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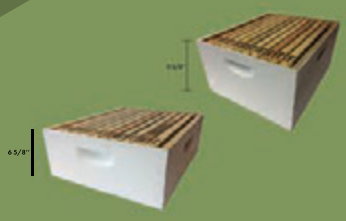
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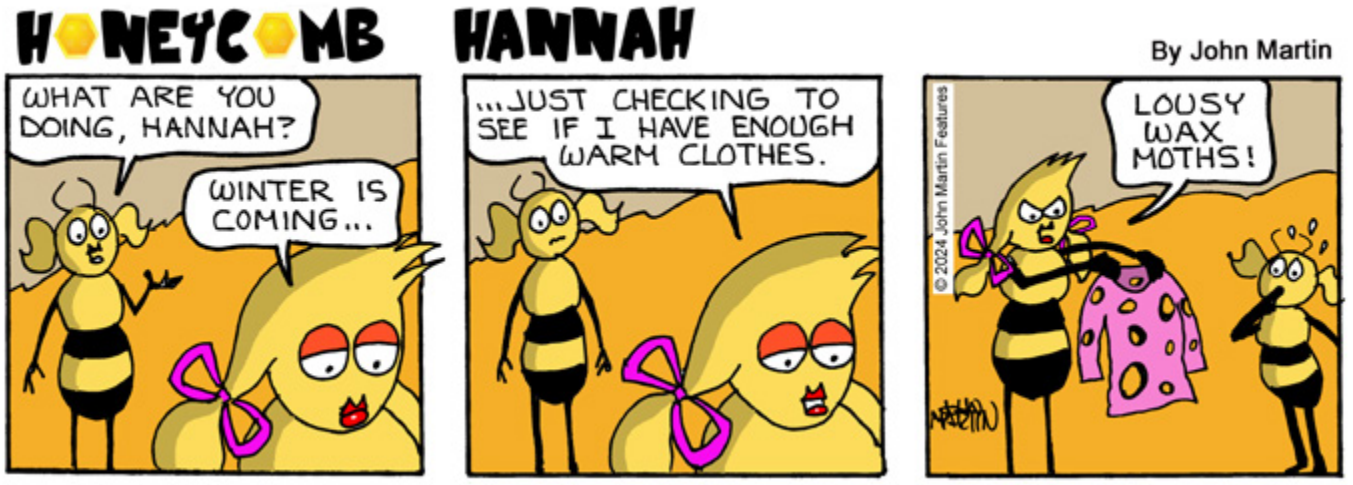
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Sincerely,
Louis R. Felty
Metro Beekeepers Association

Beekeeper Haiku

Early Spring,
examine hives,
prepare feeders.

Mail order brides,
now welcome,
by queen less colonies.

Examine my queen,
long and slender,
a perfect female.

Count drones,
men of distinction,
insect gigolos.

Pupa well fed,
royal jelly,
competition emerging.

Pollen pockets,
all filled,
honey flow peaking.

Bees dance,
A figure eight,
directions given.

Buckwheat frustration,
Morning giving,
afternoon closed.

Propolis collected,
stuck on my teeth,
every crack packed.

By William Price, OH



Activity Book

"I Spy with all Five Eyes" is a pollinator activity book, starring *apis mellifera*. There are fun, educational activities for all ages in its 42 pages, along with a friendly flower scattered throughout, hoping you'll find her.

Individual cartons of 48 are available for a suggested donation to the Kalamazoo Bee Club for $60, including shipping, at **pollinatoractivitybook@gmail.com**. Please help us spread the importance and joy of pollinators.
Charlotte Hubbard





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NEXT MONTH

DECEMBER

Region 1
- Check supplemental liquid, feed regularly
- Feed, feed, feed
- Too late for *Varroa* treatment(s)
- Clear snow away from entrances
- Wrap/insulate colonies if you haven't already
- Check bear fence and mouse guards
- Start working on cleaning, assembling equipment for 2025
- Read *Bee Culture*

Region 2
- Be sure colonies have a minimum of 40 lbs of stored honey
- Reduce entrances
- Order queens and packages for Spring
- Provide wind block for colonies
- Repair/paint boxes, build frames, read *Bee Culture*
- Feed if hive weight is too low
- Do not disturb

Region 3
- Remove forgotten mite strips
- Feed as needed
- Combine weak colonies
- Don't let them starve
- Extract honey, leave enough on for lousy Winter
- Put up windbreaks
- Repair and paint equipment

Region 4
- Consider sugar bricks or fondant
- Insulate colonies with foamboard
- ID deadouts, clean them out
- Check supers for wax moths
- Pray they stay alive
- Strap down for Winter winds
- Be sure mouse guards are in place
- Attend conferences

Region 5
- Wrapped hives
- Mouse guards
- Supplemental feed if needed
- Move to California
- Be sure windbreaks are strong
- Feed, and feed some more 2/1 sugar syrup
- Take a break

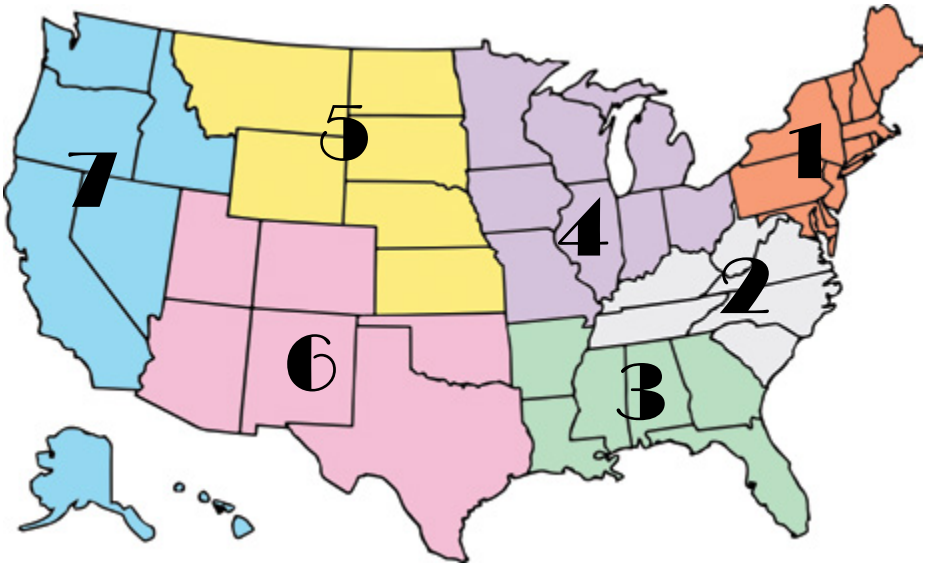
Region 6
- We can still do mite treatments in the SW
- Monitor available food stores
- Prepare equipment for next season
- Plan for Spring queens and splits
- Check for deadouts
- Have syrup premade and ready
- Wrap hives if you are in the mountains

Region 7
- Condense colonies into one box
- Upper entrances for moisture control
- Feed if lite in weight
- Lift back of hive to check weight
- Provide insulation in mountains
- Check mite levels with alcohol wash
- Assemble woodenware
- Read, rest, read some more

Honey Reporters Wanted

We are expanding our Honey Reporter population in EVERY region. We ask that you fill in most of the sections, most months, and our short survey at the bottom. 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 **Stephanie@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.

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NOVEMBER – REGIONAL HONEY PRICE REPORT

REPORTING REGIONS											History	
	1	2	3	4	5	6	7					
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS								**Range**	**Avg.**	**$/lb**	**Last Month**	**Last Year**
55 Gal. Drum, Light	2.00	-	3.02	2.64	2.29	2.90	-	1.85-3.60	2.64	2.64	2.83	3.02
55 Gal. Drum, Ambr	2.00	3.55	2.98	2.64	-	2.20	-	1.65-3.60	2.72	2.72	2.78	2.89
60# Light (retail)	249.88	341.25	224.80	223.43	247.50	218.67	-	120.00-450.00	248.70	4.15	263.38	254.90
60# Amber (retail)	262.14	279.00	224.80	210.57	-	199.50	240.00	120.00-390.00	241.69	4.03	253.58	250.83
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	116.58	118.80	93.75	94.20	87.36	90.00	-	75.00-168.00	107.57	8.96	107.64	105.69
1# 24/case	181.22	191.40	156.17	143.82	181.42	116.94	-	72.00-336.00	164.99	6.87	172.15	161.53
2# 12/case	162.83	196.07	149.17	120.80	173.76	156.00	-	90.90-360.00	154.62	6.44	154.43	146.79
12.oz. Plas. 24/cs	139.29	190.08	115.25	107.99	118.32	60.00	-	60.00-360.00	131.92	7.33	128.36	126.39
5# 6/case	186.04	154.35	168.99	125.59	156.48	144.00	-	108.00-300.00	164.59	5.49	184.97	161.82
Quarts 12/case	194.34	193.08	204.33	183.09	226.40	200.94	-	120.00-288.00	196.51	5.46	213.63	198.21
Pints 12/case	118.00	120.58	111.33	111.86	173.67	135.00	-	72.00-275.00	125.56	6.98	124.42	123.00
RETAIL SHELF PRICES												
1/2#	6.71	7.85	6.03	5.93	5.45	7.50	7.58	3.00-12.00	6.78	13.56	6.86	6.22
12 oz. Plastic	10.11	8.93	7.81	7.11	6.38	8.50	11.00	3.69-20.00	8.87	11.83	8.30	7.62
1# Glass/Plastic	11.55	12.48	10.35	9.50	10.53	11.63	14.40	5.99-20.00	11.35	11.35	11.36	10.58
2# Glass/Plastic	19.22	22.25	19.30	19.09	21.55	21.60	23.25	12.00-34.00	20.22	10.11	19.41	17.83
Pint	13.55	14.73	11.94	11.38	17.63	16.60	16.00	7.99-30.00	13.83	9.22	14.27	13.25
Quart	26.24	25.31	23.93	20.76	22.65	27.60	26.40	13.00-55.00	24.43	8.14	25.18	22.45
5# Glass/Plastic	37.82	33.58	49.25	28.67	38.85	34.00	35.00	10.00-60.00	35.97	7.19	38.38	36.99
1# Cream	13.93	21.00	12.42	12.44	-	15.00	14.00	8.00-28.00	13.53	13.53	13.75	12.78
1# Cut Comb	16.54	18.00	19.17	18.14	-	20.00	17.00	8.00-30.00	17.64	17.64	16.80	15.45
Ross Round	12.00	20.00	-	12.40	20.00	25.00	-	8.00-25.00	14.38	19.18	12.86	13.82
Wholesale Wax (Lt)	8.31	7.84	8.25	6.95	6.50	6.50	-	4.00-10.00	7.59	-	7.62	7.52
Wholesale Wax (Dk)	7.21	7.18	6.44	6.86	-	3.50	-	3.00-10.00	6.69	-	6.57	6.94
Pollination Fee/Col.	103.50	82.50	106.00	150.00	200.00	-	106.67	50.00-250.00	110.19	-	102.70	113.40
Price of Nucs	204.80	195.00	170.00	207.00	232.50	225.00	180.00	125.00-280.00	200.29	-	187.85	183.47
Price of Packages	155.83	-	125.00	205.00	147.50	173.98	-	120.00-255.00	160.45	-	155.83	161.86

Please note: anywhere within each region that there is a '-' it is because no information was sent to us for that specific item in that region.

How do you compare to our honey reporters? All data collected is from August/September 2024.

Average Honey Flow Time and Amount per Region

Region 1:
- *Timing of Flow:* Normal
- *Amount of Flow:* Average

Region 2:
- *Timing of Flow:* Normal
- *Amount of Flow:* Average

Region 3:
- *Timing of Flow:* Normal
- *Amount of Flow:* Equally light and average

Region 4:
- *Timing of Flow:* Normal
- *Amount of Flow:* Average

Region 5:
- *Timing of Flow:* Equally early and normal
- *Amount of Flow:* Light

Region 6:
- *Timing of Flow:* Normal
- *Amount of Flow:* Average

Region 7:
- *Timing of Flow:* Normal
- *Amount of Flow:* Average

Mite Treatment per Region

Region 1: Most used a Formic product.
Region 2: Most used an Unspecified Oxalic Acid product.
Region 3: Most used no mite treatment.
Region 4: Most used a Formic product.
Region 5: Not enough data.
Region 6: Most used an Oxalic Vapor product.
Region 7: Most used a Formic product.

Top Blossoming Plants per Region

Region 1: Goldenrod, Aster, Japanese Knotweed, Knotweed, Jewelweed, Rose of Sharon, Knapweed, Joe-Pye-Weed, Clover
Region 2: Goldenrod, Aster, Wingstem, Ironweed, Crepe Myrtle
Region 3: Goldenrod, Sunflower, Crepe Myrtle, Wingstem, Smartweed
Region 4: Goldenrod, Aster, Clover
Region 5: Goldenrod
Region 6: Sunflower, Goldenrod, Aster
Region 7: Oregano, Wisteria, Indian Blanket, False Dandelion, Rose of Sharon, Aster, English Ivy

Overall Top Blossoming Plants

Goldenrod, Aster, Clover, Knotweed, Wingstem, Sunflower, Crepe Myrtle, Japanese Knotweed

Book Review
Dead Bees Don't Make Honey

Dewey M. Caron

Dead Bees Don't Make Honey by Theresa Martin (2024, Little Wolf Farm, ISBN 979-8-9902757-0-6, available from Amazon) subtitled *10 Tips for Healthy Productive Bees* is an extremely well written, practical guide to help insure success with bee colony care. If you mentor others, this book could be your instructional manual.

Author Theresa Martin is a six year beekeeper from Kentucky. She started with two colonies and now keeps 20, each individually named. Following a treatment-less management approach, she has had only a single colony loss in her beekeeping journey. *Dead Bees Don't Make Honey* clearly and thoroughly explains how she has managed such success.

Dead Bees has four sections, each different but highly informative. The first section of *10 Tips* is roughly ½ of the book. The tips are her beekeeping roadmap. Five tip examples are: Acquiring local bees, encourage more propolis, space colonies out in apiary, keep colonies smaller and insulate hives. Each tip is discussed in less than 10 pages. The format is easy to follow and flows easily. Throughout the author references back to the tips as tip #1 or tip #3 for example.

Each tip has repeating, clearly identified subheadings. The information begins with a bee biology section and then, relative to that tip, coverage of conventional beekeeping related to the tip. Footnotes and references (130 total) identify the source of the material. The last two subsections are how adoption of the tip can improve bee health and productivity and then there are personal notes by Teresa identified as "my implementation."

Theresa, in her introduction, writes that *Dead Bees* is not a "how to" book of common beekeeping practices. She recommends *Honey Bee Biology & Beekeeping* and *ABC XYZ of Beekeeping* for that information. The "my implementation" section is her personal application of the tip. She specifies that the my implementation material is "detail only of the natural practices that…" are less common.

The second section is 40 pages of 10 illustrative precision beekeeping practices. The data presented by Teresa was developed via use of the T_2SM BroodMinder© (**https://broodminder.com/**) temperature sensor. Included are five examples of how temperature data illustrates brood rearing and colony queen right condition, one example of how temperature can detect swarm departure (a distinctive 4° temperature spike), two examples of how temperature can illustrate colony stressors of *varroa* and a single nighttime visit of a skunk and the last two illustrate how beekeeper management (winterizing and colony examinations) can be documented simply via temperature measurement. We can see how winterizing a colony is especially conservative of holding a Winter heat sink and its influence on Winter brood rearing.

The third Section (20 pages) covers the concept of treatment-less management as practiced by Theresa. She describes her effort to establish a treatment-free zone around one of her apiary sites but could not get buy-in from nine surrounding beekeepers (heavy losses would be expected with adoption of treatment-free selection pressure before achieving colonies more tolerant of mites). Therefore, she describes how she adopted treatment-less management. Her wintering success speaks to the effectiveness of her adopted managements.

The fourth section includes 18 frequently asked questions FAQs – developed from talks to beekeeping groups (by the way, if you are looking for a club speaker, Teresa has a great message, well delivered – you might consider inviting her to a future meeting). She additionally has seven suggestions for novices and a detailed 21 page seasonal management calendar. It includes sufficient detail to permit adoption for where you keep bees. There are numerous photos, mostly by the author and the Broodminder charts along with tables of her beekeeping results.

This is a great self-help book for those who wish to keep bees more closely to natural beekeeping but who wish to avoid continued losses. There is nothing you couldn't do – the author recognizes we all keep bees to our individual preferences. The why and how to adopt these 10 tips is clearly detailed. If you wish to become treatment-less than I highly recommend *Dead Bees Don't Make Honey* by Theresa Martin. BC



New Product

By: SEMBA Library Staff

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The SEMBA LIBRARY is 100% FREE and immediately available on the internet for you and your bee club to use.

