees. I followed the protocol and proceeded to what is now my third season of doing monthly mite counts on every colony and grafting during the Spring and Summer from the lowest number of mites per bees washes and requeening those that don't keep the mite population low. I also assess for pollen hoarding and early buildup. The work is clearly producing a result of more and more colonies that are keeping mites below the required number and just better looking bees in general. This year I have been thinking and talking with some of my queen producer friends about how often our desired outcomes are achieved with the grafting method and open mating. I think it may be much lower than we would like but it definitely does progressively make a difference over time. I can see this much in three years. I once heard a beekeeper say that grafting all summer and requeening was much akin to throwing a bucket of dice and seeing what you get. I thought that was a pretty accurate description. I am stacking my odds by slowly expanding my sphere of influence by placing apiaries of 15 full strength colonies every one to two miles apart. Because of this my mating success seems to also be improving. As of writing this I have approximately 80 colonies and should easily go into winter with around 100 good colonies. I will most likely continue this work for the rest of my life as long as I'm able. I'm honestly having a blast and wake up most days excited for life and happy. What more could a person want? BC

# Landi Simone

David **MacFawn**

*Figure 1*
*New bee enjoying honey on Landi's finger*
*Photo by Lisa Tubbs*

Landi Simone was born in Germany, the only child of an American diplomat and his Mexican-born wife. Her early years were imbued with a myriad of cultures and languages, as her parents traveled internationally on various State Department assignments. By the age of ten, Landi had lived in Germany, San Salvador, Washington, D.C., San Francisco, and Mexico. Following her parent's divorce, she and her mother settled in downtown San Francisco, where she lived until leaving to attend college. She spent a year studying classical voice at the University of Utah in Salt Lake City on a music scholarship and then headed east, lured by the siren song of New York City and her father's Alma Mater, Columbia University. With no financial assistance from either parent, Landi first found a clerical job at the University, which came with tuition benefits. She took night classes in a variety of subjects but became fascinated with the hard sciences after a class in astronomy. High marks in every class earned her scholarships and she enrolled in Columbia's School of Engineering and Applied Science, graduating in 1976 with a B.S. in civil engineering.

Landi began her engineering career in New Jersey at a firm specializing in geotechnical or "soils" engineering, a subdiscipline of civil engineering working with soil, rock, and groundwater. She loved the work, especially since a large part of it involved exploratory testing outdoors. She moved to a better position at another firm in 1978, and became a junior partner in that firm three years later, when she earned both her license to practice Professional Engineering and her M.S. from Rutgers. In 1983 she founded her engineering consulting firm, one of only two woman-owned geotechnical firms in NJ and the only one owned solely by a woman. The company grew steadily and by 1990 boasted some ten employees. Two simultaneous events would put Landi on an entirely different path: the birth of her first child and a severe recession in the construction industry. She and her husband Paul decided that, rather than forsaking her infant daughter to knock on doors 60 hours a week and drum up business, it was time for Landi to close the doors of her consulting firm and become a full-time mom. Little Kira was joined by baby brother Adrian in 1992 and their mother began to look for ways to supplement the family's income and still be there for her children. She began an organic produce co-op, purchasing cases of wholesale fruits and vegetables and dividing them up into baskets that members would pick up weekly. One of her suppliers, knowing of Landi's fascination with animals and with gardening, in passing mentioned a beekeeping class being offered at Rutgers. It was 1997 and that casual comment would mark a watershed moment in Landi's life.

*Figure 2*
*First Year Beekeeper Maddie Tubbs and Landi get ready to inspect Maddie's hive*
*Photo by Lisa Tubbs*

Growing up in downtown San Francisco, Landi's opportunities to connect with nature were few. A neighbor gave her some iris bulbs when she was eight years old and she planted them in a six-inch-wide crack of earth between the parking lot of their apartment building and the neighboring fence. The bulbs grew and bloomed and, with their purple splendor, ignited a passion for nature in the little girl. Her favorite haunts were Golden Gate Park and Muir Woods. A great uncle owned a small ranch house in central California, surrounded by mountains, forests, and the Arroyo Seco River, and home to rattlesnakes, black widow spiders, tarantulas, artichokes, apricot groves, her uncle's prized dahlia garden, and gophers whose main goal, it seemed, was to eat the dahlias. On every visit, Landi thought she had traveled to heaven. She was a country girl at heart doomed to grow up in a city. As soon as she graduated college and rented her first small house with a yard, Landi planted a garden and never looked back. Since that first garden, she has never been without home-grown tomatoes and fresh bouquets on the kitchen table. The fascination with plants was paired with an equal fascination with the creatures that live in, eat, and pollinate them. Despite her mother's terror of spiders, bees, and even ants, Landi found these animals

fascinating and was driven to learn their names and study their habits. When she took that beekeeping class at Rutgers in 1997, she felt as if she had been whacked upside the head with a cosmic two by four. *This* was what she was supposed to do.

*Figure 3*
*Landi marking the queen*
*Photo by Lisa Tubbs*

At that time, Kira had started elementary school and Adrian was in kindergarten. Paul's urgings to return to her engineering career fell on deaf ears. She continued the co-op for a time but, as Landi's fascination with bees grew and grew, so did the number of her hives. To keep her marriage, she grew the beekeeping only at a pace that would support itself and began developing ways to expand the income brought in by the fledgling operation, dubbed Goose-rock Farm after the two-acre Gooserock Pond behind the Simone's yard. She made handcrafted beeswax soaps, creams, lotions, and lip balms, and sold these products as well as honey at local craft fairs and markets. The number of hives and apiaries grew and eventually Gooserock Farm, with its small self-service store, the "Honey House," became something of a local landmark, providing the Simones with an income that was ample, if not as bountiful as that generated by engineering.

Landi loved everything about keeping bees. She loved that it kept her outside much of the time. She loved the exercise provided by lifting the heavy boxes. She loved making her own equipment. And she adored everything about the bees themselves: the complexity of their biology and society, raising queens, the challenge of working with an organism that can do one serious damage, the fact that, no matter how long one has been keeping bees, there are always still things to learn, still surprises in store. And the fact that there is rarely only one right way to do something.

Interestingly, the same qualities that made her good at soils engineering made her a good beekeeper. Geotechnical engineering involves engineering something that is non-isotropic and non-homogeneous. One can dig a test hole at one location, move 50' away and dig another hole only to find completely different subsurface conditions. Designing foundations and making recommendations for building on something so fundamentally unknowable involves a good bit of educated guesswork. And accurately identifying subsurface formations and characteristics requires a keen eye and first-rate observational skills. There are calculations, but then there is intuition. There is science, but there is also art. Most civil engineers – those that design steel or concrete structures, for instance – do not like geotechnical engineering because soil is just too hard to quantify. For every one soils engineer, there are probably twenty structural engineers. It takes a person who is *comfortable* with not knowing to be a good soils engineer. Beekeeping requires the same qualities. One can practice the same swarm management techniques on ten different hives, have five swarm anyway, three stay home and make a bumper honey crop, one supersede their queen and one become entirely queenless. And the beekeeper needs to take appropriate action for all ten to maximize their health and productivity without blinking an eye. A good beekeeper *loves* the fact that the same actions do not always produce the same result, because if they did, it would be boring. The beekeeper is happy to steer the colony in the direction he or she wants but accepts that ultimately the bees are going to do what the bees are going to do.