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While looking for **presentations** about bees on the internet, we realized there is an enormous amount of information on bees but there are almost no presentations.

Recognizing a need for **RTU** (Ready to Use) presentations and the difficulty of bee clubs to get presenters and presentations, we decided to remedy this situation. During our investigation, we also realized that there was minimal web activity other than YouTube® videos that helped the beekeeper build or create their own equipment. Therefore, like most projects our original premises developed project creep and grew to include articles about creating your own beekeeping equipment.

Consequently!

The difficulty of providing presentations for your bee club has just been made a little easier and with your help will become a free "Go To" resource for all bee clubs and reliable information for the beekeeper.

To help us achieve this goal, we would like to invite all beekeepers to **submit presentations and articles** to us to be included on the web site. To submit a presentation or an article use the "Contribute" icon on the LIBRARY/Library Information section of the SEMBA website **https://www.sembabeeclub.com/library/information**

For help creating a PowerPoint presentation, read the previous articles: Build Better Bee Presentations parts 1 – 3 in the August, September and October 2024 issues of this magazine.

NOTE: YouTube® presenters! Turn your YouTube® presentation into a printable script and a PowerPoint presentation or an article to expand your following. BC

Sincerely,

SEMBA – Library Staff- Beverly Madsen, Duane Madsen, Ed Simon

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A new threat to AMERICA?

By Dr. Humberto Boncristiani

INSIDE THE HIVE.TV

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As a beekeeper and researcher with over two decades of experience, I've been closely monitoring a trend in our industry that deserves our immediate attention. A powerful financial group is making significant moves to acquire commercial beekeeping operations across the United States. This consolidation could potentially reshape the landscape of pollination services and, by extension, have far-reaching effects on our nation's food production.

The beekeeping industry, a cornerstone of our agricultural system, is already grappling with a multitude of challenges. The widespread use of pesticides, inadequate nutrition for bees, and the persistent threat of Varroa mites have made beekeeping an increasingly precarious profession. Moreover, the control of honey prices by large packers has further squeezed the profit margins of many beekeepers. Through my extensive consulting work, I've witnessed firsthand the financial struggles of numerous commercial beekeepers across the country.

In recent months, I've become aware of a deal being circulated among beekeepers that initially seemed too good to be true. As I delved deeper into the details, I realized the potential implications of this offer could be profound for our industry and beyond.

The deal in question includes substantial upfront payments for hives, guaranteed salaries for beekeepers over multiple years, and a host of additional benefits. However, the critical aspect of this offer lies in the fine print: the new owners would gain control over pollination contracts. This shift in control could potentially give them unprecedented influence over a significant portion of our food production system.

At the heart of this development is an initiative called the GeoCure project. Its stated aim is to establish over 20 million acres of pesticide-free, non-GMO bee habitat across the United States within the next decade. While this goal appears commendable on the surface, certain aspects of the project raise important questions that warrant further investigation.

One of the most striking elements of the GeoCure project is its plan to create a "strategic reserve" of 6.5 million "non-GMO bee hives." To put this into perspective, this number exceeds the current bee population in the entire United States. The scale of this ambition, combined with the unusual terminology used, has led me to question the true intentions and potential consequences of this project.

As someone deeply committed to the beekeeping industry and its crucial role in our food system, I believe it's imperative that we bring this situation to light and examine it carefully. While it may not represent an immediate threat, the potential long-term implications for our national food security are too significant to ignore.

By sharing this information, I hope to initiate a broader, more inclusive dialogue about the future of beekeeping in America. We need to consider how changes in the ownership and control of pollination services might affect not only beekeepers but also farmers, consumers, and our entire agricultural ecosystem.

As we move forward, it's crucial that we involve all stakeholders - from individual beekeepers to agricultural policymakers - in discussions about how to ensure the resilience and sustainability of our beekeeping industry. Only through collective awareness and action can we safeguard this vital component of our food supply chain and preserve the delicate balance that exists between our pollinators and our food production systems.

Watch the video



Dr. Boncristiani is a honey bee researcher and consultant for the beekeeping industry. He is also the host of the Youtube Channel Inside The Hive.TV where he creates content related to honey bee research and the beekeeping industry.

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FOUND IN TRANSLATION

Are Your Bees Winterized?

Jay Evans, USDA Beltsville Bee Lab



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If you are in the colder half of the northern hemisphere, brood production in your colonies has slowed or stopped by now. Besides occasionally checking in on their pantries, you have only to wait patiently and hope that they, and you, did what needed to be done to hold the line against an inevitable decline in worker bee population.

What did both parties do to take some of the drama out of the next few months? As beekeepers you have a few options, besides decent nutrition, to decrease the giant sucking sound of Winter bee mortality. Darcy Gray and colleagues at Pennsylvania State University have added excellent new arguments to the role beekeepers play in keeping more colony members and colonies alive through the cold months. In "Effective pest management approaches can mitigate honey bee (*Apis mellifera*) colony Winter loss across a range of weather conditions in small-scale, stationary apiaries" (*Journal of Insect Science*, (2024) 24(3): 15; ieae043 **https://doi.org/10.1093/jisesa/ieae043**) they underscore how important it was for you to get a handle on parasitic mites in your colonies last Summer. In this study, rather than experimentally test methods (although they do cite prior evidence mounted via experiments), the authors surveyed 3000 Pennsylvania beekeepers for their management styles and checked in on their success in keeping colonies alive across multiple years. Using the intriguingly named "Random Forest Models", they sought the trees that were most important in a forest of impossibly complex factors that drive colony success or failure. These models "*are strong in characterizing nonlinear relationships with many correlated predictor variables*" and beekeepers are well aware that the good and bad factors in a bee colony's life are both intertwined and complicated (i.e., 'nonlinear').

What they found was both consistent with prior efforts and novel in offering some new subtleties. Their 'study population' comprised bees and their keepers in a four-season state, Pennsylvania. They specifically targeted beekeepers who don't hit the road with their colonies, a majority demographic for readers of *Bee Culture* and U.S. beekeepers overall. The key message, and not a huge surprise, is that beekeepers who treated for mites came back to more living colonies in the Spring. Interestingly, beekeepers who alternated across multiple mite treatments did even better, suggesting that a two-hit (or more) system is a good idea for many beekeepers. It was beyond the scope of this survey to identify the optimal two hits that have the best effect, nor did they weigh in on overall treatment intensity. In their words, "*beekeepers in the single-treatment type group may have treated repeatedly or heavily, while those with multiple-treatment types may have applied treatment less often, or vice versa.*" They DID gather data on the types of treatments used singly and multiply, showing that survival was bolstered significantly by both of the licensed organic acids, apivar (amitraz), and thymol, but especially when beekeepers used two or more of these four strategies. Interestingly, it mattered little in the end which of the four was used. Other management strategies, including the type of supplemental feeding beekeepers used, also had little effect on survival. Of the environmental components not under the whim of beekeepers, seasonal precipitation and growing degree days came out as important factors for survival for both categories of mite treatment, while on-the-ground estimates of forage seemed to rank higher for apiaries treated with just one miticide. What is striking is that colonies given a two-hit treatment regime did better across a wide range of weather and landscape challenges, again highlighting how important it is to keep mites down and the importance of hitting them with two or more active ingredients. This is consistent with the good management practices many of you teach and deploy currently.

If beekeepers have more evidence for what to do, how is the report card for your bees? Since a landmark paper by Heather Mattila, J. Lloyd Harris, and Gard Otis ("Timing of Production of Winter Bees in Honey Bee (*Apis mellifera*) Colonies" (2001) *Insectes Sociaux* 48 88–93, **https://www.tandfonline.com/doi/abs/10.3896/IBRA.1.49.2.04**) many scientists and beekeepers have been intrigued by the cues bees use to decide Winter is coming and the means they use to raise sisters who are just a bit better at hanging in there for unusually long lives. Building on excellent work in bee physiology (e.g., Huang, Z.-Y. and G.E. Robinson, "Seasonal changes in juvenile hormone titres and rates of biosynthesis in honey bees" (1995) *J. Comp. Physiol.* B 165: 18–28, **https://link.springer.com/article/10.1007/bf00264682**) Mattila and colleagues mapped out



both physiological changes in bees and how those worked best in order to achieve healthy colony numbers in the Spring. This field got a boost this month from a new paper by Jelena Spremo and colleagues in Serbia (Spremo, J., Purać, J., Čelić, T., Đorđievski, S., Pihler, I., Kojić, D., & Vukašinović, E. "Assessment of oxidative status, detoxification capacity and immune responsiveness in honey bees with ageing" (2024) *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology, 298*, 111735, **doi:https://doi.org/10.1016/j.cbpa.2024.111735**). They tackled the stresses we social organisms face while ageing in a crowded world; chemical stress, disease and just the general pressure of the environment on our fragile cells. Surprisingly, Winter bees did not show huge differences in the activity levels of genes whose proteins tackle chemical threats, when compared Summer bees. The strongest result came from two immune proteins that can generally suppress infection in bee bodies by interference or a form of 'scabbing'. Winter bee abdomens showed higher activity for these genes versus Summer bees. The abdomen region is known to produce the primary immune responses for honey bees and it seems likely that Winter bees were poised from the start to have a better immune defense against whatever challenges came their way. This is not to say that they don't differ at all from Summer bees, and ample studies have shown they do, just that as they build their armor for Winter, they have biological threats in mind along with chemical or environmental threats. Like humans, this immune defense decreased as bees grew older, but by stretching the limits they presumably kept a few more bacteria, gut parasites, or viruses at bay during their many months of life.

These studies help to divide the pie of tasks needed by beekeepers and bees to get through a long Winter. If you do your part, your bees will do theirs, and they should live to see more flowers soon enough. BC





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A Closer LOOK

Pollen Digestion and Nutrition

Clarence Collison

"Bees are herbivorous insects, consuming nectar and pollen throughout their life cycles. Nectar is primarily an energy source, but in addition to sugars contains various minor constituents that may, directly or indirectly, have nutritional significance. Pollen provides bees with the protein, lipids, vitamins and minerals that are essential for larval rearing. Chemical analyses of pollen have tended to focus on the protein component of bee-collected pollens as an index of nutritional quality. However, the substantial nectar content of such samples (~ 50% dry mass) should not be ignored, especially in view of current interest in measuring the nutritional quality of floral resources for bees (Nicolson, 2011)."

"Pollen, the main protein source for **honey bees**, is mixed with regurgitated nectar or honey during collection and then stored as 'bee bread' before its consumption, mainly by young nurse workers. It has been suggested that storage of pollen improves its nutritional value and **digestibility**, but there is little evidence for such changes. Two fresh pollen types of different protein content (aloe and sunflower), and two stored pollen types (sunflower and a mixed pollen), were fed to young caged worker bees. Daily consumption of pollen and sucrose solution, and survival after 14 days were measured. At day 14 we recorded ovarian activation and extraction efficiency, by counting empty pollen grains in the rectal contents. Extraction efficiency is a measure of pollen digestibility. Contrary to our predictions, bees did not consume more fresh sunflower pollen than fresh aloe pollen to compensate for the lower protein content of sunflower pollen. In addition, they did not consume less sucrose solution when fed stored pollen diets that are already enriched in sugar. Consumption of stored sunflower pollen resulted in a low protein to carbohydrate (P:C) intake. Survival and ovarian activation were higher on diets giving higher P:C intakes. Extraction efficiency was high (up to 99%) for all pollen diets, and comparison of fresh and stored sunflower pollen showed that storage did not make it easier to digest. Changes to pollen during storage do not confer obvious benefits to honey bees (Nicolson et al., 2018)."

"Diet is an important factor in the proper development of the individual and the entire colony. A pollen diet affects honey bees in a number of ways. It can stimulate the number and type of hemocytes (blood cells), the total number of proteins, carbohydrates and lipids, affect the histology of the middle intestine and ensure the correct ontogenesis (development) of the larvae. Moreover, selected single-flower diets can stimulate the development of the pharyngeal glands that produce royal jelly, thus conditioning the development of secretory immunity. Selected single-species pollen may also increase the phenol oxidase concentration, which contributes to the humoral response. A honey bee diet based on multi-flower pollen is more desirable than a mono-flower diet, but must be properly balanced (Bryś et al., 2021)."

"Pollen is the main protein source for honey bees, and its quality and digestibility are important factors for bee health. The effects of eight different mixed-pollen diets were compared on queenless adult survival and physiology. The mixtures represented the pollen source for bees in a natural environment. They consisted of three to five familial pollen types, and the protein percentage varied from 8.4 to 18.1%. The mixtures that contained mainly Asteraceae pollen were less consumed and enhanced bee mortality, suggesting that this pollen type offers poor nutritional quality and assimilation for the bees. All pollen diets promoted ovarian activation, but among the pollen-treated groups, the percentage of bees with activated ovaries was not related to the protein content of the diet, which suggests that ovarian activation may also depend on other nutrients. Survival was also positively correlated to the vitellogenin levels in the hemolymph. Their results showed that the amount of protein consumption and the pollen type influenced bee survival and physiology (Frias et al., 2015)."

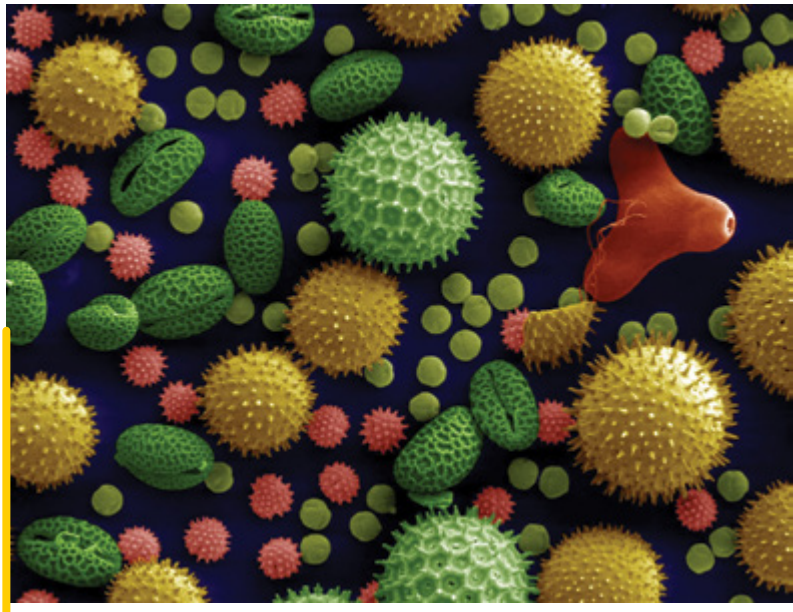
"Carbohydrate-active enzymes play an important role in the honey bee due to its dietary specialization on plant-based nutrition. Secretory glycoside hydrolases (GHs) produced in worker head glands aid in the processing of floral nectar into honey and are expressed in accordance with age-based division of labor. Pollen utilization by the honey bee has been investigated in considerable detail, but little is known about the metabolic fate of indigestible carbohydrates and glycosides in pollen biomass. Here, we demonstrate that pollen consumption stimulates the hydrolysis of sugars that are toxic to the bee (xylose, arabinose, mannose). GHs produced in the head accumulate

in the midgut and persist in the hindgut that harbors a core microbial community composed of approximately 10^8 bacterial cells. Pollen consumption significantly impacted total and specific bacterial abundance in the digestive tract. Bacterial isolates representing major fermentative gut phylotypes exhibited primarily membrane-bound GH activities that may function in tandem with soluble host enzymes retained in the hindgut. Additionally, we found that plant-originating β-galactosidase activity in pollen may be sufficient, in some cases, for probable physiological activity in the gut. These findings emphasize the potential relative contributions of host, bacteria, and pollen enzyme activities to carbohydrate breakdown, which may be tied to gut microbiome dynamics and associated host nutrition (Ricigliano et al., 2017)."

"Honey bees are generalist foragers and are dependent on diverse forage to adequately meet their nutritional needs. Through analysis of stored pollen (bee bread) samples obtained from 26 honey bee hives across northwest England, they quantified bee bread nutritional content and the plant species that produced these stores from pollen. Protein was the most abundant nutrient by mass (63%), followed by carbohydrates (26%). Protein and lipid content (but not carbohydrate) contributed significantly to ordinations (act of occurring) of floral diversity, linking dietary quality with forage composition. DNA sequencing of the ITS2 region of the nuclear ribosomal DNA gene identified pollen from 89 distinct plant genera, with each bee bread sample containing between six and 35 pollen types. Dominant genera included dandelion (*Taraxacum*), which was positively correlated with bee bread protein content, and cherry (*Prunus*), which was negatively correlated with the amount of protein. In addition, proportions of amino acids (e.g. histidine and valine) varied as a function of floral species composition. These results also quantify the effects of individual plant genera on the nutrition of honey bees. They concluded that pollens of different plants act synergistically to influence host nutrition; the pollen diversity of bee bread is linked to its nutrient content (Donkersley et al., 2017)."

"Different pollens have varying nutritional value for the honey bee. However, the digestion of the protein in the pollen is still not well understood. Here, we investigated this issue using a rectum-testing method. The results indicated that a higher proportion of the protein in camellia pollen is digested compared with the protein in rape pollen. Chemical and histochemical analyses indicated that protein digestion is closely associated with the diet that a worker bee consumes. Our results demonstrate that camellia pollen has a higher nutritive value than rape pollen for honey bees. By influencing midgut development, different bee diets cause discrepancies in digestive and absorptive functions, which are ultimately reflected by differences in protein digestion (Wang et al., 2014)."

"Proteolytic activity in the midguts of pupae and imagos (final and mature stage) of worker honey bees was determined over a one-year period. The bees were of defined ages and the size of the hypopharyngeal glands was used as a parameter of their functional status. The activities of trypsin-like, chymotrypsin-like enzymes and the total caseinolytic activity were investigated; they did not depend on Ca^{2+} and showed optimal turnover at pH values above seven. Proteolytic activity is limited in pupae and newly emerged bees, then increases rapidly in the first hours of the imago stage. Proteolytic activity and the relation between trypsin- and chymotrypsin-like activity vary with age, season and functional status of the insects. Nurse bees show the greatest proteolytic activity. Age-dependent distributions of enzymatic activities in the endo- and ecto-peritrophic space indicate that the peritrophic membrane establishes compartments within the midgut lumen (Moritz and Crailsheim, 1987)."



Pollen from a variety of common plants: sunflower (Helianthus annuus, small spiky sphericals, colorized pink), morning glory (Ipomoea purpurea, big sphericals with hexagonal cavities, colorized mint green), hollyhock (Sildalcea malviflora, big spiky sphericals, colorized yellow), lily (Lilium auratum, bean shaped, colorized dark green), primrose (Oenothera fruticosa, tripod shaped, colorized red) and castor bean (Ricinus communis, small smooth sphericals, colorized light green). The image is magnified some x500, so the bean shaped grain in the bottom left corner is about 50 µm long. Photo Credit: Dartmouth Electron Microscope Facility, Dartmouth College, April 8, 2011.

"Intensive agricultural systems often expose honey bees to large temporal variations in the availability (quantity, quality and diversity) of nutritional resources. Such nutritional irregularity is expected to affect honey bee health. We therefore tested under laboratory conditions the effect of such variation in pollen availability on honey bee health (survival and nursing physiology—hypopharyngeal gland development and *vitellogenin* expression). Honey bees were fed with different diets composed of pollen pellets collected by honey bees in an agricultural landscape of western France. Slight drops (5–10%) in the availability of oilseed rape (*Brassica napus* L.) pollen resulted in significant reductions of all tested variables. Despite some variations in taxonomic diversity and nutritional quality, the pollen mixes harvested over the season had a similar positive influence on honey bee health, except for the one collected in late July that induced poor survival and nursing physiology. This period coincided with the mass-flowering of maize (*Zea mays* L.), an anemophilous crop (wind pollinated) which produces poor-quality pollen. Therefore, changes in bee health were not connected to variations in pollen diversity but rather to variations in pollen depletion and quality, such as can be encountered in an intensive agricultural system of western France. Finally, even though pollen can be avail-

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able *ad libitum* (as often as necessary or desired) during the mass-flowering of some crops (e.g. maize), it can fail to provide bees with diet adequate for their development (Di Pasquale et al., 2016)."

"The mechanisms by which pollen is digested by honey bees are incompletely understood. Potential methods are thought to include pseudogermination, mechanical disruption, enzymatic breakdown or osmotic shock. Understanding the role of pseudogermination in this process has been hampered by a lack of tools demonstrating retention of metabolic activity in pollen collected by honey bees. Here, we show that pollen collected by honey bees produces reactive oxygen species (ROS) (byproducts of the normal metabolism of oxygen) at robust levels upon germination, suggesting that ROS is a suitable marker of this process in pollen. ROS can be readily found in the digestive tract of honey bees and is localized to pollen grains within the lumen (inside space of a tubular structure). Finally, manipulating pollen levels in the midgut can change ROS levels in the digestive tract. These data provide evidence of retained metabolic activity in bee-collected pollen that lends support to pseudogermination as a mechanism for pollen digestion in honey bees, and points to novel approaches for better understanding of pollen digestion in this species and beyond (McKinstry et al., 2020)."

"Because animals that feed on pollen vary in size, behavior, and physiology, there is a wide range of pollen digestion mechanisms: (1) mechanically crack open the pollen wall, (2) pierce the pollen wall with sharp mouthparts, (3) dissolve the pollen wall with enzymes, (4) induce germination or pseudo-germination, (5) osmotic shock bursts the pollen wall, and (6) digestive enzymes penetrate the pollen wall (Roulston and Cane, 2000). The first three of these methods are uncommon, and the last three are difficult to identify. Pollen digestion can be difficult due to the multiple cell wall layers that cover the nutritional cytoplasm. Kroon et al. (1974) hypothesized that differences in osmotic pressure between the bee crop and the midgut could cause pollen grains to break, exposing the nutrient cytoplasm. Other studies, however, rejected this hypothesis, finding a high number of undamaged pollen grains in the midgut (Klungness and Peng 1984; Peng et al., 1985). Furthermore, Moritz and Crailsheim (1987) and Dobson (1988) reported that the external structure of the pollen grain wall, particularly exine, was found to be indigestible. As a result, the percentage of empty pollen grains in bee feces was used to assess digestion performance (Roulston and Cane, 2000). Furthermore, Crailsheim et al. (1992) discovered a difference in the percentage of empty grains between two different types of pollen (*Castanea sativa* MILL (chestnut) and *Trifolium repens* L.) (white clover) (Omar et al., 2022)."

"An ultrasonication and high shear technique was used to break the walls of five species of bee pollen, including rape bee pollen, lotus bee pollen, camellia bee pollen, wuweizi bee pollen and apricot bee pollen. They compared the digestibilities of bee pollen with or without wall-disruption. After *in vitro* and *in vivo* digestion, unbroken bee pollen grains were still intact and the fragments of wall-disrupted bee pollen still remained as fragments. Mouse *in vivo* digestion results suggested that the wall-disrupted bee pollen was more easily emptied from the gastrointestinal tract than unbroken bee pollen. After dynamic *in vitro* digestion, the digestibilities of protein and crude fat in wall-disrupted bee pollen significantly increased to more than 80%; similarly, the release rates of amino acids and reducing sugars in all wall-disrupted samples were almost 1.5 and 2 times as much as those of unbroken samples (Wu et al., 2020)."

"A honey bee colony's ability to grow and develop is dependent on adequate nutrition. Bees collect pollen from flowers as a source of protein, fat, vitamins and minerals. The crude protein content of corn pollen is considered low, around 15%; however, bees frequently visit the male flowers of the tassels for pollen. In this study, we aimed for the first time to improve the nutritious value of corn pollen by mechanically crushing its external pollen wall. We then compared the effect of feeding crushed vs. non-crushed corn pollen grains on honey bee diet consumption, digestibility, hemolymph protein content, hypopharyngeal gland (HPG) size, and thorax weight under laboratory conditions. We found that crushing corn pollen grains increased diet digestibility and hemolymph protein content while decreasing honey bee pollen consumption (−39.88%). Crushing pollen however had no effect on HPG size or thorax weight. These findings may be beneficial to beekeepers in areas where corn monoculture is prevalent. The effect of crushed corn pollen on larval development and growth, as well as colony development and vitality, should be investigated in future studies (Omar et al., 2022)." BC

Clarence Collison is an Emeritus Professor of Entomology and Department Head Emeritus of Entomology and Plant Pathology at Mississippi State University, Mississippi State, MS. Became interested in entomology through 4-H and studied honey bees for both my Master's and Ph.D. Have been involved with beekeeping for 50+ years.

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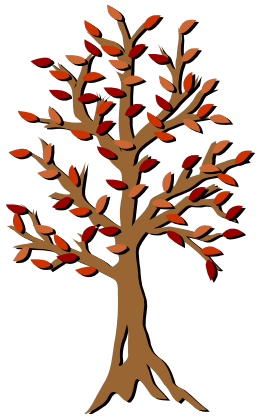
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The Media

John Miller





From time to time beekeepers are approached by media for interviews.

In our own industry, we have a couple of well-known podcasts, "Two Bees in a Podcast" and "Beekeeping Today". Both feature excellent programming, archived into e-editions. Both bring interesting subjects and interesting speakers. Podcasts allow the guest time to unpack the ideas in the interview by devoting an hour, or maybe a half-hour to tell their story.

Sometimes we are approached by radio, or television; or educational series available on Public Television. Every once in a great while, an author connects to write a book. I've done a few of all of the above. The book, *The Beekeepers Lament* by Hannah Nordhaus was a thoughtful compilation of over a year's worth of visits, interviews and hands on in the beeyard reportage.

The documentary *More Than Honey* by Markus Imhoof was an unflattering portrayal of commercial beekeeping and almond production which I regret. I learned the 'camera never blinks' as put by Dan Rather. We once did a piece for the New York Times, by Amanda Hesser which ran in the food section. She came to Gackle, North Dakota to gather information and photography for the piece.

Everyone in beekeeping has had a microphone thrust in her face with an ask for a story.

In the past month, we've done two pieces for two different series on Public Television.

The idea behind one of the crews was the human footprint concerning human interaction with honey bees. Production crews are better now than ten years ago. Pre-arrival questions help frame up the essence of the story the producer is trying to tell. We are all telling our stories – and make no mistake – the story beekeepers have to tell is compelling. I've many times in this space referred to beekeepers as the gate-keepers of the food supply. It is not an exaggeration.

One of the interview questions was: Are honey bees domesticated? My response was and is: Honey bees are wild animals. If anything, it is the bees that have domesticated the humans – and after ten-thousand years, we humans are finally doing a better job of meeting the needs of the bees. Indoor wintering, now widely adopted, and no longer in question, is a superior way to overwinter bees – because beekeepers have adopted the practice bees prefer: Dark, Quiet, Steady, Undisturbed – just as bees preferentially selected for ten-thousand years ago in the forests of northern Europe. Humans are just slow learners.

The crew, with technicians, camera equipment, production and assistants didn't even look at the indoor wintering building. The crew glossed over hive health challenges and how pollination for the crops bees pollinate impact our businesses. It was in the words once coined by Rush Limbaugh, a 'drive by' look at beekeeping…because the very next day the crew was off to Thailand… and three days later in Australia. I asked them if they were investigating *Tropilaelaps mercedesae.* Nope.

The other crew was a little more aware of the connection of bees, livestock and where food actually comes from. Refreshing. Again, breaking down a colony of bees – describing the different age-castes and responsibilities – how a colony organizes itself – how in fact the front door of a beehive is never closed – how a colony of bees is a wild super-organism is not easy to communicate in a segment that will mostly end up on the cutting room floor. We had a honey tasting. Why does this honey taste different from that honey? It's the flowers the bees visit while foraging, grocery shopping. Orange blossom honey smells and tastes like the aroma of an orange grove in bloom. Tallow honey tastes like case glue – because well, it just does.

Basswood's smooth flavor; Clover honey's non-forward flavor notes blends well with most other honey. Buckwheat's big flavor notes and aromas, excellent in baked goods. We are in the familiar. We are in our element both in the hive and in the



The Hot Room



Three vans to get seven people and a ton of gear to the beeyard

extracting room – but for the viewer, it may be the first time they've seen the inside of a hive, or the inside of a honey house.

We should keep that in mind.

Keeping things simple with the media keeps the narrative easy to digest.

The 30-second answer is better than a three-minute ramble.It's not easy being brief. We are telling a story we live.

Viewers absorb the edited story the producers craft.

It's better to say 'I don't know', when you don't know.

Before the interview, ask questions of the producer. What is the goal of this episode?

How should I best prepare? And **do clean the honey house** before crew arrives.

Clean up. You may be proud of your 'worn plenty' coveralls – the camera sees filth.

We dress the film crew in brand new B.J. Sheriff's – why not you on this one day?

Here is what I think is happening.

This ongoing '15 minutes of fame' famously referred to by Andy Warhol does not apply to beekeeping. The public is fascinated by bees; by this bravura last of the hard jobs. That's nice.

There is more to it, though. We are in the midst of a long-term effort by agencies, environmentalists, influencers, authors and scientists to change our environmental behavior. The most recent example is *What if We Get It Right?: Visions of Climate Futures*, by Ayana Elizabeth Johnson. She gave an NPR 'All Things Considered' interview on Friday, September 13, 2024 describing the book.

Bees have a vital, central role in the climate future. We should be saying so. Bring The Seeds!

The Bee and Butterfly Habitat Fund (BBHF) is aligned for the future with seed mixes and recommendations now recognized by solar installations as the way to best manage solar sites. Plants grow on solar sites (Nevada excluded), and utilities have no experience managing, or even designing the areas beneath solar panels. BBHF is filling that void with science-driven recommendations. This is a key point if you are able to do an interview: Bring the Seeds! Project *Apis m.* and Blue Diamond Growers also have a real initiative: The Climate Smart effort is to put more seeds for bees and other beneficial pollinators in the ground. Bring the Seeds! Plant the seeds!

Beekeeping and beekeepers are more romantic than prosaic to the public. We are interesting because we do a hard job, and harvest a little honey. But I think something else is afoot, too.

Though we are in a romantic relationship with that danged jar of honey – it is the outsized impact the honey bee has on the environment. It is the outsized impact the honey bee has on food supply chains. Few, very few see that impact. It is a fact hiding in plain sight. You want food security? You want robust supply chains for fresh fruits, vegetables berries, legumes, vine crops and the many, many other produce items dependent on pollen transfer? We, beekeepers are covering that, almost without recognition. I think that is going to change.

I recently asked, "Is Beekeeping Relevant?" Yes, beekeeping is very relevant. For another 15 minutes at least.

Be ready when the interview opportunity comes. Be comfortable by asking questions before the interview begins. Step back and take pictures, even during production, and LOOK at the story the picture is telling. Take control of the images you can and the story being told honestly. Smile.

And be pleased: For the first time in your life, your mom will see you on TV for a good thing! BC

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Dalan ANIMAL HEALTH

TO BELIEVE OR NOT TO BELIEVE:

My Failed Attempt at Citizen Science

James Masucci

I have been a scientist my entire adult life. Even though I've retired, I still think like a scientist. I constantly ask "why" and "how". I am always trying to improve my bee operation. I am also very skeptical about what I read and what I am told. "Wait, skepticism? Isn't science supposed to provide all our answers," you ask? Science doesn't prove anything, it only provides clues. Scientists try to provide meaningful data to solve life's puzzles. But the scientific literature is fraught with misinterpreted and over-interpreted data. You see, life's puzzles are infinitely complex and we can only use our limited knowledge to design what we think are good experiments to explain them. We generate data but may not understand everything that impacted the data. What we rely on are other scientists asking the same questions and getting the same results. It's when you have a large body of evidence that your start to believe. The problem comes when the first bit of evidence gets taken as truth and nobody bothers to follow-up. Look at *varroa*. For decades people believed mites fed on hemolymph. Years ago, Dr. Allen Cohen, the guru of insect diets, told me there is no way *varroa* feeds on hemolymph. Not enough surface area in their digestive tract. It wasn't until Dr. Samuel Ramsey was told about Dr. Cohen's hypothesis by Jerry Hayes and did his experiments several years later that we learned *varroa* feeds on fat bodies.

It was with this healthy skepticism that I heard Kaira Wagoner and Phoebe Snyder present their data on UBeeO (unhealthy bee odor). They mimicked/reproduced the pheromone that unhealthy brood emits, triggering hygienic bees to remove the unhealthy larvae. If this were true, I recognized that this could be a real queen breeding tool. So, I wanted to test it. I also knew that I didn't have the resources to test it properly, so I put out a request in *Bee Culture* for people who were going to try UBeeO to share data with me. My hope was, that together, we would generate enough data so that beekeepers could make informed decisions as to whether it was worth using in our queen production programs.