Most people are left-brain dominant (the scientific types) or right-brain dominant (the artsy types.) A few oddballs are both. Landi is one of these. Early exposure to multiple languages gave her facility with both foreign languages and with English. She learned to read and write at age three. She enjoyed drawing and painting. She loved music and was the star soprano in her high school choir. Bottom line, Landi always enjoyed *making things*. Whether it was a garden, a painting, an ingenious engineering solution to a problem, a magazine article, a bookshelf, a nuc box, or a PowerPoint talk, she has always been content when allowing her creativity free rein. And she finds that creativity is a great asset when it comes to running a small commercial beekeeping operation. The branding of her products, the variety of items made from only a handful of hive products, and the marketing of her farm have enabled Landi to make a modest living from only 100-150 hives, a number which would generally be considered sideliner rather than commercial. And creativity is an asset in managing not only the farm but the bees as well. Landi loves finding ingenious ways to accomplish management tasks. As an example, one apiary faced a meadow where the property owners, who managed a dog kennel, often walked the dogs. Landi needed a way to protect the people and animals from stings but still permit light and air to reach the bees, which faced east and had shade to the south. She erected a fence with a double layer of deer netting. The bees preferred flying over the netting rather than through it but the hives still received morning sunlight. Another example was when she realized that open feeding of hives eliminated the bees' tendency to rob during dearth, she combined open feeding with individual feeding of lighter hives. The bees working the feed buckets were uninterested in targeting the weaker hives being fed individually because they were "on a flow." And feeding during dearth following or during a

*Figure 4*
*Treating nucs with Apivar*
*Photo by Pat Harrison*

mite treatment stimulated queens to lay copious healthy brood for a strong wintering population. Such techniques have enabled Landi to successfully overwinter 97-98% of her colonies in recent years.

Engineers tend to be very well-organized individuals and Landi is no exception. There is always a prioritized to-do list on the kitchen counter and not much slips through the cracks. A facility with mathematics is useful for everything from calculating correct mixing dosages of medication for a hive suffering from EFB to figuring how much emulsifier and preservative is needed in a new cream recipe. Building things is also a skill possessed by many engineers, and Landi builds many of her own hive components, her electric fences, even a hen house with a sunroof for her flock of chickens.

Engineering is applied science, using scientific principles and facts to creatively solve problems. The argument can be made that beekeepers are all engineers. The science involved is biology, and the problem needing a solution is how best to help the superorganism that is a honey bee colony survive, thrive, and in the process provide income for the beekeeper.

*Figure 5*
*A few of Landi's Gooserock Farm cosmetics*
*Photo by Landi Simone*

Like most beekeepers that are passionate about their craft, Landi loved talking bees. When her family delivered an ultimatum that she was forbidden to even mention the word "bee" again at dinner, she became active in her local bee club, and in the state NJBA, where she could talk about bees as much as she wanted, and in 2002 she started a short course that has, over the years, educated hundreds of NJ beekeepers. She was introduced to Eastern Apiculture Society (EAS) in the same year by a beekeeping friend and became a loyal life member, attending every conference since the first one at Cornell. VA beekeeper Billy Davis encouraged her to pursue the Master Beekeeper certification and, in 2004 at Seven Springs PA, Landi took and passed the difficult four-part examination. The following year she helped Dr. Collison and the team of Master Beekeeper volunteers with the grading and administering of the exam. At that time, the oral exam had only been in place for a few years and Landi, Billy Davis, and Brenda Kiessling decided that a grading rubric would help make the oral exam less subjective. Many hours of work went into accomplishing that goal, which was followed by a similar process for the field exam. Landi was elected Master Beekeeper Director and then, in 2015 was appointed to serve as Chair of the MB Certification Committee. In 2019 she was asked to serve a second term and agreed to do so.

*Figure 6*
*Landi making Lye Water for soap*
*Photo by Adrian Simone*

*Figure 7*
*VA beekeeper Parks Talley with Landi and EAS Master Beekeeper Bill Davis, who passed away in 2018*
*Photo by Alex McLellan*

The Master Beekeepers are frequently involved in teaching the EAS short course portion of the conference, and Landi began giving talks on topics ranging from soap making to electric bear fencing to nucs. EAS attendees began asking Landi to speak to clubs in their home states, and, as the years went by, she shared her passion for bees and her practical approach to their management to clubs in nearby Pennsylvania but also Arkansas, New Hampshire, Oklahoma, and even Colorado. Covid-19 brought a surge in remote meetings and made it possible to visit with clubs in far-off locations. It always felt right to help new beekeepers because there had always been more experienced beekeepers helping her when she was learning, so Landi continued a tradition that is no doubt centuries old.

We are very fortunate to have Landi in the bee industry! Her many developed and learned skills are a great benefit and needed in the beekeeping industry. Her organizational skills and creativities serve EAS and national beekeepers well. Landi is a self-motivated self-starter which is very needed in beekeeping. We wish her the best of success.

David MacFawn (**dmacfawn@aol.com**) is an Eastern Apicultural Society Master Beekeeper and a North Carolina Master Craftsman beekeeper living in the Columbia, South Carolina, area. He is the author of three books, Applied Beekeeping in the United States by David MacFawn, published by Outskirts Press **https://outskirtspress.com/BeekeepingTipsandTechniquesfortheSoutheastUnitedStatesBeekeepingFinance** and **https://outskirtspress.com/gettingthebestfromyourbees.**

# Off the Wahl Beekeeping

## A BEGINNER'S THOUGHTS AND WINTER CHALLENGES

Richard **Wahl**

**Getting Started:** Although I still consider myself a beginner, I am entering my thirteenth year of bee management. I hesitate to use the word "keeping" because bees have kept themselves around for thousands of years without mankind's interference. If you are considering getting into the management of honey bees here are several things I would like to share.

*My First Hive*

There is a cost involved, but to get started you do not need to buy every gadget and gizmo in the bee catalogues. I purchased a single deep hive from a nearby beekeeper for $50.00. This was the result of recognizing a large swarm in one of my backyard pine trees on June 26 of that first year. My intent was to find a beekeeper and give him the bees; but when he offered to buy them or sell me a used hive I purchased the basic well-used hive with ten drawn comb frames. And that is how I started my career in bee management which occurred during my second year of a second retirement. In my area of southeast Michigan basic hive components can be found for around $200.00. The hive basics would include a bottom board, a deep with eight or ten frames and foundation, an inner cover and outer telescoping cover for a Langstroth style hive. Components for a top bar hive can be had for a similar amount. If I had it to do over I would stick with an eight frame set-up as ten frame deeps can get to be quite heavy if the frames are filled with honey as is often the case approaching fall with a second deep. Deciding to give beekeeping a try I soon purchased a smoker, bee brush, hive tool, coveralls and hat veil for another $150. It didn't take long that first summer before the bees had filled eight or nine frames with eggs, brood, pollen and nectar and I needed a second deep.