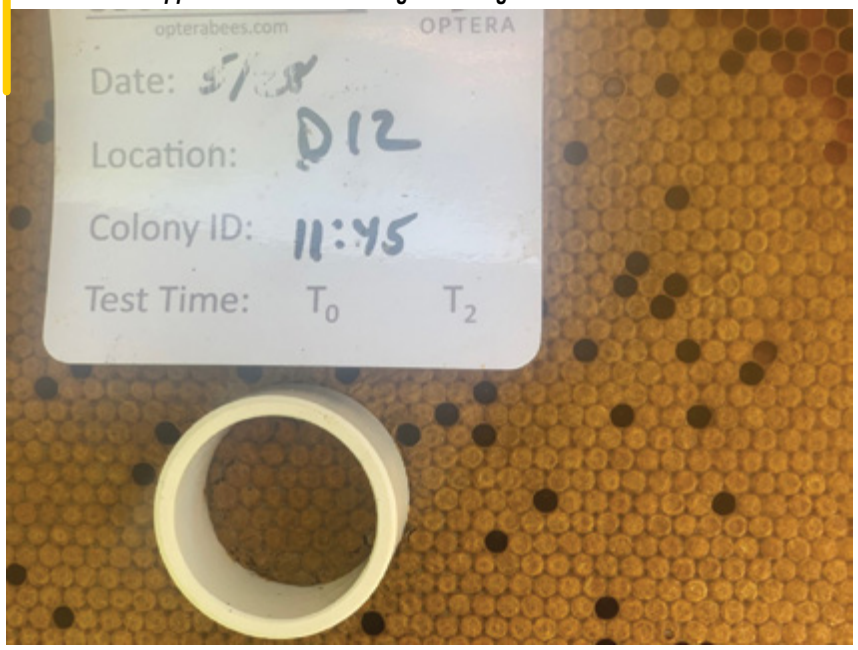
There were four of us in the St. Louis area that were going to test 140 hives and six other beekeepers responded to my request. Together, we would have over 200 colonies, enough to have a decent experiment. The experiment was in two parts and was designed to ask three questions: 1. What is the frequency of the trait in our unselected colonies? 2. Do colonies scoring high for hygienic behavior have lower mite counts? 3. Does grafting from high-scoring colonies increase the frequency of the behavior in your population (can you use it as a breeding tool)? The trial was in two parts. First, test colonies with UBeeO and, prior to mite treatments, determine the mite loads. These data address questions 1 and 2. Next, graft from high scoring queens, preferably in a mating yard with high scoring hives, and repeat the process the following year. That addresses question 3.

Now the problem: nearly all the participants were too busy to actually test their colonies. What I have to report are the data from the 37 colonies that I tested and I can supplement that with communications with two other beekeepers that had incomplete data sets. So, rather than use this article to evaluate UBeeO effectiveness in regular beekeepers' hands, I think it will be more useful as an example of the difficulty in drawing hard conclusions from experiments.

Figure 1 shows how the treatment is set up (sorry for the blur, it's hard to keep your camera clean in the bee yard). Late-stage pupae are identified using a PVC ring. The pheromone is then applied within the ring and two hours later the number of treated cells that were uncapped were counted. The level of hygienic behavior was determined by dividing the number of uncapped cells by the total number of cells treated. Low activity is considered anything uncapping less than 40% of the treated cells. Medium activity is considered uncapping 40-59% of the treated cells. High activity is considered uncapping 60% or more of the treated cells.

Figure 2 (see next page) shows the hygienic scores for my 37 colonies. Out of 37 colonies, two (~5%)

Figure 1: Preparing to treat with UBeeO. Hygienic behavior was scored by dividing the number of treated cells uncapped by the total number of cells treated. The treatment was applied within the PVC ring according to the instructions.



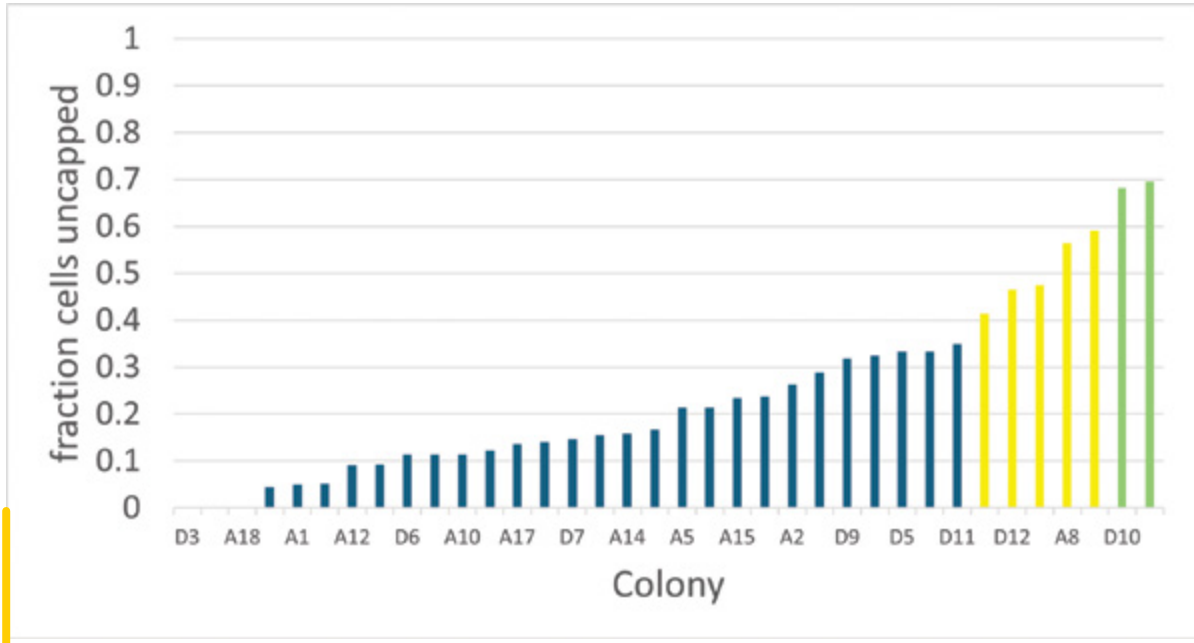


Figure 2: The frequency of hygienic activity detected in my tested colonies. 37 colonies were treated with UBeeO according to instructions. The graph represents the hygienic activity of each colony, which is calculated by the number of cells uncapped divided by the number of colonies treated. High activity (shown in green) means 60%-100% of the treated cells were uncapped. Medium activity (shown in yellow) means 40%-59% of the treated cells were uncapped. Low activity (shown in blue) means less than 40% of the treated cells were uncapped.

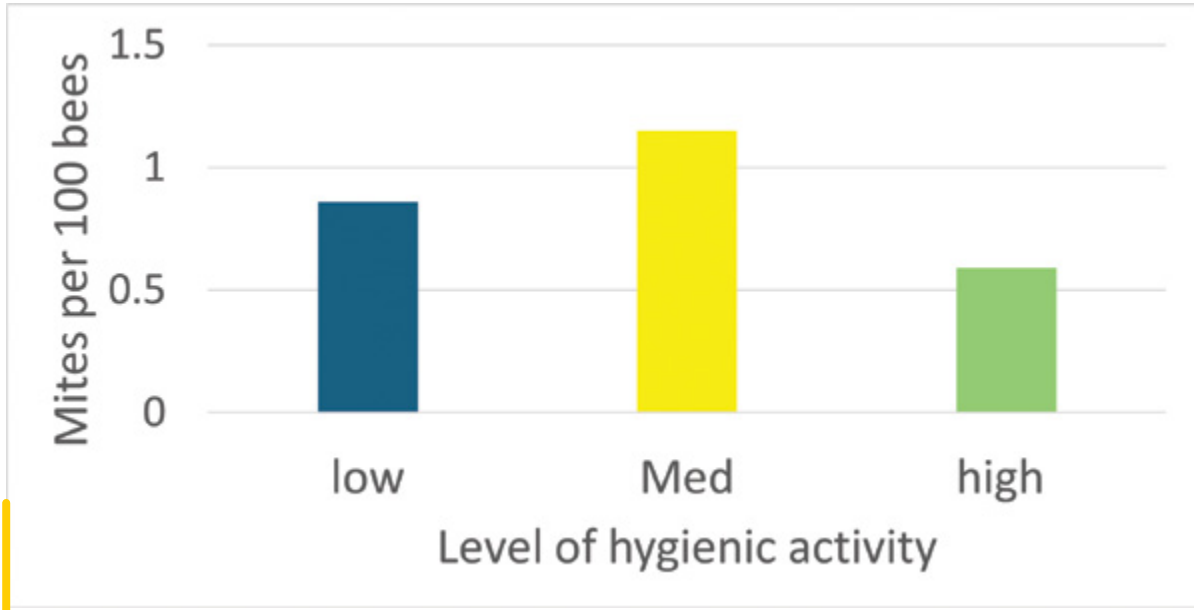


Figure 3: The average mite levels for all colonies showing a certain level of UBeeO-induced hygienic behavior. Those colonies showing high levels of activity are shown in green (n=2), those colonies showing medium levels of activity are shown in yellow (n=5) and those showing low levels of activity are shown in blue (n=29).

showed high hygienic activity (68% and 70%) , five (~14%) showed medium activity and the remaining 29 (~80%) colonies showed low activity. The conclusion is that the UBeeO-induced hygienic trait is not very prevalent in unselected populations, right? Not necessarily. Play the skeptic. How else could I have gotten these data? 1. These were two yards, 10 miles apart. Perhaps this is an isolated incident true only for a small region of the country? 2. Single beekeeper, perhaps I inadvertently select for non-hygienic behavior with my breeder queens? 3. Single applicator, perhaps I mis-applied the product or stored it improperly? This is why you need to have experiments repeated. Fortunately, two other participants tested with UBeeO. Their stories were the same. One reported zero positives out of eight hives, the other reported a couple positives out of 25 hives. Both also questioned whether they applied appropriately. The real conclusion? Don't know.

The second question was whether high UBeeO-induced hygienic activity correlated with low mite counts. There are several ways to look at the data. Figure 3 shows a bar graph of the average mite count per "class of hygienic behavior." True, the high activity hives had lower mite counts than the low activity hives, but the

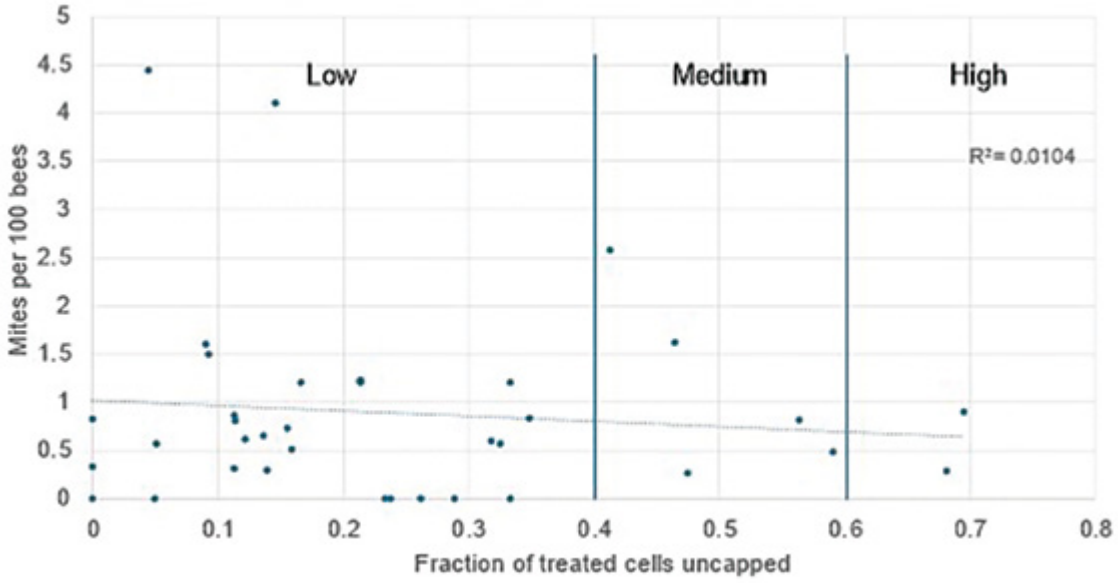


Figure 4: Plot of mite levels vs hygienic activity looking for a correlation between activity and mite levels. Although the trendline shows a negative slope is it highly influenced by the two colonies with more than four mites per 100 bees. If those two colonies are removed, the trendline shows a positive slope. In THIS data set, there really is not correlation.

medium activity hives had higher mite counts than the low activity hives. Statistically speaking, when you take into standard deviations, they are all about the same. Figure 4 shows a linear regression, which takes into account each hive. It comes out as a slightly negative slope with an R^2 value of .01. That can be interpreted as a small negative correlation between activity and mite number. Hurray, right? Notice there are two hives with abnormally high mite counts (over four mites per 100 bees). They might be considered outliers. If you remove those two hives then you have a positive correlation between mite counts and hygienic behavior, also with an R^2 value of .01. Given the small correlation either way, it's fair to conclude there is no significant correlation between hygienic behavior and mite levels in your hive. Right? Well, for this data set that's true, but are only two colonies with high levels of activity enough to really evaluate the question? What if those colonies had the same mite pressure as those two outliers, but due to their hygienic behavior they had half the number of mites? We just don't know. You need lots of data points to be convincing.

As you can see, it is difficult to draw convincing conclusions from a single experiment. Yet, it happens all the time. I wish I had a bigger data set to report to you. I wish I could tell you either way whether UBeeO is going to be a great breeding tool. But I can't. Instead, I hope you take this as a lesson as to how complicated even simple experiments can be and why it is so important to have multiple studies before any real conclusions can be made. BC



Sugar, Sugar

Stephen Bishop

Listen along here! https://www.beeculture.com/sugar-sugar/

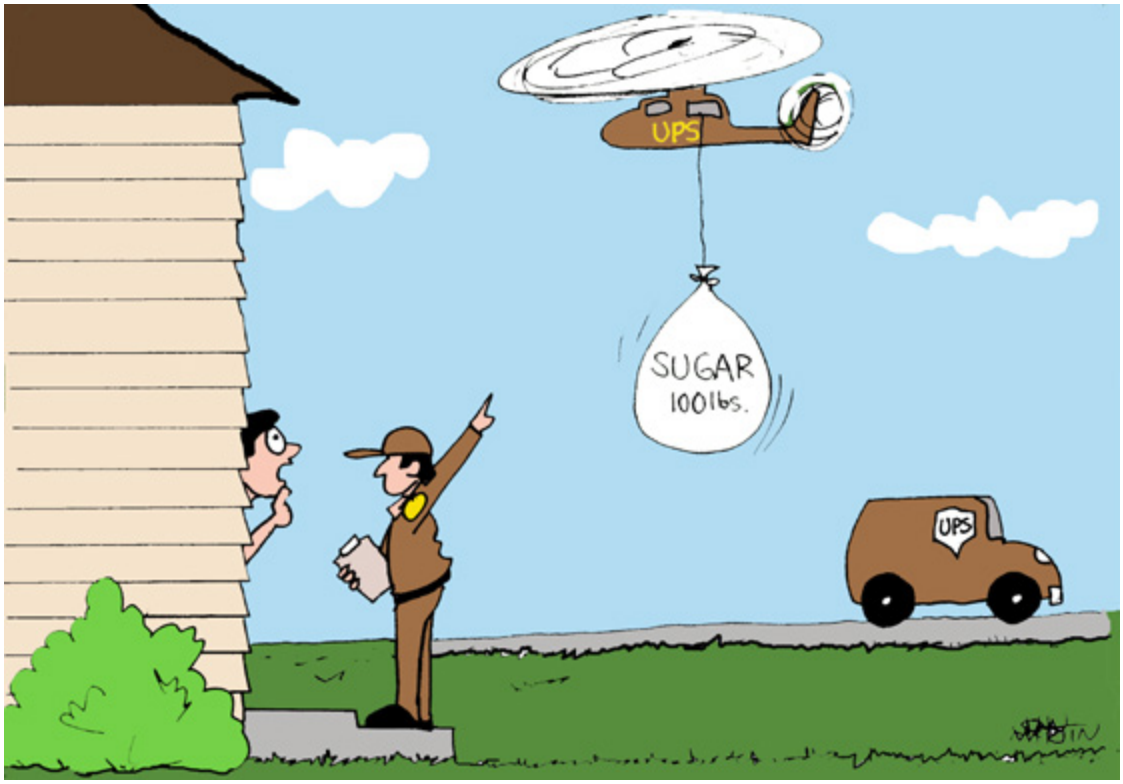
I try to live and let live, but I draw the line on people who put sugar in grits. Just last week I learned that our new county 4-H agent practices that heretical approach to grit cooking. It makes me wonder how effective new-hire drug screenings are if they can't detect someone who uses such a simple illicit substance as granular glucose in grits. Just think of all the farmers who worked hard to plant, tend, and defend that corn from earworms, all so she could later defile it by sweetening something that should always remain salty. A good helping of salt (enough to raise your blood pressure about twenty points) is the only granular substance allowed in grits. In her defense, she was raised above the Mason-Dixon line where people must sweeten their inferior corn product, hominy, to make it edible.

And in my defense, I'm somewhat sensitive to the wasteful misuse of sugar. I think most beekeepers are. Sometimes I like to think about the good ole days when buying sugar didn't require a down payment and thirty-year mortgage. What confuses me is how the price of sugar can spike and nearly double while the price of honey barely budges upward, even in a period of high inflation. To put it another way, why is the price of sugar so volatile while the price of honey is so inert? I'm sure there is a reasonable answer, but even if I knew what it was, it wouldn't alleviate my apprehension while I'm waiting in the checkout line with a grocery cart full of sugar.

When I first started beekeeping, I remember thinking that I was never going to feed on point of principle because feeding sugar to bees was unnatural. Somewhere along the line I realized that losing bees to *varroa* was not fun, but losing bees to starvation was an absolute misery because it could have been so easily prevented. So now I feed bees on point of principle because starvation seems cruel.

And I think I can chart my journey through beekeeping by the size of sugar bags I buy. I started with 5-pound bags, then 10-pound bags, then 25-pound bags. In a major milestone, this year I just bought my first one-ton sack of sugar. The front-in-loader on my tractor could barely lift it. I was worried because it would have been just my luck to save money buying bulk sugar only to have it destroy my tractor, but thankfully I was able to get it unloaded and stored away without incident. I'm not sure what my next milestone will be — maybe a helicopter airlifting in a 100-ton sack of sugar?

Anyway, you might be wondering how you go about procuring a one-ton bulk sack of sugar? That is a good question that I don't rightly know the answer to either. The way it worked for me is I met a well-connected beekeeper who knew a guy, who knew another guy in the restaurant industry, who knew a supplier who knew how to get bulk sugar. To be honest, I didn't ask many questions. All I know is the bulk sugar was half the price per pound of 25-pound bags at the grocery store, plus I didn't have to make multiple trips to the grocery store throughout the year to empty out the sugar aisle. Nor did I have a worry about an off-duty police officer spotting me with a cart full of sugar and suspecting I might be making moonshine.



Needless to say, I now have more sugar than I know what to do with. That said, you'll still never catch me putting sugar on grits. BC

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The Business of Beekeeping

Some Things to Consider When Launching a Commercial Sideline Operation

Listen along here!
https://www.beeculture.com/the-business-of-beekeeping/

While beekeeping can be a fun and interesting backyard activity, it can also be a profitable business and does not require a large bank loan to get started. If a beekeeper is adept at proper hive management, does not take on too much debt all at once and is willing to consider multiple income streams, a small profit can be realized within the first year or two.

Start up investment

Getting started in beekeeping today will typically run somewhere between $800-$1400 for a hive or two. This just covers the basics: bees, hive components and equipment, a hive tool, smoker and veil. Too many times I have heard the story of a person that starts out with around ten hives, and harvests hundreds of pounds, or even a thousand pounds of honey their first year. Dollar signs appear in their eyes and they make big plans to expand and get serious about beekeeping as a business the following season, only to never be heard from again. Beekeeping is farming and there are no guarantees in agriculture. While some may be tempted to jump in whole hog, a more considered approach is to build a business slowly, keeping costs to a minimum and increasing your skill and competence as you go.



Location

A beekeeper can own, rent or try to find free locations to set up their apiaries where their bees can forage. Many beekeepers will offer a case of honey (approximately 30 pounds) annually to a property owner who makes their land available as an apiary site. Beeyards that are surrounded by lots of pollinator forage and host a minimal amount of industrial agriculture activity are the most valuable places to keep bees. Where ever you decide to keep bees, be sure to follow the municipal beekeeping ordinances and state regulations for registering hives and operating a honey processing facility. In some places hives are kept stationary year-around, while in other areas bees are moved during the season, sometimes multiple times a season. Much depends on the beekeeper's goals and the amount and quality of local forage as well as the number of hives the area can support, which is something established beekeepers in the area can inform you about. Other factors that make an ideal apiary location are easy accessibility, a local water source, a respectful distance from other people and apiaries and a well-drained location. In Northern areas it can be beneficial to have a wind break of some kind (hedge row, building, fence, etc.) to block the prevailing winds. In Southern and desert locations afternoon shade is advisable, while full sun exposure is usually preferable in the north.

The honey house

Every beekeeping business will need a place to assemble and repair equipment, extract and package honey, mix up bee feed, store honey and equipment, etc. If you are single you can probably work out of your house initially, but if you are married or have a partner and want to maintain domestic harmony, find a separate place to conduct your beekeeping work. Some beekeepers will rent a place while others will build a 'honey house' specifically designed to make handling equipment and honey efficient. Large operations will have a dedicated building for their business, while smaller operations and those just getting started might use a shed or garage. Whatever you use, make sure it is well maintained and keeps out bees, rodents and other pests.

Transportation

Whether you own, lease or borrow, you will need a vehicle for moving bees and hauling equipment, honey, etc., from one place to another. While some beekeepers will use a station wagon or pickup truck, large operations typically use flatbed trucks often equipped with a bee boom, or carrying a forklift, so hives do not have to be moved by hand.

Sourcing bees

Whether you obtain full sized colonies complete with equipment, purchase packages and queens, buy nucleus colonies, or split your existing colonies, you will need a source of bees. Ordering bees through the mail is risky as the bees may die during transport. Some beekeepers work with animal control agencies, along with police and fire departments to catch swarms and remove colonies that have taken up residence in buildings or other unwanted places. Using bait hives to catch swarms is typically not reliable enough a process to build a business upon.

Income generation

For-profit beekeeping can extend far beyond simply selling honey along with the byproduct of honey production: beeswax. While the largest beekeepers earn their incomes primarily by providing pollination services, depending on your goals, there are numerous ways to make money commercially from bees.

Besides honey, beeswax and pollination, the basic products from the hive that have the potential to be harvested in quantity include royal jelly, pollen and propolis, and to a



Buying out another operation is a common way for beekeepers to obtain good apiary locations in areas that are already saturated with bees.

much lesser extent, honey bee larvae and bee venom. All the products from the hive can be combined with each other and/or additional ingredients to produce a myriad of value added products such as candles, salves, balms, flavored and varietal honey, creamed or crystallized honey, comb or chunk honey, soaps, moisturizers, face masks, creams, shampoo, honey sticks and candies, the list goes on.

Another source of revenue that can be created from honey bee colonies and is increasingly in higher and higher demand as the environment becomes more and more degraded, are bees themselves. Packages, nucleus colonies and queen bees are highly sought after as new beekeepers take up the craft and experienced beekeepers seek to replace annual losses, or look to expand their operations. There is also a small but important market for swarm removal services available to those with carpentry skills and tools.

The steep learning curve required for a beginner beekeeper today has also created a need for teachers, mentors and guides to help new beekeepers get up to speed. This has created a strong demand for beekeeping classes, workshops and consultation services from experienced beekeepers. Many local beekeeping organizations offer such services to their members, but often the need outweighs availability. Such educational work can be done in person or online, or the written word through articles, blogs and books.

Back in the days of the California gold rush, the most reliable way to earn a solid living was not to pan or mine for gold, but to sell tools, equipment and supplies to the hoards of fortune seekers that flocked west in search of riches. Unfortunately, given the existential threats to beekeeping from the onslaught of chemical based agriculture and our collective inability to get serious about ending the production and use of fossil fuels, keeping bees alive and healthy is

more challenging than ever. If you're not having luck keeping bees themselves, a more reliable way to earn money in the beekeeping industry may well be to simply offer beekeeping equipment and supplies to other beekeepers and not try to earn a living from the bees directly.

Markets and marketing

Who are your customers going to be and how do you intend to reach them? It's easy to start out working with family, friends, neighbors and word of mouth, but how do you intend to reach beyond this circle? Are you going to focus on retail or wholesale markets? Will you offer everyday household items, high end or commodity products? How will you stand out from the competition? Can you offer better pricing, higher quality or a unique product or service that is not readily available in your area? The answer to such questions will help you determine the kinds of packaging and labeling you will use.

When it comes to reaching new customers, the minimum requirements are a business card and a website. After that, you'll need to decide whether to add additional marketing channels such as catalogues, or through newspapers, magazines and newsletters as well as online advertising and social media. When advertising, it is a good idea to somehow measure the effectiveness of each ad so you can direct resources to those avenues that work best. For example, offering a coupon and seeing how many are redeemed is one way to get a sense of how many people are coming to you as a result of a particular advertising channel.

Turning a backyard operation into a sideline business can be a fun and profitable way to expand your beekeeping activities. With forethought, planning and clear goals in mind your chances of success increase greatly. BC

Ross Conrad is the author or Natural Beekeeping and co-author of *The Land of Milk and Honey*



"Every beekeeping business needs reliable transportation. This lean, green, beekeeping machine was converted over 15 years ago to run on waste vegetable oil that I collect from local restaurants. With over 470,000 miles on the odometer, she is still going strong."



BEE VET

To Bee or Not to Bee Dialogues: Part 2

Dr. Tracy Farone



This article is part two of our dual interview of a state veterinarian and state apiarist in Utah working to find practical solutions for all parties involved in promoting honey bee health. If you missed last month's article, please go back, and check it out! Now on with the discussion…

Q4: What solutions are you considering to help solve the shortage of veterinarians needed to serve honey bees and beekeepers?

Dr. Sabo: "Given the veterinary shortage in Utah and our dispersed state, we are fully supportive of educating veterinarians, however something more drastic needs to be done to realistically solve the problem in a timely manner. Without getting too deep into the legal weeds, our ideas boil down to 3 main ideas: 1) Change the wording in the Utah Veterinary Practice Act to: a) Allow an exception for vets not to have to visit a bee yard to establish a Veterinarian Client Patient Relationship if that producer has a developed relationship with the State of Utah Bee Inspectors. b) The same as 1a), but to apply only to veterinarians that work as employees for the State of Utah. 2) Ask the Food and Drug Administration (FDA) for an exemption to the enforcement of their VFD rules in the case of bee producers in Utah. Additionally, we think that advocacy to the beekeepers and apiary industry is key. There are a number of additional **federal programs** that could be adjusted to incentivize veterinarians to learn about and practice bee medicine. Changing these programs requires that the industry organize itself and advocate clearly for what it wants."

Jen Crowder: "Apiary inspectors deliver talks at veterinary associations about Foulbrood disease and the VCPR. When the VFD rule was first implemented, apiary program staff organized workshops for veterinarians, teaching them how to work with honey bees and beekeepers."

Q5: What concerns do you have about changing the Veterinary Practice Act to allow for certain exceptions to apply to the VCPR when diagnosing and treating honey bee bacterial diseases?

Dr. Sabo: "The reasoning behind Utah law requiring a veterinarian to make an in-person visit to a premise to establish a VCPR is all about trust and relationship building. In production animal species, the veterinarian is making an agreement with a producer that they will use antimicrobials in a way that is within the laws. Because production veterinarians are permitting producers to acquire large amounts of drugs in order to treat many different individuals (hives), there is a higher requirement for the relationship than when you take an individual animal to the vet for one particular illness unique to that animal.

The vet needs to ensure the producer understands the law to 1) allow the disease to be treated 2) limit the **risk of antimicrobial resistance** 3) remove the risk of **contaminating food** with the drug and 4) maintain high standards of animal, worker, environmental and consumer **welfare**. **As beekeepers know, decreasing the impact of disease is much more about prevention and promoting best practices than it is about giving an antimicrobial.** In most cases, drugs do not work as anticipated if the environment is not right; the bees may not eat enough, they may be too weak or stressed to begin with or the diagnosis may not be correct. If a vet is not familiar with a beekeeper and their operation, they are **taking on a lot of risk** giving them antimicrobials.

A discussion for another day is why judicious use of antimicrobials is important and why the laws changed around prescriptions. Keep in mind that there are many organizations that track what antibiotics are used by which vets and where and how antimicrobial resistance is developing. You can think of the Veterinary Practice Act as the law that defines what things only veterinarians can do. We have these rules in place, so folks who use veterinary services (from having an animal diagnosed with a disease, and performing surgery or other invasive procedures, to prescribing medications) can be confident that the doctor is adequately trained and will follow a defined code of ethics. Long story short, it is **consumer protection**, so that you get what you are asking for. It is generally thought of as a good idea to not change broad laws very often, because there are commonly unanticipated consequences. If we decide to change the law here in Utah so that veterinarians could rely on the reports from our state and county bee inspectors to establish relationships with our beekeepers and inspect their facilities, we would be not only weakening what it means to be a veterinarian here in Utah, but also across the country. There is a chance that if an exception is made for beekeepers, producers from other industries will demand similar treatment, but **without the advantage of a program like the one our Utah bee inspectors and laboratory provide**. Veterinarians must complete an undergraduate degree and four years of veterinary school (the same as human doctors) in order to be eligible to work. The average veterinary student graduates with around $200,000 of debt and that number is only growing. In addition, there is a constantly growing need for more veterinarians across the country, so it is only logical that veterinarians will choose to practice in places where they stand to be able to pay off those loans as quickly as possible. Weakening standards for what jobs veterinarians are required to perform would not make Utah an attractive place to work.

Finally, we are concerned about longevity. Any time a law is changed, that is a **permanent** alteration. We

are very confident in the quality of Utah's Bee Inspection program now and trust its apiarists, but there is little guarantee of that moving into the future. If something drastic changes in the way that the state apiary program is structured and run, the law would still allow for an inspector to work as a proxy for a veterinarian despite not having the same skills and training."

Jenna Crowder: "The UDAF Apiary Program has **no** concerns about changing the Veterinary Practice Act to allow for certain exceptions to apply to the VCPR when diagnosing and treating honey bee bacterial diseases - if it makes it easier for beekeepers to get the antibiotics they need, we are all for it."

Q6: Could states have a State Veterinarian position (partial position) created to "specialize" in honey bee health?

Dr. Sabo: "That would be one way to approach this issue for sure. In order to make something like that happen, the position would need to be funded, usually through the legislature. **If beekeepers and industry get together and advocate for one specific solution**, it has a much higher chance of becoming reality. As employees of the UDAF, we are here to promote the interests of our various agriculture entities. If a **united** group of producers that represents multiple sectors (for example commercial AND backyard beekeepers) lets us know they are interested in a specific solution, that really helps us know where to focus our efforts. Unfortunately, in Utah, there seems to be a large divide between what the industry and backyard beekeepers want. We have had bills run attempting to weaken the bee inspection requirements that have been in place here since before Utah was even a State. (hive registration is currently voluntary in Utah).

Jenna Crowder: Declined the opportunity to answer this question.

Many great points, concerns and potential solutions were presented here. Will the bee hive state help to lead the way? To quote Hamlet again "We know what we are but know not what we may be…."

In addition to the points highlighted here, I will offer a few more areas of thought and additional solutions on the forefront. Through the work of the HBVC, veterinarian educators, and veterinary schools more honey bee education and continuing education is being offered to veterinarians and veterinary students than ever before. A veterinary certification program has been launched by the HBVC to assure basic competency of veterinarians working with honey bees (more on this in articles to come).

According to the CDC, 1.27 million human deaths and 5 million associated human deaths occurred due to antimicrobial resistance in 2019 worldwide. In the US alone 2.8 million infections occur due to antimicrobial resistance (1). Honey bee pollination of our is crucial to food security and lack of hive product adulteration is critical to public health. It is imperative that many folks **come together** to seek solutions to serve the honey bee industry and the public health, especially the honey bee industry itself. Honey bees should be represented as an **agricultural animal** to be eligible for **more federal** recognition and funding programs. In reality, our biggest disease threat to honey bees is not bacterial diseases or some made up disease syndrome, but parasitic diseases like *Varroa* and potentially *Tropilaelaps* mites. These are national and international challenges that must be met with a collective force. BC

*Thank you to Dr. Sabo, Jenn Crowder and the Utah Department of Agriculture and Food for providing information within this article.

1. **https://www.cdc.gov/antimicrobial-resistance/data-research/facts-stats/index.html** Accessed 8/10/2024.



These are pictures of Jenna during some NHBS visits!





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Minding Your Bees And Cues

A Survey of Newsworthy Bees

Becky Masterman & Bridget Mendel

https://www.beeculture.com/minding-your-bees-and-cues-28/

Listen along here!



Bees feeding on a microalgae patty. Photo credit: Dr. Vincent Ricigliano, USDA ARS

This year bees in the news got off to a **dramatic start**[1] with unprecedentedly high rates of bee theft during almond pollination in California. As we face the end of the calendar year, we thought we'd have a look through popular bee themed articles over 2024, a survey of the kinds of drama these sweet little beings have inflicted on the human populace this time.