When adding this new deep and frames to the hive I realized just how well-used the barely holding together first deep was. I would say that in today's market you could get started for under $1,000.00 assuming you are also buying a $150 - $200 three pound package of bees with a mated queen. At that time I knew nothing about bee management. I used the internet as an information resource, but had to be careful about what informative sources I relied on. Following the activities of a beekeeper in North Carolina or Georgia does not often equate to conditions in SE Michigan. I soon found reputable beekeepers at much the same latitude as my own or some a bit farther north which more closely matched my climate here in Michigan. I made a lot of mistakes my first winter, but was lucky in doing many things for the wrong reason that turned out OK and not hurting my bees. My mite management that first summer amounted to one application of Check-Mite strips. I guess I was lucky as I had no knowledge of testing for mites or how often to treat. This has become a very important piece of beekeeping management.

**Feeding in Winter:** I did feed my bees in February of that first winter.

*The hive with its second ten frame deep*

*The granulated sugar feeder on top of the second deep with outer black Coroplast insulation*

This is a late time to start winter feeding, but must have been soon enough that first year. The hive came into spring thriving. I now like to get supplemental granulated sugar on the hive by Christmas and continue to check it on those once a month or so days that get between the 45° to 50° or even 60° range. That first winter I made a hard candy board which held four to five pounds of candied sugar. I have since found a better way than dissolving, cooking and letting the mixture harden in the two to three inch spacer hard candy board with a center hole that I made to match my ten frame deeps. I now use a half inch hardware cloth stapled to the sides of a three inch spacer the same size as the width and length of my deeps. On this I place a piece of baking parchment folded up the sides an inch or so. I find the bees chew through the parchment in one or two spots and work from those spots.

When using newspaper the bees tend to chew through most all of the paper and much of the granulated sugar placed on top falls through to the bottom board. Protein patties or supplements can be added to the granulated sugar if your local seasonal pollen supply is more limited which is not the case in Michigan. The inner cover is then placed over the feeder with a Vivaldi spacer on top of the inner cover. Although the granulated sugar absorbs a lot of moisture, the burlap in the Vivaldi spacer still gets quite wet in some hives. It is the damp moisture falling on bees that kills them, not cold temperatures, if the inside hive condensation is not controlled. My Vivaldi spacer is about three inches deep with a length and width the same as my deeps. It sits over the inner cover and the inner cover hole is enough to let condensation escape into a burlap layer within the Vivaldi spacer. Four or five half inch holes in the short sides of the Vivaldi space provide the ventilation that will normally keep the burlap dryer.

*My north and west wind protection*

*Above*
*Vivaldi Spacer with burlap insert*

*Above*
*Hive components bottom to top: deep, sugar feeder, inner cover, Vivaldi spacer, insulation*

There have been occasions where I needed to replace wet burlap with dry if the condensation was that great. So the hive components above the top deep include the sugar feeder, inner cover, Vivaldi spacer and above that I keep a one inch thick piece of foam insulation which fits nicely in the telescoping outer cover all on the top of the hive. I have successfully gotten up to all nine of my hives through some nasty winters with this arrangement. In addition to the feeding, a good wind break is almost a necessity in our sometimes cold windy, Winters. I am fortunate in that I have two connected hip roof barns in an L shape that protect hives from the north and west winds.

I have also kept bees on a son-in-law's property in an open field only protected on the north and west by six foot tall scrub brush. Having any type wind break can only help the bee's Winter survival. I also have found that a layer of insulation around the hive in Winter helps mitigate wild cold temperature swings. This could be a bee cozy sold in most bee catalogues, a wrap of stapled tar paper or just sheets of insulation. In my case I purchased several 4x8 foot sheets of Coroplast which is two layers of plastic separated by ribs spaced every ¼ inch. One sheet will cover about 2 ½ two deep hives. Coroplast can usually be ordered through a graphic arts or printing store as it is the same material most campaign signs are made of. I measured the Coroplast sides a quarter inch larger than the hive body sides and made folds with waterproof Gorilla tape holding the first side to the fourth. At the bottom an entrance flap is folded up while on the top a small hole is cut where the hive top entrance is. It's a real joy to come into spring with some thriving hives, ready to be split, but only after our dandelions come into full bloom. I have learned that much of bee management is based on my environment and weather conditions rather than a strict adherence to calendar dates. There will be more on that in a later essay. For now these are things that have worked for me. Your bee management experience could vary based on your conditions, environment, experience or the state of your hives. Happy bee management.

# Bee Driven Mid-Life Crisis, Part 6
# Getting Ready to Build

James **Masucci**

*Yes! It fits! After having the sewer lines marked out and knowing I had to be at least 10 feet off them, laying down the corners helped convince me the building would fit where I wanted it. It also helped to visualize how it would lay in relation to the driveway and rest of the lot.*

I'm writing about my honey house in three phases. In my last article, I bought land for my honey house. In this article, I'm going to describe how I came up with my design and what it took to get things ready to build. The first question I needed answered was whether a permit is needed. Since the answer was yes, I then needed to know what is required to comply with the building permit. Being completely ignorant, I called the county building department because the land is in unincorporated county. The big question was whether this was considered a commercial property or not, because commercial properties have more requirements. Luckily, because there will be not retail sales, meaning no customers, and few, if any employees, this qualifies for a personal storage space. Here are the main requirements for the application for a storage building/pole building/detached garage:

1. Permit application form which wants to know what type of sewer, water, electricity, and gas services will be used and who will be installing them.
2. A set of plans which state the depth of holes, type of material, size of lumber, and drawings of the wall sections and truss detail.
3. A site plan which includes the location of existing structures and distance to property lines.

Basically, I need to know what I'm building, in detail, and where I am building it. I started by contacting a commercial beekeeper friend, John Miller, to ask him his thoughts. His first response was to ask me two questions, which everyone doing this should ask themselves. One, What is your business model? This is obvious because you need to know what you will need for your operation. The second was much more profound. What is your exit strategy? In 10-15 years when I retire from beekeeping, am I going to sell this to another beekeeper or to sell this as an improved property with a "not-too-customized" building. I chose the latter and this changed the way I thought about this. First, the primary building site I left alone so that someone can build a house there. I chose the "perfect site" for an awesome outbuilding that can be used as a shop, garage, boat storage, "man cave", or even to put in an apartment.

Next, I sent him a list of problems that I was trying to solve with this building and asked his advice.

1. I need a garage because I am getting an F450 bee truck and have no place to park it.
2. I need a place to extract honey and I need an efficient honey extraction system. My garage is too small. The easier the extracting is for me, the more I will be willing to do. In the Spring and early Summer I always think I can run more bees. After extracting, I feel I have too many hives. I need to set aside room for a small, automated extraction line. That decision leads to the following questions. How big of a space? What type of flooring? What type of drainage? What do I need for clean-up? Hot water? Pressure washer?
3. My kitchen is sticky for a month during honey season. I need a dedicated room for bottling. In MO, if you sell more than $50K gross in honey, you need to have an inspected facility. What do I need to pass inspection? Do I want an automated bottling system? What type of floor and drainage? What kind of washing station for jars?
4. How much storage space will I need? There are honey buckets, feeders, supers, frames, boxes, sugar, water tanks, etc.
5. I will need restrooms to pass the inspection for a commercial kitchen.
6. What else?

I received a two page e-mail that is just full of priceless wisdom. But here are just a few of the suggestions I've incorporated into my design.

"I have never built a building too big or with too high vertical walls". Point taken. Having a loading dock on one side (for deliveries) and walk-in

*I had to start thinking like a contractor. Clearing the land and pouring the foundation was not in my wheelhouse. I was able to find some good people to make it happen.*

elevation on the other (handicap entrance). My slightly slanted landscape makes this possible. Concrete floors that are treated every year. Smooth finish slippery and a brushed finish traps wax. Neither one is great. Have drains in the floor big enough for a thorough flush otherwise you harbor hive beetles. Make sure the floor is tapered to the drains. Have enough outlets and run electricity (and compressed air) along the ceiling because the number one OSHA violation is electric cords on wet floors. Bees get into light fixtures so get sealed fixtures that you can wash. As for the kitchen, a bottler will be nice. I will need to have a storage tank to feed the bottler and need a way to pour my honey into that bottler. I need a clear path to go from storage to the bottling tank. If I'm in barrels, I need some heavy-duty lifting equipment or a pumping strategy. If I stay in five gallon buckets, I need to have a dumping strategy. I also need a way to deal with crystallization. Lastly, based on his recommendation, I have a space set aside for a cold room. I can either fumigate my hives for wax moths or put them in cold storage during moth season.

Next, I needed to determine size and type of building. Steel buildings are the cheapest, especially with Covid lumber prices. Another commercial beekeeper, Leo Rukin, was helping me with the types of buildings. He also wants to put up a new honey house and was also looking at steel buildings. I showed him what I was looking at and he said these were all tubular designs and he was looking at I-beam designs. I asked him the difference. He figured all designs would work; the biggest difference is how much weight you can hang from the "rafters". For him, who may have lifts to raise heavy pieces of equipment, I-beam makes sense. For me, the cheaper, tubular or pole-barn designs make sense.

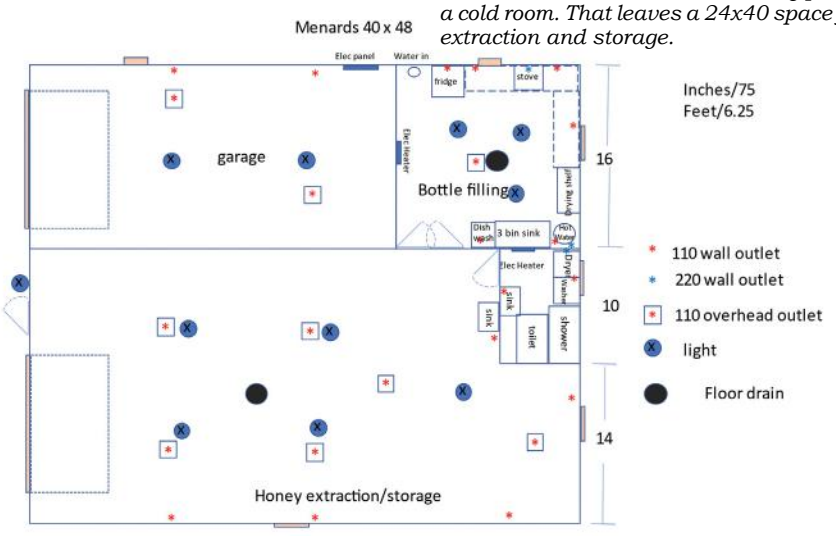
Then deciding on a size. I was originally thinking 30x50 but the "I've never built a building too big" mantra kept haunting me. Perhaps 40x60? While visiting our parents, my wife and I stayed at an air B&B. What luck. Right on the grounds were two outbuilding and based on my pacing, one was 30x50 and the other 40x60. If it weren't for my truck needing a really big space (say 16x32), the 30x50 would have been plenty. But, I decided then to go bigger…until I got a quote from a local contractor of $116K to put up a 40x60 building. That did not include windows, doors, electricity, and sewer hook-up. Holy cow, what did I get myself into.

It was time to get serious and determine exactly what I needed and how much I could do myself. I was looking at buildings and developing floor plans at the same time. I was at a friend's house and their bathroom had a shower, toilet, sink, washer and dryer in a 10x7 room. Perfect! I stole the design. I figured I needed a 16x32 space for my truck. It could be smaller, but I'd rather have extra room than being too tight. Then, I figured a 16x16 space for my kitchen/bottling area. Again, possible to go smaller, but this allows me to expand into it and store jars there. This got me to a 40x48 building. If price dictated, I could fit it into a 30x48 building, but the extra space will be utilized, I'm sure. I checked at my preferred building site, and it fits.

While looking at building designs, I found a tubular design that would allow me to install the building myself (and some friends). That made me feel better because I can save money doing that. Then, I spoke with some people that put up buildings they bought from Menards. It's a wood frame pole building with trusses. I went online, used their design tool, and voila. $21K with 11% off I get it for $19K. This includes two garage doors, one regular door and six windows (see below). That, I can afford. The trusses scare me, but I have several strategies to put them up. That's coming in the next article (I hope).

*This is how it stands at the time this went to press. Four walls and half a roof. I will take you through the trials and tribulations of the build in the next installment.*

At this point, I had to stop thinking like a beekeeper and start thinking like a contractor. I needed someone to pour the slab. Turns out there are seven to eight different ways of pouring the foundation/slab and I got quotes ranging from $23K to $47K. I need water coming in from the well. I need electricity coming from the pole. I need sewer lines and drain lines set up before the concrete is poured. This is the stuff that I know nothing about. It took several phone calls to businesses that folks recommended to me and several meetings at the building site. It was/is a steep learning curve, but finally people are lined up and the plan is in place. The building permit application was submitted last week. Wish me luck. I will let you know how the construction goes. BC




*I finally settled on a 40x48 building. It allows ample space for a garage, bottling room, washroom, and extraction room. The space between the bathroom and the lower wall is where I will eventually put in a cold room. That leaves a 24x40 space for extraction and storage.*

*Sedum 'Autumn Joy' A.I. Root*

# Sedum for Pollinators

## Alyssum **Flowers**

Sedum, also called stonecrop or ice plant is in a large family (Family Crassulaceae) of succulents that mostly grow in sunny, dry areas in Zones 4-9 and fit well in rock gardens, train and miniature gardens, along sidewalks and edges of perennial or pollinator gardens. Native to temperate zones and mountains in the tropics, they are heat and drought tolerant as well as deer/rabbit resistant. The flowers attract a myriad of small-medium sized butterflies, skippers, many species of bees as well as colorful flies and beetles. You can't go wrong planting a variety of these showy and attractive pollinator magnets!