While some nefarious folks made news by stealing bees, other unsavory types made news by **leaving unwanted bees.**[2] While we would be delighted by a deposit of adorable honey bees outside our door, for non-beekeepers this would clearly be a terrifying experience. Politically speaking, we're for keeping bees as inspiration for a well-functioning democracy, not ploys for pettiness.

Across the globe in Korea, **bees are participating in politics in a more successful way.**[3] In a recent Times article, beekeepers in the Demilitarized Zone between North and South Korea spoke poetically of their bees' ability to transcend borders that are restricted for humans. They forage on land that's still riddled with landmines; the resulting honey contains flavors from many wildflowers, and also the bittersweet longing of Koreans who have been cut off from their ancestral lands.

The question of **whether bees possess consciousness**[4] is a tricky one (what is consciousness?) but Prof Lars Chittka of Queen Mary University of London thinks that "Given all the evidence that is on the table, it is quite likely that bees are conscious." Studies that show bees' ability to recall, to play and use tools, appear to back up this statement. While other researchers remain unconvinced, the topic is an irresistible one to any conscious reader.

Honey bees are well known for their industriousness, but this year they took it to the next level, making June news as fighters of both crime *and* cancer. **Forensic researchers in Virginia**[5] are essentially studying the volatile acids bees pick up while foraging near dead and decomposing bodies, in order to develop a correlative process whereby bees near a local crime scene can be assessed by detectives for evidence of a corpse.

Meanwhile, in Michigan, **bees themselves are proving good little detectives** — this time for lung cancer.[6] Researchers have found that honey bees can detect chemicals associated with lung cancer in the human breath, and can even differentiate between types of lung cancer. As beekeepers, we know that smell is a powerful communication tool for bees, and that they use smell to detect volatiles associated with death and disease in their brood nests. We're curious to learn that Michigan researchers found the bees could "not only detect cancer cells, but also distinguish between cell lines of various types of lung cancer. It suggests that bees could be detecting particular diseases in their hive, rather than simply reacting to a general signal of health or disease.

It seems that, like other years, the media continues to oscillate between doom for bees and a sort of meta-drama around the idea that we're unnecessarily worried about bees. From dramatic reveals about how we should be worried about native bees instead of honey bees,[7] to how honey bees are doomed by increasingly long and warm Falls in northern climates.[8]

Australian beekeepers are facing the new reality of managing *Varroa destructor* after the eradication path proved to be unsuccessful. Over two years into the *varroa* invasion, the beekeepers who waited decades to detect *varroa* on their island are needing to **add mite mitigation to their beekeeping regimes or end their operations**[9]

Dr. Vincent Ricigliano, Research Entomologist at the Baton Rouge, Louisiana USDA Bee Lab, is **making waves with using blue-green**

[1] https://abcnews.go.com/US/beehives-stolen-california-central-valley/story?id=107031950

[2] https://www.newsweek.com/texas-republican-swarmed-bees-blames-opponents-allies-1903410

[3] https://www.nytimes. com/2024/08/24/world/asia/south-korea-dmz-honey.html

[4] https://www.bbc.com/news/articles/cv223z15mpmo

[5] https://www.nytimes.com/2024/06/21/science/body-donation-farm-virginia-death-scent.html?searchResultPosition=4

[6] https://msutoday.msu.edu/news/2024/msu-researchers-discover-honeybees-can-detect-lung-cancer

[7] https://www.vox.com/down-to-earth/2023/1/19/23552518/honey-bees-native-bees-decline

[8] https://www.usnews.com/news/health-news/articles/2024-03-26/warmer-autumns-may-doom-hardworking-honey-bees

[9] https://www.theguardian.com/australia-news/article/2024/sep/05/its-inevitable-australian-bee-keepers-brace-for-national-spread-of-varroa-mite



Most U.S. beekeepers don't haven't experienced pre and post varroa beekeeping. Australian beekeepers now have to decide if they want to live through it and the varroa management necessary to maintain healthy colonies. Photo credit: Rebecca Masterman

algae or microalgae as a colony nutritional supplement.[10] The supplement is effective in reducing viral levels, but beekeepers need to wait for it to come to market. A patent has been applied for and commercial beekeepers have been enlisted to participate in this research.

Lastly, **the hot honey trend held on** and went big in 2024. It infiltrated martinis, coffee drinks and ice cream to name a few unexpected items. While certain brands seem to have a corner on the market, we think every beekeeper should have their own take on a hot honey recipe.[11]

What will next year bring? Hot honey drizzled on pancakes? Drones sitting in boardrooms? Will bees, possessing consciousness, begin leading meditation retreats? We're sure that bees will be writing newsworthy poems in 2025. As we write this, the American presidential election is undecided. By the time you read this, who knows? There could be a honey bee for president. BC

[10] https://www.ars.usda.gov/news-events/news/research-news/2024/usda-researchers-use-an-edible-blue-green-algae-to-protect-honey-bees-against-viruses/

[11] https://www.nytimes.com/2024/05/08/dining/hot-honey.html?searchResultPosition=3

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Psalms 107:1

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Becky Masterman earned a PhD in entomology studying hygienic behavior at the University of Minnesota and is currently a host for the Beekeeping Today Podcast. Bridget Mendel joined the Bee Squad in 2013 and led the program from 2020 to 2023. Photos of Becky (left) and Bridget (right) looking for their respective hives. If you would like to contact the authors with your own wintering ideas or other thoughts, please send an email to mindingyourbeesandcues@gmail.com

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Bees on the Green

Jennifer **Berry**

A few years ago, I received a call from the University of Georgia's Golf Course Superintendent, Scott Griffith. After introducing himself, he asked if I would be willing to help him put honey bees colonies on the UGA golf course. At first, I wanted to say, "Are you crazy!!! Honey bees on a golf course. No way will that ever work." But after we chatted for a few minutes, I decided to meet him at the course to further the conversation.

Driving out to meet Scott, I thought about the last time I played a round of golf or was even on a golf course. It was in 1992. I remember that day, because a few weeks later, I moved to Los Angeles. For the few years leading up to point, I thought I wanted to be a golfer. I enjoyed the sport, the exercise and of course, driving the little golf carts. But I also enjoyed being outside and experiencing the beauty of different courses. I always appreciated how well manicured and formal the landscapes were. But once in LA, lacking the funds for green fees, I had to give up my clubs. In retrospect, it was a good thing since I sucked at the sport.

Once I arrived at the UGA golf course, Scott pulled up in a cart with his dog and companion, a Border Collie named Birdie. After introductions, he invited me to ride along and check out the course first hand. The 18-hole golf course is located on the campus of UGA and is considered one of the best university golf courses in the U.S. And I could see why. The course is stunning. Rolling hills, big majestic trees, scenic vistas, babbling brooks and a lot of very well-manicured green grass. It's a golf course after all. As we drove around, he pointed out the areas that had and were going to be dedicated for flowers, but more specifically, pollinator habitat. What???

Anytime someone wants to talk to me about pollinator habitat, I am all ears. And here I was strolling around a golf course talking with Scott about adding not just a few token flowers here and there, but actual plots of pollinator & wildlife habitat sprinkled around the course. This was music to my ears! At the end of our tour, he showed me where he wanted to put the bee hives. It was close to the club house, which made them visible to everyone coming out to play. I was very excited to be a part of this project but I had to ask, was this a good idea to have honey bee colonies housed at a golf course? Before I go into how this was going to work, let me back up a few years and explain how it all started.

In 2015, the golf course industry and Syngenta, partnered together to plant more pollinator & wildlife habitat on and around golf courses. It is a national program coined Operation Pollinator and is funded by Syngenta. As some of you may know, Syngenta is a global leader when it comes to developing and producing insecticides, herbicides and fungicides. Their products are also widely used for turf management and golf courses are in need of turf management. Operation Pollinator encourages golf course superintendents to plant pollinator and wildlife habitat in and around "out of play areas." It's a brilliant idea and extremely important considering that our pollinators are experiencing huge drops in populations. Why are their numbers dwindling worldwide? There

Appalachian Mountain Mint a native to the U.S. and a pollinator magnet. I love Mountain Mints!



Blue Azure Salvia is easy to grow. A skipper butterfly and bumblebee find this a tasty treat!





The first honey bee colony at the UGA Golf Course. The ground around the hive is being prepped for planting this Fall. What a nice view for the bees and the golfers.



Scott Griffith, now a UGA Certified Beekeeper, proudly stands with his second honey bee colony at the golf course.

are a number of contributing factors, which are pesticides, climate change, pollution, invasive species and diseases. But one factor that is probably the most detrimental is habitat loss due to land-use change, agricultural intensification and development.

There's been a whole host of research on this topic, and we are discovering that conservation of land is key in order to slow the decline of our pollinators. Yet, with a growing human population, how? Recent research has shown how cities and urban landscapes are providing refuge for bees and other pollinators (Hall et al., 2017). As land is being consumed by developers to house the many and by agriculture to feed the many, we need to be creative and provide food wherever possible, which is why pollinator habitat in cities, towns and golf courses is becoming a more and more important food source. The U.S. has over 2.3 million acres of golf courses. Now granted, not all 2.3 million acres will be planted in pollinator or wildlife habitiat, but every acre counts!

Now, some may say Syngenta's Operation Pollinator program is nothing more than greenwashing, which is a practice whereby companies falsely promote their environmental benefits. I did take a gander at Syngenta's website and poked around. The section dedicated to their pollinator conservation is very nicely done. So, is this greenwashing? Maybe, or it may be that Syngenta truly wants to help pollinators. Hard to say since this company does produce products that are harmful to them, but if they want to spend money to feed and promote pollinators, then go for it.

When Scott found out about this program he wanted the UGA golf course to be involved. He decided to plant the first pollinator plot by the putting green so it would be visible. He showed me photos of the first year and the plot looked amazing. Full of

The UGA Golf Course pollinator habitat included Asters, Mountain Mints, Salivas, Rudbeckias, Coreopsis, Monardas, Butterfly Weed and more.

Another view of the pollinator habitat Scott planted at the course. Monardas, Butterfly Weed and more.

flowers and pollinators. However, the second year it didn't look so great. Weeds moved in pushing the flowering plants out. Scott realized for this to be successful, he needed to do more research on plot preparation and maintenance. Thankfully, he did not give up!

Planting pollinator habitat is not hard but depending on where the area exists, will determine how much prep and maintenance it must receive. For example, in Scott's case, the plot needs to be somewhat horticulturally pleasing. In other words, more formal "gardenish" than "wild". This is a golf course after all, where everything is kept manicured, neat and tidy. And there are no weeds allowed, especially on the putting greens. Maintaining pollinator plots has been an issue not just for Scott but for other golf superintendents as well. Managing a golf course is not easy, and takes time. Adding additional areas that need to be tended to, weeded, watered, mulched, well, therein lies the problem. Scott is not only working with the bee lab, but also the Audubon and Monarch Society in order to learn better ways to maintain habitat without it dipping too deep into budgets and schedules.

Now for the elephant in the room. Why did I have such a negative reaction when Scott first reached out about putting bees on the UGA golf course? It is because of my perception of golf courses prior to my understanding about how they are managed. As a friend once said, and I agreed, golf courses are doused with insecticides, herbicides and fungicides on a regular basis. The grounds and surrounding area are unsafe for any kind of insect and is no place for honey bees. Well, like a lot of things in life, you need to uncover the truth, or search for yourself, or ask questions instead of assuming. I assumed golf courses were toxic landscapes and would be detrimental to all wildlife. That is not the case, and is definitely not the case at the UGA golf course. Do they use pesticides, of course. But do they douse the entire landscape on a regular basis, no. To begin with, pesticides are expensive and with all businesses, there are budgets. There is also the safety of the golfers and those employed to be considered. And finally, when you have a superintendent who wants to make a difference and support wildlife on the course, sustainable management practices are employed.

For the past two Springs, Scott has purchased hundreds of the bee lab's pollinator plants. We hold a pollinator garden sale and Scott has been our number one customer. It has been a real treat to travel out to the golf course and see the bee hives and the areas that have been planted for pollinators. But that's not all you encounter. There's a whole host of native bees, butterflies and birds, which is just delightful. Plus they've added Barred Owl and blue bird boxes too; there are signs as well. Not only does Scott want to help feed pollinators but his plan also includes educating folks about the importance of them. And what a better place, while your teeing off, you see his honey bee colonies with signs about their importance. Next while putting in the back nine, you're enjoying the beauty of flowering plants covered in bees, butterflies and the occasional hummingbird. I am so happy that areas like golf courses can be home to such a number of wildlife species. Maybe I'll pick up golf again. Who knows, the bees and butterflies may just help my game. "Fore!!!"

Take care of you and your bees and pollinators;) BC

Hall, D. M., Camilo, G. R., Tonietto, R. K., Ollerton, J., Ahrné, K., Arduser, M., ... & Threlfall, C. G. (2017). *The city as a refuge for insect pollinators.* Conservation Biology, 31(1), 24-29.





A Monarch sign located on the course. Another pollinator program Scott is involved with.



Monarda, or bee balm, is a favorite among our native pollinators.



Off the Wahl Beekeeping

FALL: TIME TO GET READY FOR WINTER

Richard Wahl

https://www.beeculture.com/off-the-wahl-beekeeping-20/

Listen along here!

Changing Weather

As the leaves begin to change colors here in southeast Michigan and the days become cooler, there are actions that can be taken to ensure your hives are ready to survive our variable Winters. Although the timing may vary depending on your particular climate area or the weather patterns that may differ from year to year, the techniques I will describe that follow will at some point in time apply to nearly all beekeepers. A little preparation and forethought can go a long way in determining the success of your hives when the following Spring arrives.

Adequate Honey Stores

The bees have been busy all summer and Fall, gathering nectar that they have turned into honey in order for them to survive the following Winter. It is to our benefit that they are somewhat altruistic and store more honey than what they will need to use themselves. We humans have therefore taken advantage of this trait and collect what we hope is not in excess of their needs. The minimum amount of stored honey recommended for the bees is in the sixty to eighty pound range. The amount of honey to be left for the bees will depend on the colony strength and the size of the hive. A double ten frame deep full of bees will require more than a single deep or a five frame nuc. A full deep frame of capped honey will weigh on average around eight pounds. A double ten frame deep full with bees should weigh closer to the upper end of 80 pounds or a bit more. This means the entire top deep should be nearly filled with capped honey or a combination of about ten to twelve total frames from both deeps covered with honey. As August days change to September and then into October the queen is given less and less space in the brood rearing area for eggs as more and more of the space is used to store the winter honey supply. A single deep may only need the sixty pound amount which means at least seven frames fully covered in honey are present. A five frame nuc may get by with thirty to forty pounds but I like my five frame nucs to be at least a double story deep which takes us to the same amount as a ten frame deep. If in a late August through early October hive check amounts do not seem to be approaching these levels due to a dearth or weather precluding a strong Fall nectar flow, feeding is strongly recommended. A two parts sugar dissolved in one part water sugar syrup mix should be fed to the bees until nighttime temperatures continually fall below zero. The two to one ratio gives the bees less water to extract and the higher carbohydrate content allows the Winter bees to fatten up for the colder temperatures soon to arrive. This sugar syrup mix is particularly a good idea if the beekeeper has lighter deeps with most of the honey having been taken from upper level honey supers. As the bees fill the previous brood cells with honey, they should be fed as much syrup as they will take. The stored honey serves as insulation surrounding the ever smaller brood nest area where the queen will initially reside. Leaving sufficient honey stores for the bees is the best insurance against possible early Spring starvation.

Queen Excluders and Honey Super Cleanout



A beautifully capped frame of honey

If you use queen excluders with a honey super that will remain over the deep through Winter, the queen excluder needs to have been removed by this time. If the cluster of bees moves up the queen must also be able to move up to be kept warm by the cluster. Occasionally I will leave a filled honey super over a single heavily populated deep so as to leave an adequate amount of food stores for that deep over the Winter. By this point in time any honey supers that are intended to be removed should have had the honey extracted. If you do not use queen excluders there are often a few cells along the bottom of the honey super frames that have had eggs laid in them and may have capped brood. When extracting, I do not remove the caps from those brood and I spin out the uncapped honey cells in my motorized extractor at full speed. The capped brood does not get thrown out of their capped cells to mix with the honey.