Sedum has two main growth habits, upright and creeping, with pale green, blue or brick red leaves. The flower color ranges from white to pink to fiery red. Upright sedums or border sedums (*Hylotelephium spp*) begin as short, green and fleshy mounds each Spring then the stems elongate to reach 2-3' tall with broad flat leaves. In late Summer, clusters of four petaled, star shaped flowers develop toward the top of the plant and at the tip of each stem resulting in masses of color that lasts over a month. As the temperature cools in the Fall, both the plant and flowers deepen in color.

The creeping varieties vary in shape and growth habit as well as some are short but upright while others creep horizontally across the ground. They rarely exceed 2" in height. Most people are familiar with "Hens and Chicks" which are popular additions to planters, but many trailing species are available, all of which attract pollinators and brighten the garden. Another common cultivar is golden stonecrop, a creeper with spikes of bright yellow flowers. Others have green leaves with dark red edges and red flowers or fuzzy white leaves. The most common is Sedum 'Autumn Joy', grown at AI Root, which has hot pink flowers in the Fall which darken to deep red. The leaves gradually become plum colored which adds a dramatic splash of color when other gardens have turned brown.

Stonecrop can easily be propagated by cutting pieces and rooting in moist potting mix or directly into the ground. Lay the stems on moist soil or cover a part of it with moist leaves or soil. Within a few weeks, the section under the soil will have small roots. Keep the area moist until new growth appears then transplant it carefully or leave it where it is growing.

Sedum *'Autumn Charm'* **https://www.gardenia.net/plant/sedum-autumn-charm**

Sedum *'Purple Emporer'* **https://www.bluestoneperennials.com/SEPE**


**References:**

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*Sedum 'Steel the Show'*
**https://www.bluestoneperennials.com/SESS**

**SEDUM REFLEXUM**
*'Blue Spruce'*

**https://www.drought-smart-plants.com/sedum-reflexum-blue-spruce.html**

*Sedum kamtschatcum'Little Miss Sunshine'*
**https://www.bluestoneperennials.com/SELM**



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# Beekeeping is in Transition

## Part 1: It has always been.

**English is my only language.**

I have always envied those of you who are multi-linguistic and acquired multiple languages as a child. Not me. As a graduate student, I sweated through Introductory German and Spanish and learned just enough to meet my required language obligations – and not a single *palabra* more. Those of you who learned other languages – painlessly – as children were fortunate.

**I accidentally learned computer use**

My wife typed my required academic papers on a Smith-Corona portable typewriter. Hardly ten years later, she was teaching high school students to use Tandy Radio Shack computers with primitive TRS-80 *Scriptsit*[1] software. She taught herself the mechanics of computer use. My career-long job at Ohio State required me to learn various computer functions and to regularly use them. I never had a plan to grow in my computer literacy, it just happened as I met my routine job requirements. Now, while I am no electronic whiz, for my age, I am a reasonably proficient computer user. My wife and I were lucky. We learned slowly and we learned over a long time. It wasn't painful. In fact, my computer has become one of my best electronic friends.

**I stumbled into beekeeping**

I never had a plan to become a beekeeper. My initial plan was that I would become an entomologist, but while pursuing that goal, I fell into beekeeping. I am a lifelong woodworker. When I was first exposed to beekeeping, one of my first thoughts was, *"I can build all of this stuff."* For years, I did just that. Ironically, of the hundreds of boxes I built, none remain – not one. In the late '70s, beekeeping was simple and practical. I was lucky to have started when it was so much simpler. You *really could* build your own equipment, and you didn't need a lot of money.

**I admire today's New Beekeeper**

If I had to start beekeeping today, I don't know that I would. It's daunting. It's expensive. If I had to begin learning computer use today, I don't know that I would – or could. If I decided to become a woodworker today, I doubt that I would. I am certainly not going to seriously study other languages at my age.

So, I admire today's new beekeeper. Modern beekeeping is complex – indeed, I would say that it is needlessly complex. While mite control and queen management equipment needs are complicated and necessary, a good number of the listings in bee supply catalogs are not truly required. These apicultural appliances are listed because I want them, but not because I must have to them to keep my colonies productive. Today's catalogs are beautiful, full color publications filled with bee baubles that fire me off and make me want to spend money. But I confess, that at times, I must stop and study the catalog item to understand what a particular piece of equipment is used for and exactly why I want it.

In life, if you stop, it will pass you by. Beekeeping is no different. Beekeeping is in transition. It has always been in transition. The beekeeping I started in the early 1970s is not the beekeeping of today. Not better. Not worse. Just different.

**We never used skeps in the US**

Seeley, in his book, *The Lives of Bees*[2], postulated that, when searching for nest cavities, swarming bees could have come to human homesites and found unused baskets and containers that the homeless swarm could claim as their nest abode. Of course, humans, desiring sweet honey, took notice of this hypothetical scenario and began to fashion baskets just for bees ergo - skeps. It was so much better to have the colonies right on the homesite rather than having to beeline them all over the surrounding environs.

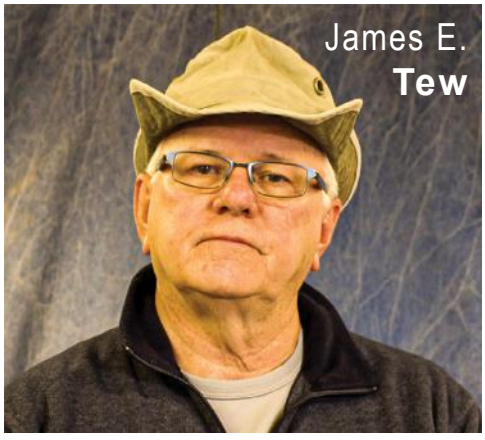
In this country, especially on the eastern and southern sides, old growth forests were abundant – standing in the way of progress (as it were). US beekeepers rarely used skeps to house bees. Lumber was plentiful, so (apparently) we built boxes for our bees and called them box hives. A technical concept – right?

The hive design epoch was a glorious time in beekeeping development. Beekeeping has a complex history of tried and discarded bee hive designs. We have worked from the very earliest days of bee colony management up to this very moment trying to develop the absolute best *"box"* for our colonies. But to quote lyrics from the musical group – U2, *I still haven't found what I'm looking for."* With great gusto, modern-day beekeepers continue to design and redesign beehive styles. There's no end in sight. Nothing wrong with that.

**Beekeeping is in transition. It always has been evolving.**

In my earliest beekeeping years, box hives were still occasionally used by older beekeepers. These crude hives were not coveted and, being difficult to inspect for diseases, were commonly considered illegal by state regulatory authorities. These crude boxes represented old-styled, unimproved beekeeping. Ironically, these simple box hives represent the last hive design that completely allowed the bees to lay out the interior combs in the style that they wanted.

[1]Scriptsit is Latin that roughly translates to "wrote"




[2]Seeley, Thomas D. 2019. The Lives of Bees, The Untold Story of the Honey Bee in the Wild. Princeton University Press. Princeton and Oxford. 353pp.

No frames and no foundation – box hives were the last natural bee hive. Beekeepers just supplied the cavity. The bees supplied the internal appliances.