If your hives have been visited by hive beetles it is important to extract the honey within three days of honey super removal so that any hive beetles that may have laid eggs in the honey super do not turn into larva. In three days hive beetle eggs turn into larva that will chew though

comb and honey and leave a trail of beetle excrement behind which destroys the quality of the honey making it unusable. Once I have extracted the honey I will place the honey super back on a hive over the inner cover and under the outer cover. In this manner only the bees in the hive can go up through the inner cover hole and get to the honey super for cleanup which decreases other hives urge to start a robbing event. This also keeps visiting wasps and yellow jackets from getting to the empty super. This works best if the honey super is returned to a different hive other than the one it was originally taken from. It seems the different remaining pheromone encourages the bees that are cleaning out the super to have less of a tendency to store more nectar in the returned super. The bees will clean out and remove any remaining capped brood if the honey super is returned to the top of a hive for a refill. I like to retire the cleaned out honey supers into an old chest freezer for 48 hours to kill any beetle or wax moth eggs that might remain. For storage one can stack three or four honey supers with a paper pie plate holding Para moth crystals on top of the supers followed by three or four more supers with another paper pie plate with Para moth crystals. The crystal vapor descends down through the honey super below to keep moths out. Do not use regular naphthalene moth balls or crystals normally used in clothes closets as the naphthalene will also kill your bees if used on any supers that are returned to the hive. Once my honey supers are emptied, cleaned out and frozen for a day or two, I place each in a 30 gallon garbage bag and stack them in an unheated out building. As long as there are no rips or holes in the garbage bags I have not had any problems with wax moths. I do use a few paper cups with the naphthalene moth balls set around the outside of the bagged honey supers which seems to keep any curious moths away from the bagged supers.

A fall hive inspection accomplishing three things at once: showing plenty of bees in the hive, full frames of capped honey and a mite check with no mites.



Fall Hive Inspections

Full Fall hive inspections should only be made when the temperature will remain above 50°F (10°C) for a period of time during and after the inspection. In addition to determining the need to feed your bees it will be a good time to do a mite check. If counts in the Fall exceed three percent, it is time to apply a mite treatment. Try to get mite counts as low as possible before going into the Winter months. Since the queen is beginning to lay fewer eggs with less brood present it is a good time to consider an oxalic dribble or oxalic vapor treatment. Temperatures remaining above 40°F (4.5°C) the night following a daytime dribble are ideal to allow the bees enough time to clean themselves off and not get chilled that following eve. The earlier in the day a dribble can be done the better. The oxalic treatments do not penetrate capped brood so if temperatures allow there are other treatments that can be used. I like the Formic Pro since the formic has been found to penetrate the capped brood cells to some extent and can be used with honey supers on. The greatest reason for bee hive losses in the Spring is an over-abundance of mites present in the Fall and through the Winter. Mites can survive on adult bees for up to three months. Mites are out-producing the bees by a more than three to one ratio in the Fall months. As soon as the queen starts laying a few eggs in the Spring, perhaps as early as January, the mites can sense when a larva is to be capped and will crawl into that cell to live off the capped pupa and reproduce. Research has found that a single mite living off the body fat of a bee can decrease that bee's life by twenty five to thirty percent. If the bee is carrying two mites it can cut the bee's life by fifty percent. And that does not take into account the forty or so viruses or diseases the mite could possibly be passing on to the bee. At the time of the inspection it is good to see a nice brood pattern although much smaller than that seen in Summer. These are the bees that will emerge to survive for as much as four to six months and provide for the care of the new Spring eggs, brood and emerging bees. In the event a hive seems weak or has lost their queen with no evidence of eggs or small larva, the hive can be married to another. Although I do not like to pinch off a queen, it is sometimes the better choice than letting a hive struggle to get through the Winter with a weak performing queen. A sheet of newspaper placed between the bottom deep that has a good queen and the top deep with no queen will allow the top deep queenless bees to get used to their new queen's pheromone as they chew through the paper. Any bits of the scrap paper fuzz that falls to the bottom board should be removed a week or so after the marriage to preclude a moisture buildup in any of the fallen refuse paper. You'll notice with cooler temperatures, the blooms of goldenrod and purple asters quickly start to diminish. This is the sign to evaluate hives and combine where necessary or shakedown colonies that have too much empty space. Weak hives should be combined with stronger hives. If two weak colonies are combined you simple end up with one larger weak colony; it is not recommended to combine two weak hives together.



A two deep, four frames queenless nuc added to a strong existing hive.

Robbing

Leaving a hive open or a honey super exposed for any length of time in the Fall is a sure invitation for robbing. The late Summer and Fall may have a short supply of nectar producing flowers or be in a dearth. Since bees are continually on the lookout for new nectar or honey sources, an exposed honey super or open hive is very tempting for robbing. Whether using a fumigant, a hive escape board, a leaf blower or simply brushing bees off frames of honey to be taken, it is a good idea to place them in an extra empty super that is set on a flat board or extra outer cover. As soon as the frame or entire honey super is placed on the flat moveable surface cover it with another outer cover. In this way the honey is not exposed to investigating bees and it is unlikely a robbing frenzy will be started. Likewise, any open hive should have as much of the exposed frames covered with a white sheet or inverted extra outer cover to avoid any chance of starting robbing. Work in your hives quickly but carefully when removing honey frames or full honey supers. Nearby hives that are of the same relative strength that are queenright provide less of a chance for a robbing event. If robbing does start it may only take a day or two for the weak hive to lose out and you will more than likely be unable to recover it at that point. I keep my entrance reducers on all my hives through the late Summer through the Winter with the smallest entrance on any nucs or hives that I suspect are a bit weaker. Hive reducers also make it more difficult for mice or voles to get into a hive unless they are very small and courageous. If a hive is found to be mostly empty of bees and honey, a robbery has already occurred. A telltale sign of this is wax capping detritus on the bottom board as robbing bees merely rip open capped honey cells, engorge their honey stomachs and return to their hives with their bounty. If robbing has already taken place, there will be an abnormal amount of dead bees inside or just outside of the hive. If there is any question about a robbing potential, the use of robbing screens is also advised.

Moisture Control

Although moisture control is not normally a concern in the Fall, preparations can be made now for when it may become a problem during Winter. Bees can tolerate very cold temperatures as long as the cold condensation moisture is not allowed to drip back on them. Bees exhale warm air that results in water vapor seen as a fog the same as humans exhaling in cold temperatures. In a cluster that warm air turning into moisture and falling back on them can cause them to freeze. The key is to be sure the hive can adequately ventilate. The small notch on the front edge of the inner cover is normally recommended to be down during the Winter. This provides for fanning bees to maintain ventilation and also provides a second entrance/exit point if the lower entrance gets blocked by snow.

One inch insulation slips into the outer cover.



When I began using a half or one inch piece of foam insulation board cut to just fit inside the outer cover on my hives over the Winter months, I noticed a much better rate of survival. Just that small bit of insulation in the outer cover seemed to allow the bees to more easily control humidity and moisture content in each hive. Cut pieces out of a four by eight foot sheet and have them ready to install when temperatures continually go below freezing at night. For my purposes I leave these foam sheets on year round. I find they are just as good during hot Summers mitigating the hot sun shining on the metal outer cover sheath and emanating through the thin outer cover usually made of wood. This seems to cut down on the Summer bearding on hot days as well. In addition to the outer cover insulation, a Vivaldi style spacer can be placed over the inner cover, as explained in last month's article.

Conclusion

As the days of Fall change to cooler and shorter the bees are accommodating those changes by using more brood space to store honey, raising fattened bees to survive the Winter, and trying to find as many last minute resources to store as possible. If we as beekeepers help to assist in this annual transition the survival of the hive becomes more likely through the coming cold Winter months. There is no greater pleasure than coming into that first Spring inspection to find a strong healthy hive with an excellent queen ready to bring in more honey in the coming season. BC



Richard Wahl began learning beekeeping the hard way starting in 2010 with no mentor or club association and a swarm catch. He is now a self-sustainable hobby beekeeper since 2018, writing articles, giving lectures and teaching beginning honey bee husbandry and hive management.





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Miss Bee Haven welcomes visitors to the garden (artist Donna Billick).

As you are cozying up to your fireplaces drinking hot cider and reading *Bee Culture*, you might be thinking, well talking about plants and gardening hardly seems appropriate for a November issue. But if you are an avid gardener you know that in parts of the country November is a perfect time to plant forage that will be available to our beloved bees in the Spring. Plus it is a perfect time to start planning your garden needs for the following year. So here I am talking about gardens in November! More specifically, if you ever find yourself on the UC Davis campus I want to invite you to visit the UC Davis Bee Haven, a unique pollinator garden where bees and plants come together to co-exist in perfect harmony. Located on the West side of campus, and nestled cozily next to the Harry H. Laidlaw Jr. Honey Bee Research Facility on Bee Biology Road, this half-acre garden is truly a haven for bees, bee enthusiasts, and many other insects, arthropods and birds. Whether you're a seasoned gardener, a curious student or just someone who loves nature, the Bee Haven has something for everyone. Let's dive into the captivating world of the UC Davis Bee Haven and explore its history, mission, outreach efforts, and more!

The mission of the UC Davis Bee Haven is to provide resources for local bee (and other) pollinators, inspire and educate visitors to create pollinator habitat gardens and offer a site for the observation and study of bees and the plants that support them. By planting a diverse array of flowering plants, the garden ensures that bees have access to nectar and pollen throughout the year. With many bee species in decline, the Bee Haven educates visitors on the importance of bees and how they can help. While the original intent of the garden was to help support our research colonies, the garden now serves as a model for creating pollinator habitats, inspiring visitors to plant their own bee-friendly gardens all while keeping in mind that California is very dry most of the year.

The UC Davis Bee Haven was created in the Spring of 2009 thanks to a generous donation from Häagen-Dazs®. You likely remember that

Discover the Buzz at UC Davis Bee Haven

The UC Davis Series

Elina L. Niño



Garden plants with research and educational hives in the background.



Labels at the Haven indicate what the plant produces for pollinators and its water needs.



Pollinator water source at the Haven.

it was right around 2006-2007 when the first reports of Colony Collapse Disorder started coming out prompting beekeepers, researchers and many other organizations to spring into action. Recognizing the need for the public to better understand the link between bees and our food supply, Häagen-Dazs® partnered with UC Davis to develop the garden. Instrumental in this effort were Dr. Lynn Kimsey (the chair of the Department of Entomology at the time and currently retired) and Dr. Dave Fujino (previously director of the California Center for Urban Horticulture, currently retired). The garden was planted in the Fall of 2009 and has since become a beloved destination for bee enthusiasts and nature lovers alike. Over the years, the garden has expanded to include more diverse plants, a children's learning area (currently under reconstruction) and a demonstration beehive. In 2022, the garden's name was changed from Honey Bee Haven to the UC Davis Bee Haven to reflect the vast diversity of inhabitants well beyond honey bees. In fact, I remember when late Dr. Robbin Thorp would go out into the garden every lunch break and record all the different bees visiting the garden blooms. During his observations he managed to identify over 80 different bee species! The garden is also a home to many different beneficial insect species and many birds including several hummingbird species. Because of the diversity of the wildlife that the garden hosts, we are often a must-visit spot for many bird watchers and photographers. And artists! Yes,artists and art lovers can enjoy beautifully crafted pollinator-themed art displays visible throughout the Haven. Perhaps the most famous is Miss Bee Haven, an anatomically accurate sculpture of a forager honey bee gracing the entrance to the garden. The artwork was completed by the local artist Donna Billick in collaboration with Dr. Diane Ullman, both of whom have been deeply involved with the Art/Science Fusion Program which brings scientific accuracy to intricate and beautiful nature art pieces.

The Bee Haven's animal diversity is of course due to its well over 150 pollinator-supportive plants. This also might be a good spot to get on my (very small) soap box. The term "pollinator-friendly" plants never sat well with me. In my opinion it doesn't really highlight just how important and co-dependent plants and pollinators are for each other. Instead, whenever possible I try to use the term "pollinator-supportive" plants. It still doesn't fully describe the symbiotic relationship at hand, but it drives home the point that plants are important for sustaining pollinators, and it sends a clearer



Preparing the snack table for the Pollinator Education Program featuring pollinated foods and some that are not (yes, we are aware we had Cuties on display).

message to the general public. Haven's plants were carefully chosen by the garden designers and prior garden manager Dr. Christine Casey (currently retired) to fulfill several requirements. The garden has a variety of plants that bloom year round, which is crucial when trying to support pollinators that are present throughout the year in relatively warm areas like California. The plants provide either nectar or pollen or both, and we know both protein (pollen) and carbohydrates (nectar) are crucial for supporting pollinators. And the garden showcases mostly California native, drought-tolerant plants, which of course is crucial when planting in arid areas such is ours. For a list of pollinator-supportive plants that can be found at the Haven, and to inspire your own pollinator garden make sure to visit the Haven or the UC Davis Bee Haven website!

The garden was originally designed to highlight some of the important aspects of the pollinator-plant relationship. For example, the Nectar Nook was designed to boast nectar-rich flowers, Pollinator Patch was designed to have a diverse array of flowering plants that attract a variety of pollinators, including bees, butterflies and hummingbirds, and Honeycomb Hideout is a garden area designed to mimic the structure of a honeycomb, providing bees with a safe place to forage and rest. While the Haven has gone through updates and changes throughout its 15 years in existence, the purpose and messaging remains the same: to educate the public about the importance of pollinators and pollinator habitats. With that goal in mind the Haven offers a variety of outreach programs. These include a self-guided tour where visitors can explore the garden at their own pace, using informational placards to learn about the plants and bees they encounter. Although currently on pause due to staffing changes and irrigation updates, we also offer tours led by knowledgeable staff members which provide an in-depth look at the garden and its inhabitants. The Haven is also the site of our "Pollinator Education Program" (or as I like to call it PEP!) where we engage with 3rd and 4th graders to teach them about the diversity and importance of pollinators through games and hands-on activities. Everyone's favorite is the honey tasting and the pollinator snack table featuring foods produced by the help of pollinators. To read more about this program visit **https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=27922**

The Bee Haven also hosts a variety of fun and educational events for visitors of all ages where visitors can participate in a catch-and-release



Educational signs provide information and examples of how best to support bees other than honey bees.



A section of the Haven showcases crops pollinated by bees, and educational signs (visible in the background) discuss importance of pollinators for crop production.



Beautiful decorative planters at the Haven.

bee activity where bees can be observed up close as visitors learn about their behavior and biology. We also offer presentations on pollinator research where our expert scientists from the University of California share the latest findings on pollinator health and conservation. In addition, the Haven has been a site of several research projects including evaluation of commonly used ornamental plants for their attractiveness to different bee species, and it continues to serve as a site for UC Davis student education. Lastly, we host family-friendly open houses featuring a little bit of everything including short garden tours, bee-related activities and information on low-water plants.

Most importantly, the UC Davis Bee Haven is open daily from dawn to dusk, and admission is free. The garden is wheelchair accessible and offers parking free of charge for the first hour and a half. Visitors to the garden are encouraged to wear closed-toed shoes and avoid scented personal care products to prevent disturbing the bees.

And before we part ways today, I have to mention dedicated volunteers who have provided assistance with garden management and delivering educational events to the public, and many donors who have graciously supported the Haven through the years. Thank you! – The Haven would not be what it is today without your generosity!

The UC Davis Bee Haven is more than just a garden; it's a vibrant community dedicated to the conservation of bees and other pollinators and the plants that support them. Whether you're looking to learn more about pollinators, get inspired to plant your own bee-friendly garden or simply enjoy a peaceful stroll among the flowers, the Bee Haven has something for everyone. So come on down to Bee Biology Road and discover the buzz at the UC Davis Bee Haven! BC

To learn more about the UC Davis Bee Haven please visit **https://bee-garden.ucdavis.edu/** and to stay up-to date on current happenings at the garden follow us on Facebook **https://www.facebook.com/HoneyBeeHaven.UCDavis/** To support the Haven visit **https://give.ucdavis.edu/AENM/GRDNBEE**

BUILD A BETTER BEE PRESENTATION PART 4

Ed Simon



It is Jerry Hayes' fault. He caused the SEMBA's Library to come into existence. And it is working out beautifully!

Jerry Hayes, editor of *Bee Culture*, sent a note to me after accepting the article series *Build Better Bee Presentations*. He wanted a QR™[1] code that would give his readers a link to download the resulting PowerPoint™ presentation "Swarms are Free" and its supporting documentation. There was absolutely no way I was prepared to accommodate this request. In a fit of fantasy, I imagined 123 bee clubs requesting this information before their next monthly meeting.

BUT! Sometimes there is a **EURIKA** moment. I realized that most bee clubs struggle to find presenters for their monthly meetings It was the time that is involved in creating a decent presentation that caused reluctance to give a presentation, not that beekeepers didn't have the knowledge or experience. They are just too busy.