One of the greatest lamentations of my bee life was that my brother and I did not document one of the last box hives apiaries in our home town before he and I converted all the irregular boxes to *"modern"* hives. So eager was I to make these hives better, I snapped not a single photo of the old rustic boxes as we transferred them to "modern" Langstroth hive designs.

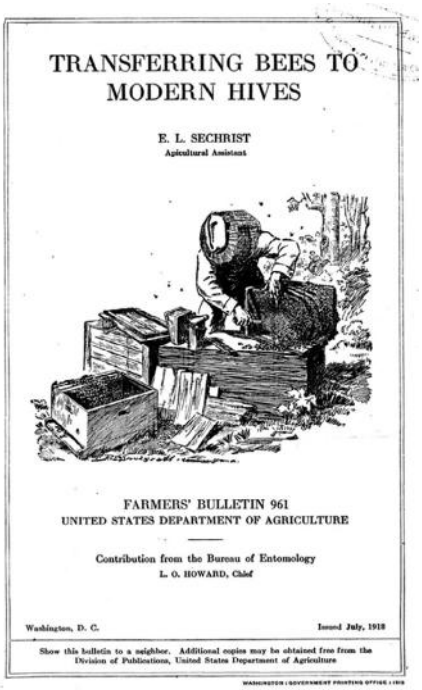

*Figure 1*
*Box hives being transferred to standard equipment*[3]

There were USDA (1918) pamphlets describing how box hives were to be converted to Langstroth equipment. The old way was dying, and I was there for a bit of the departure and did not document the passing. This was a major transition through which beekeeping passed. You probably missed it.

## Bee Lining, an old-time procedure that has transitioned into obsolesce.

Box hives are not the only beekeeping concept to pass into oblivion. There is an entire beelining technology that is now gone except for the few who still perform the procedures for enjoyment and natural satisfaction. Is bee lining now like modern-day Geocaching (**https://www.geocaching.com/play**)? Today, finding bees by lining them seems to be only kept alive by a dedicated few.

The technique required a small, improvised box[4] to capture a few foragers at water or food sources.


TRANSFERRING BEES TO MODERN HIVES

E. L. SECHRIST
Apicultural Assistant

FARMERS' BULLETIN 961
UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Bureau of Entomology
L. O. HOWARD, Chief

Washington, D. C. Issued July, 1918

Show this bulletin to a neighbor. Additional copies may be obtained free from the Division of Publications, United States Department of Agriculture

*Figure 2*
***https://archive.org/details/CAT87202609***

While confined within the lining box, bees were dusted with some kind of powder - maybe powdered sugar - and then, when individually released, their flight path was visually followed as the freed forager flew back toward her nest site. Of course, this process is not as easy as it sounds and took time and commitment and multiple dusted foragers. Success was never guaranteed. Recently, Seeley[5] wrote a book on this subject and generated renewed interest in an old bee management procedure.

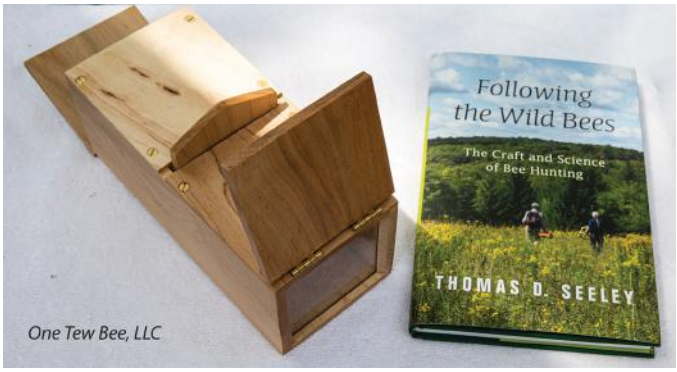



*Figure 3*
*A bee lining box with an instruction book*

On this bee lining subject, I have been saving a story for more than a year that is an old, old memory recited by a beekeeper who lined bees as a child. I will not use his name here, but *E.T.*, if you're reading this, you know who you are, and you know it's your story. I had thought that a proper moment would come along within an article for this memory, but due to the unique features of this story, an opportunity has not yet arisen. Happily, it fits well enough here. So, for the first time in print….a old time personal memory of beelining.

## Children lining bees

It was a simple procedure. No lining box was used – just six kids of varying ages. Flour was sprinkled on several bees at a watering source or at a food source. As the disturbed forager took flight, a sharp-eyed kid would run after the marked bee until the bee was lost. The kid would then wait, at that spot, until another flour-marked bee flew by. Then run again. The kids worked in relays, dusting, running, yelling, and pointing. E.T. said that they wanted dusted bees to stay near ground. The flour dust made the bees heavier, thus keeping them nearer the ground and marking them as well. Bees flying higher, against the sky, were harder to see. If possible, dusting bees near an open field was preferable because bees would fly lower across an open field.

Using nothing more than a bit of flour, six kids, and a lot of energy, these kids would spend the afternoon – in game like fashion - chasing after white-dusted honey bees. After successes and failures, a nest site would frequently be found. These beelining events were happening from about 1946-1950.

The discovered nest was nearly always in a tree cavity – some nests openings were high while others were lower. During those times all those years ago, land boundaries were more of a suggestion than a restriction. In my own experiences from those times, a kid could just roam the world. It was yours. Don't let a few fence rows hold you back. Once found, E.T.'s dad would contact the land owner for permission to get the

[3]Colonies that were being transferred were frequently *"drummed"* but that is yet another old process that is now obsolete.
[4]At antique dealers today, these lining boxes are highly collectible. They are always simple and always expensive.
[5]Seeley, Thomas D. 2016. Following the Wild Bees, The Craft and Science of Bee Hunting. Princeton University Press. 164pp

tree, which was subsequently cut down and torn open. A tree was never taken without permission.

They did not always line the bees. Sometimes, the kids would just wander through swamps and forests looking and listening for wild colonies. Also, hunters would tell his dad about bee trees that they noticed. Bees were plentiful and common. No thought was given to their individual survival concerns.

Amazingly, while the nest was being destroyed, no typical protective gear was worn. E.T. did not even own bee gloves or veils. He said that the bees were crazy defensive at first but calmed down and began to engorge on honey[6]. Yes, they were all stung - multiple times. The bees were dark, small bees – probably some kind of German variety.

His Dad was not a beekeeper and essentially had no interest in becoming one. The most hives E.T.'s family ever had was a single box hive – just one. They had no concern for the bees. They never made any effort to save anything but honey. Bees, brood, and wax were simply discarded. In no way were these kids beekeepers. They were accomplished *"honey hunters."* But that was not all they hunted.

In a way, E.T.'s family also lined turkeys. One of the kids would stealthily follow a turkey hen - but not too close. If the hen spooked, the kid would move from view into a nearby hiding spot. *(JTew guess – the kids were probably following a partially domesticated turkey hen hiding a nest in the wild.)* The kids would begin to formulate an idea where the hen was going. Over time, a trail would start to emerge. One of the kids would hide, out of sight, near the trail the hen turkey was taking. Different kids would be hiding in different places. The turkey hen was smart and would not take the same pathway and would abandon the trip if disturbed. The kids were pretty clever, too.

Once the nest was found, the kids would use a long-handled wooden spoon to rob some of the eggs – but not all. If all the eggs were taken, the turkey would abandon the nest. The nest could not be touched in any human way. The pilfered turkey eggs were put underneath a brooding chicken hen. During one specific summer, the kids successfully raised something like 20 turkeys from these eggs robbed from various turkey nests and incubated beneath chicken hens.

My friend, E.T., said that after he matured and became a committed beekeeper, he was pained at how much damage he and his siblings caused the bees. Disregarding the season, they took the honey any time they could find a nest. He said that they did not know to have concern for the condition in which they were leaving ravaged colony. For both bees and turkeys, the only equipment really used was six kids watching and working in relays and an adult to take down the tree. I have never heard such a story as this one.

## It was a different time

It was a different time. In this particular phase of transitional beekeeping, destroying box hives and robbing bee trees was not anything unusual. Today, clearly things have changed. Beekeeping continues to be in constant transition.

## Part 2, next month

Dear reader, thank you for staying with me to this point. Next month, I would like to continue this discussion as beekeeping continues to evolve. Exactly what is *medium brood* foundation and why do I want it? How many *section scraping knives* should I own? How many *Hoffman frames* do I need? Why are there sometimes *hooks* on my foundation sheets? And comb honey, *oh my stars*, the herculean efforts earlier beekeepers expended to get the delectable comb product. Plastic. Chemicals. Mites. Pesticides. We have been very busy changing and adapting. That's a lot of transition. Until next month, thank you so kindly for reading.

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[6]To me, this is a very interesting comment. At some point, does a colony under attack relinquish the defensive mode and shift to saving enough honey stores to make a start at another location? Remember, the nest cavity has been destroyed. Would that destruction not make more survival sense than fighting to the death at the home nest location for an obliterated cavity? Could the queen fly – at all? And consider the average wild nest size. Most likely, the population was small compared to our big, managed colonies of this time. Not as many defenders to sting beekeepers. Let's both think about this some more.

# Valentine's Honey Recipe –

Shana **Archibald**

### Cream Cheese Cookies

**INGREDIENTS**

1/2 cup butter, softened (1 stick)
8 ounces cream cheese, room temperature
1/2 cup of honey
1 egg
1 teaspoon vanilla extract
1 teaspoon almond extract
1/2 teaspoon baking powder
1 3/4 cup cake flour *if you don't have cake flour; add 2 tbsp of cornstarch to the same amount of regular flour*

**INSTRUCTIONS**

Line baking sheet with parchment paper. You can use aluminum foil, if you don't have parchment paper. Cream together butter and cream cheese with electric mixer.

Add honey and beat for one minute. Add egg and beat to combine. Add extracts and beat until combined. Add in baking powder and cake flour (in three sections), mixing to combine.

Once incorporated, refrigerate dough for at least an hour.

Preheat oven to 375°F. Dough will be sticky so use flour on your hands to roll out 1-2 inch balls. You can use the bottom of a cup/glass dipped in flour to gently flatten the balls, if you'd like. Don't flatten too much or the cookies won't puff up.

Bake for 9-11 minutes. Important: Pull them out when you see the underside edges turning golden. These cookies are the perfect "simple" cookie, and aren't overly sweet. Feel free to add powdered sugar, your choice of frosting or glaze to them, for extra sweetness.

# CALENDAR

### ♦GEORGIA♦

**Georgia Beekeepers Association** is holding their 2022 Spring Conference on February 18-19, 2022 at the Robert F. Hatcher, SR. Conference Center at Middle Gerogia State University in Macon, GA.

Featured keynote speakers include Dr. Mohammed Alburaki, Kent Williams, Dr. Lewis Bartlett, and Dr. Keith Delplane.

For details and to register go to **gabeekeeping.com**.

### ♦INDIANA♦

**Indiana Bee School XX** will be held February 26, 2022 at Horizon Convention Center in Muncie, Indiana. Cost is $50 for members and $60 for non-members. Our Beginning Classes cost $55 for members and $65 for non-members. All registrations include lunches.

We have three guest speaker this year for an oustanding diverse agenda. Our guest speakers will be Geoffrey Williams, Brock Harpur, and Joan Gunter.

Our breakout sessions include "Using Technology in Beekeeping," "Beekeeping as a Supplemental Cash Crop," and "Races of Honeybees-Characteristics and Traits."

We hold a silent, live auction and raffle with over 30 vendors.

For more information about speakers, topics, vendors, hotels, and to see the registration links, visit **https://indianabeekeeper.com/events/indiana_bee_school_xx**.

**The Heartland Apicultural Society (HAS)** has made plans to host its 2022 conference in June in Evansville, Indiana.

Watch **www.heartlandbees.org** for details.

### ♦MISSOURI♦

**Missouri State Beekeepers Association** will hold its 2022 Spring Conference on March 11-12 at the Truman State University Student Union building, 901 S Franklin St, Kirksville, MO 63501.

Speakers include Zac Lamas, Marla Spivak, and Carl Korschgen.

Afternoon breakout classes on Friday and Saturday include two segments on Queen Production by Queen Breeder Cory Stevens, EAS Master Beekeeper; Microscopy Discoveries in Beekeeping, and more.

There will be a vendor hall during the entire conference with state and national beekeeping supply vendors.

Keep updated on conference details, registration, and hotel accomodations at **www.mostatebeekeepers.org**.

**Eastern Missouri Beekeepers** to host 15th Annual Beekeeping Workshops on February 5th and 12th, 2022.

Two days of professional, virtual beekeeping instructional presentations for beginners and experenced beekeepers. This will be held on ZOOM Webinar. Registrants may attend either or both courses for a single tution cost of $20.

Instructors for the experienced course on February 12th include Dr. Jennifer Tsuruda, Assistant Professor of Entomology, University of Tennessee, and Mary Reed, Chief Apiary Inspector for the Texas Apiary Inspection Service (TAIS).

Instructors for the beginners course on February 5th include Bridget Mendel Lee, Bee Lab Team Leader, Becky Masterman, PhD., Bee Squad Instructor, and Ana Heck, Michigan State University, Department of Entomology.

Registration is available online at **www.easternmobeekeepers.com**. More information is available by email to **info@easternmobeekeepers.com** or calling **314-669-1828**.

### ♦OHIO♦

**Greater Cleveland Beekeepers Association** is holding Beginning Beekeeping classes on Wednesdays in February 2022 (2-2, 2-9, 2-16, 2-23). Classes run from 6:30-9pm. It will be held at Cuyahoga County Fairgrounds, Building 25.

Registration now open. It is $50 which includes four class sessions and a one year family membership to GCBA.

For more information and to sign up visit **greaterclevelandbeekeepers.com**.

**Lorain County Beekeepers Association** is proud to announce the 27th Annual Beginner Beekeeping Class.

The classes will be held on March 4, 11, 18, and 25, 2022 from 7pm-9pm at Life Church (1033 Elm Street, Grafton, Ohio 44044). The cost is $50 and includes a one year LCBA membership and a montly email newletter. Books will be available for an additional $23 fee during classes.

For more information and to download the Class Registration Form go to the LCBA website: **www.loraincountybeekeepers.org.**

### ♦WYOMING♦

**The Wyoming Bee College** beekeeping pre-conference workshops and conference will be held at Laramie County Community College in Cheyenne, WY, on March 11-13, 2022.

The pre-conference on Friday is offering three different workshops and the main conference offers everything from beginning beekeeping through journeymen and advanced beekeeping.

For more information, please isit: **http://www.wyomingbeecollege.org**.

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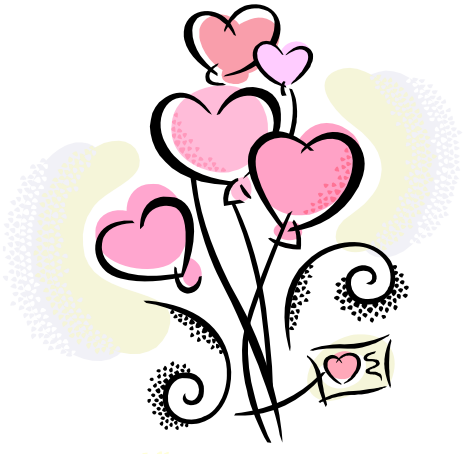

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I've known three grown men who were convinced that – within a matter of weeks – treasure-laden Spanish galleons would be salvaged from the depths of the Caribbean, and that they – investors in these unlikely enterprises – would become rich beyond your wildest dreams. One was a likeable young man fresh out of the Navy, who did odd jobs around the farm. He told my ex Linda that he planned to buy a Lamborghini once the jewel chests got pried open and all the Aztec gold and silver weighed and sold to the highest bidder.

How do you talk someone down from such an illusion? Linda put it this way: "This is tragic. He's such a nice young man, and I really want him to get that car. I want his dreams to all come true."

My gal Marilyn owns the oldest house in town. It's a diamond in the rough, but her renters cover the mortgage and taxes. She lives here on the farm with me and her blue heeler Pepper, along with her lambs and chickens and her dead 1992 Volvo, for practically free. I call this a really good deal.

A few weeks ago when her tenant had us over for his birthday party, he made an announcement. He'd struck a deal to trade his partially restored 1970 K5 Chevy Blazer for a sweet 1968 Corvette that just needs a little brake work. He showed us photographs of the Corvette. The Blazer was already gone. Two Russians picked it up. Seriously, Russians! All David had to do now was straighten up some hang-up with the title, send it off to Texas, and wait for his 'Vette to show up. He was pumped. My scam antenna immediately popped up, but for once I kept my mouth shut. It was his birthday, after all.

A Blazer for a Corvette? To me it sounded like trading a sack of potatoes for a bucket of Tupelo honey. But what do I know?

Marilyn and I talked this over. A couple of days later I dropped by. I cautioned David that he might want to hang onto that title, until he got something in return. He allowed as how getting scammed had entered his mind but then showed me some legitimate-looking documents from the seller, who insisted that he receive the Blazer title before the Corvette got shipped. Against all odds, David was committed. Within days the seller had both the Blazer and the title. David had nothing. I told Marilyn, "That Blazer's at a Denver chop shop!" Once a fish swallows the hook, you've got him. There was nothing more I could do.

But this is a bee magazine, so let's talk about beekeeping! Why do we make it so complicated? Grandma had bees on the ranch, and I'm pretty sure she didn't spend much time "looking for the queen" or stressing over bee diseases. This was long before *Varroa* mites, and it was Montana, so she probably fed some sugar syrup when spring didn't arrive on schedule. But I suspect she mostly just put on supers and harvested honey.

When Grandpa got behind on the mortgage, Doc Packard repossessed the ranch. He informed the good citizens of Jefferson County that, "If Bill Vanderhyde can't ranch, I'll by God find a man who can!" That stung. You bet it did.

Grandma and Grandpa bought the house in Whitehall with money Grandma had squirreled away over the years from selling apples and honey.

Except for those darned *Varroa* mites, beekeeping today isn't so different from Grandma's time. To keep your bees alive requires that those little darlings have adequate honey stores. In addition, bees need some relief from mites and the viruses associated with *Varroa*. Even if you apply a chemical mite treatment for *Varroa* -- and you'll almost certainly need to – you need to confirm that the treatment worked. You might need a Plan B. If your bees get American foulbrood (AFB), you'll need to deal with it, so as to not infect the neighborhood.

Other things are important but maybe not critical. If your bees swarm, well, so what? Maybe you have some chalk brood or European foulbrood. They're generally not fatal. Keep your eye on the ball! If your main goal is to keep your little darlings alive, then most bee "problems" aren't really that important – or, like pesticides, they're out of your control. Stress over what really matters and what you can actually impact: honey stores, mites, AFB.

If beekeepers, especially backyarders, spent half the time monitoring and controlling mites that they waste obsessing over hive insulation, they might learn that uninsulated hives with very low mite populations winter much better than insulated hives with higher mite numbers. Unless you live an extremely cold place, like the interior of Alaska, cold weather won't kill your bees. But mites will.

AFB's a little tricky, but you might never see it. So don't borrow trouble, OK? This is generally a struggling hive, with sunken, perforated, capped brood cells with dark goo inside them. AFB has a distinctive and occasionally overpowering smell that you won't forget. The "ropy test" is pretty definitive. You poke a matchstick into a brood cell, and if goo sticks to it and stretches like mucus when you pull the matchstick away, that's AFB.

Have I made this simple enough? Do you think me wise? I must know what I'm talking about if I write for *Bee Culture*, right? Please. I can get it wrong, too, just like you.

Take that car scam I pontificated about earlier. I have an update. When I drove past Marilyn's house this morning, there was a shiny blue 1968 Corvette parked outside.

Ed **Colby**

# Sweet '68 Corvette

BOTTOM BOARD

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**b DECO EMBOSSED JUGS**

5 LB - $90.67 / 72 Ct. Case
3 LB - $118.87 / 126 Ct. Case *No Caps*

**c CLASSIC PLASTIC JARS**

32 oz - $73.77 / 110 Ct. Case
*No Caps*
16 oz - $94.19 / 225 Ct. Case
*No Caps*

**d SQUARE PLASTIC**

16 oz - $225.95 / 343 Ct. Case
*With Lids*

## Glass


**e GLASS 3 OZ. MINI MASON**

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*Lids now available in Gold, Black or White*

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**g 12 OZ & 3 OZ GLASS SKEP JARS**

12 oz Skep Jars $18.85 / 12 Ct.
3 oz Skep Jars $15.95 / 24 Ct.
*Gold Metal Lids Included*

**h MUTH JARS**

4 oz - $32.49 / 36 Ct. Case
8 oz - $14.95 / 12 Ct. Case
16 oz - $19.95 / 12ct. Case
*Includes Corks*

**i CLASSIC GLASS JARS**

8oz - $19.10 / 24 Ct. Case
16 oz - $9.75 / 12 Ct. Case
32 oz - $13.95 / 12 Ct. Case

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