Why couldn't our bee club provide a **library** of **free** presentations that any beekeeper or bee club could download and use? The requesting club would need to provide the speaker, but all the speakers would need to do to prepare is read all the supporting documentation and then give the presentation in their own words (Rule #1: Do not read a presentation to the audience!). Providing a presentation with supporting information along with the presenter's experience should provide for good presentations at the meetings.

Project Creep

The result of Jerry's request has resulted in an addition to the SEMBA's web site called "Library". While pulling together the concept for this library, I realized I couldn't find any web site that caters specifically to beekeepers who like to build their own equipment. Since I am overly enthusiastic about creating my own equipment, the library project was expanded to include articles on making beekeeping equipment and other articles.

Then, while discussing this project with SEMBA's web developers and current co-presidents, Beverly and Duane Madsen, the phenomenon called "**Project Creep**" occurred.

Project Creep is when more bells and whistles keep being added to a project.

Since I had available over 60 published and 40 unpublished articles, we would add these to the library.

We were now on a roll!

Many bee club coordinators base the monthly meetings on the activity needed in the following weeks, it was also decided that the library would be centered on subject matter.

Hence the main thrust for the SEMBA library was solidified.

Note: Before computers, in each library there was a long series of pull-out drawers that held the card catalog. This is where many of us, of the more senior generation, spent long grueling hours as students looking up information and reference books for our senior thesis. Using this subject oriented concept for the catalog and adding an easy cross-referencing method for authors was added to the project.

Note: This library, just like the old card catalogs, will have all entries or items listed alphabetically.

Using these added features, the user can now access presentations or articles through a selected number of categories. Those being the Catalog and Presentations. Two additional categories, Contributors and Library Information are needed to support the Catalog and Presentations categories.



Catalog Category

The first Library category is Catalog. The category Catalog is further segmented into four sections whose titles are self-explanatory. Each of these sections contain articles that can be viewed or downloaded to the user's computer for their further use.

Presentations Category

The last category on the mail library display is Presentations. It contains the canned presentations available to bee clubs for their use.

Under each item there are functions for viewing and retrieving the information for that item.

1) *View Script* – This is a document that can be read by the presenter. This is a slide-by-slide version of what the original developer of this presentation would be saying. It is to be used as a guide and information for the new presenter.

[1] QR code (quick-response code) is a type of two-dimensional matrix barcode, invented in 1944, by Japanese company Denso Wave for labeling automobile parts.

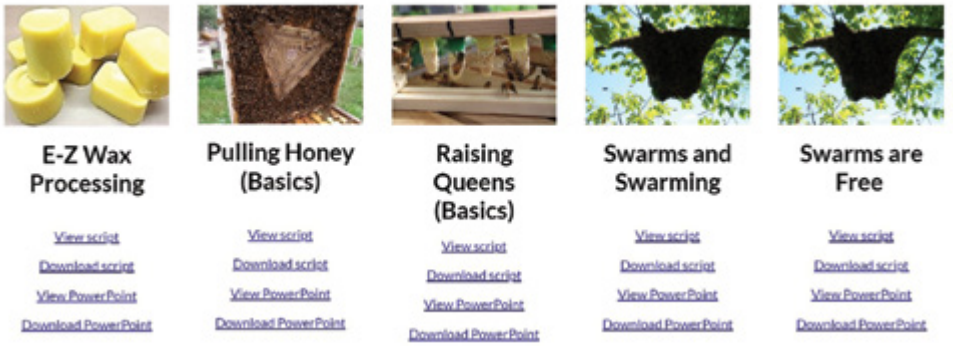
Library Category



Catalog Category



Presentations Category



2) *Download Script* – A PDF version of the script will be downloaded to the requester's computer.
3) *View PowerPoint* – The slide portion of the presentation is displayed for the requester to review and use to decide if they want to use this presentation.
4) *Download PowerPoint* – A PPT version of the script will be downloaded to the requester's computer for their use.

Using the functions you can now easily view and download the listed presentations.

Note: Not all presentations have all the functions listed.

JERRY, it took a lot of work to get to this point. But we made it! This is where your download request is finally fulfilled.

How to use the SEMBA Library:

To use the new SEMBA's Library facility and download the "Swarms are Free" presentation, take the following easy steps.

Step 1: Sign on to the SEMBA web site at: **https://www.sembabeeclub.com/** (Or place your phone's camera over the QR code to the right.)

Step 2: Select "Library" from the list at the top of the display.

Step 3: Select "Presentations" from the library list.

Step 4: View and then download the parts of the presentation you need.

That's all it takes. We tried to make it easy for you.



Note: while you are in the SEMBA's Library you may want to look at the other options available to you.

Big Problem

As you will probably notice, there are very few qualifying presentations.

This is where **YOU** as beekeepers and readers of *Bee Culture* can help. We would like to expand the presentation and the catalog section of the SEMBA library with additional items from a variety of sources. If you have a presentation or an item that you are willing to donate to the SEMBA library for **free** private use by bee clubs or individual beekeepers, we would like to know about it.



Select "Library Information" from the main library display and follow it by selecting the "Contribute" function to read how you can help us.

Note: We are not asking for money, just help.

Suggestion: Many of the items available in the catalog section of this this web site can be used as the source for a presentation. The information is available and already organized. You can use them as a base to create your fantastic presentation. If you create one, please submit it to us so we can make it available for other bee clubs.

Jerry Hayes, with his basic request, kicked off a good idea that we hope will eventually become a major resource for all bee clubs.

Thank you Jerry! BC

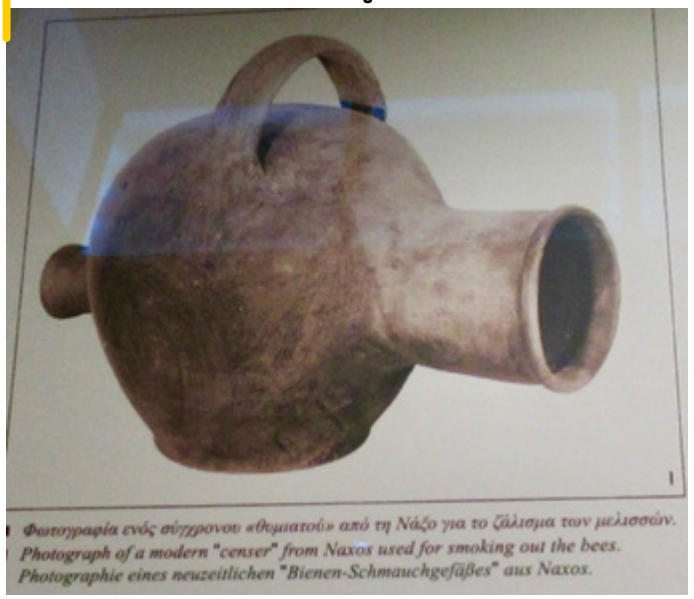
Beekeeping in Greece From Past to Present

Ettamarie Peterson

The Greeks have had knowledge of gathering honey since ancient times. In the 5th Century BCE upper class women were using oils and honey to moisten their skin. Hippocrates (460-377 BCE), known as the father of modern medicine taught about the healing virtues of honey. He advised that honey cleans sores and ulcers, softens hard ulcers of the lips, heals carbuncles and running sores. When I visited different archeological museums in Greece, I discovered ancient bee smokers and bee hives that dated back to the 5th Century BCE. These were all made of clay. The Greeks were gifted pottery makers and used clay in their every day lives for just about everything. The archeologists think they may have had some wooden beehives but only the clay ones survived the thousands of years. One display I saw in the Archeological Museum in Thessoloniki was particularly fascinating. It had been a beehive that was used as a burial container for a small child. The skeleton of the child was in the clay beehive! I wish I could have talked to the archeologists to quiz them about their belief that this was a repurposed beehive. Another display of a clay beehive said there was a thumb print put in the clay to encourage the bees to make the wax there. How archeologists make these decisions is a mystery to me. The first ancient smoker I discovered was in the Athens National Archeological Museum. It did not describe what kind of fuel was used in it. The fuel would have to have been something that just smoldered as it did not have bellows as our modern-day smokers do. It was designed to work like an incense burner on a large scale. Luckily the exhibits in these museums have explanations in English as well as Greek.

Each visit to Greece we went to the next town from our Greek/American host Evi Smith's town of Zouberi. Nea Makri is bigger and has more businesses, banks and a huge farmer's market every Thursday that of course sells honey. On our first visit my eyes quickly spotted a shop on the main street cleverly named "Honey Sak". Of course, I had to go in to see what kind of honey was for sale. To my delight I met a wonderful lady named Christinaki Sakarikou. She goes by the name of Christie and besides selling her father's honey has developed an interesting line of cosmetics using products from the bees. For ten years now I have always made a point to visit with her each time we are in Nea Makri. This year I reminded her of what she told me about the display of beehives in her little shop. She told me, "I was born in those." She laughed and said it was true! Her father has 400 beehives. She said that due to global warming his honey crops come from higher altitudes now as there is practically no honey coming at the lower elevations. His colonies pollinate oranges, mandarins and lemons. He gives the owners of those trees honey in payment for keeping colonies on their land. He also gets thyme, mixed floral, pine and fir honey. The Greeks call the pine and fir honey "mountain honey." We would call it honey dew

Naxos bee smoker found in Archeological Museum



Φωτογραφία ενός σύγχρονου «θυμιατού» από τη Νάξο για το ζάλισμα των μελισσών.
Photograph of a modern "censer" from Naxos used for smoking out the bees.
Photographie eines neuzeitlichen "Bienen-Schmauchgefäßes" aus Naxos.

Another ancient bee smoker - thousands of centuries BCE!



Ancient beehive repurposed as tomb for a small child. Found in Archeological Museum in Thessoloniki



Honey Sak store in Nea Makri, Greece



Christinaki Sakarikou in her store with some of her cosmetics and honey. Note some of the honey is sold in cans and some in jars.



My Greek/American friend Evi Smith, me and Christinaki Sakarikou in her store.



honey. In the good weather months of the year, he moves his colonies monthly. This is a common practice with commercial beekeepers in Greece.

Her cosmetic labels have the name Christie's on them. She has some very nice beeswax lipstick, "Body Butter", a cooling mist she calls "Shimmer & Shine", a great lotion, balm and other beauty products. I absolutely love the soft scent of her Body Butter and use it daily! I wish she was able to sell her products here! I asked her how she knew what to put in her various products and she explained different ladies have shared their recipes with her. She rents a laboratory and works with a chemist to formulate the finished products to exact standards. In her little shop she sells the cosmetics, bees wax candles, little bees wax ornaments, honey and cans of wild flower seed mixtures with "Save the Bees!" on them. She has a beautiful website **https://christies.gr** but unfortunately it is all in Greek with no English version.

In other towns I also found lots of shops that sold local honey and bee products. I came home with a little "travel kit" made of up to 97% natural ingredients. It included a hair conditioner, shower gel, gentle shampoo, moisturizing "body milk" and lip care made with beeswax, of course. The local honey was sold in various size containers, some glass and some in metal cans, at reasonable prices. I enjoyed seeing the various labels. One of my favorites had a picture of a bee on skis because it was from a town that was a popular place for people to ski in the Winter. Another one I liked was in Crete. That one had a picture of the beekeeper with his gigantic pet goat! No kidding! When we were in Crete, we saw the guy at his roadside honey stand with his pet goat at his side. It was an attention getter, for sure! I wish I could find the photo of those two but somehow it has gotten lost in my computer. The most honey stands I ever saw in one area was on the island of Crete. Fifteen percent of Greek honey

Bee on skis label on honey sold up in the mountains in a ski town (Count the legs!)



comes from Thyme. I saw a lot of it in Crete. Honey is a major product in Greece. It ranks third in European honey production. Everywhere I saw honey for sale there was lots of thyme honey. It is a very nice tasting honey and is good for sore throats. I brought some home and have been eating it every day just because I enjoy the taste. It is amazing where they keep bees. I got home with a jar of honey from the Meteora Monastery. This Monastery is on top of an extremely tall peak. On the label is a little picture of a beehive with a rope tied around it to remind people that the hive had to be hoisted up to the be available to pollinate the lovely garden and orchard way up there. When I pack jars of honey to bring home, I wrap it a plastic bag and then pack lots of clothes around each jar in my checked luggage. I have never had any problems getting my honey home.



Honey label on honey sold up in the Monastery of Meteora, a World Heritage site. Note the bee hive with ropes around it. This shows that the hive was brought up to the very high peak by a pulley.

The Greeks don't just harvest honey. Some of their very best-known foods are made with honey. I think most everyone is familiar with baklava, a pastry that just oozes honey! My friend Evie introduced us to another popular honey dessert. It is a deep-fried pastry often in the same shape as a donut but sometimes just in small balls. This delicious desert is called "loukoumades" and is served covered with a honey syrup with chopped nuts pored over the top. As I was going through the Athens airport this Summer, I spotted a food stand that sold only loukaumades. I think this gives the Greeks one last chance to enjoy a favorite treat before leaving their country! One evening we were served baked feta cheese with honey and sesame seeds over the top of it. That was delicious!

On one trip we were invited to meet Evi's friend that keeps bees on the island of Milos. This is the island where the famous statue of Venus de Milo was found. We were the guests of Aleko Loui and his wife for a week on the island. While we were there Aleko invited me to come along with him when he inspected his beehives. That was quite an adventure! He packed his car with all his gear including an extra bee suit for me and a huge container of water because the bees were in a very dry area. We drove through a herd of goats to get to his apiary where he met his beekeeping partner. We suited up and started inspecting the long line of hives. They put a supplemental food packet on the top bars of the weakest colonies. I had my friend Evi translate what was in it. The packet said, "Arkadiki Beekeeping" (the company name). Gritzali brothers are the owners.

The mix has: Μέλι
Φρουτοζη. Honey
Δεξτροζη. Fructose
Μαλτοζη. Dextrose
Τρίοζη Triode
Ανώτερα ζάχαρα. Higher sugar

This is a healthy nutrient feed that Alekos and his partner decided some colonies needed. I did not see them put any pollen patties in any hives. A few colonies also had the inside frame feeders just like the ones used here in the USA to give sugar water. Aleko and his partner move the hives three times a year to take advantage of what is blooming and what the bees like. He says the honey is thicker because there is not much rain on the island. They harvest the honey three times a year so that each time they have a distinct taste. They always leave some honey for the bees, so they don't have to give them sugar water. In a good year they can harvest 15 to 20 kilos (33 pounds to 44 pounds for those of us who don't think in kilos). They use only organic methods to control ants and other pests.

In Thessaloniki there is an American Farm School (**www.perrotiscollege.edu.gr** It can be read in English.) that invites students to do a study abroad program about all things agricultural. One year Evi arranged for us to have a very detailed tour. Our guide took us all around the campus. I asked him if they had a program to teach about honey bees, so he showed us the beehives. I found it interesting that the beehives were on very large tires painted bright colors. It is not a large apiary, but the students can learn beekeeping. There is a large park in Thessaloniki dedicated to all things about honey bees. It is called Anel Honey Park. I learned about it after we had returned home so I sent Evi to check it out for me. She was going to visit friends in Thessaloniki, so she spent a day at this marvelous park. She sent me pictures of the educational posters that were on display. Now I want to visit it myself after seeing her photos and looking at their website. It bills itself as the first bee tourism and bee therapy park in Greece. Look at the website **www.honeypark.gr**. It is in English. This is just one more excuse for me to make another trip to Greece!

I am very fortunate to have my friend, Evi Smith (she married an American) who was born in Greece near Athens and usually spends four months a year living in her second home in a lovely area not far from there. In the past ten years she has had my husband and me as her guests four different times. She is proud of her homeland and has taken us to many different parts of it. This is such a special treat to be her guest. She has spent a lot of time introducing us to many friends and relatives as well as many Greek places and cuisine. I thank her for all of this, especially her help introducing me to beekeepers, bee history and foods made with honey! BC

Note: Back in California, beekeeping was not done until 1853 so Ettamarie was extra fascinated to see the archeological bee related exhibits in Greece. When she is not traveling, she tends a few bee hives, a small flock of chickens and a big vegetable garden to have some things to sell to neighbors and feed her family. Her husband is in charge of the cattle and ponies keeping his distance from the bees. She is also the project leader for Liberty 4-H beekeeping.






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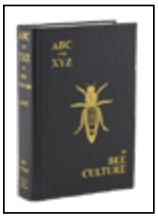






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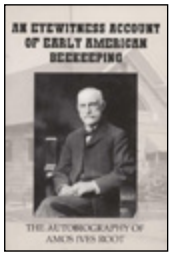
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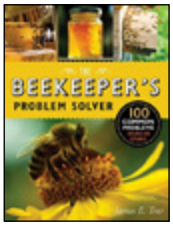
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Bees and Women

Mrs. Vera Winkler

Nina Bagley



Mrs. Vera Winkler, probably the most extensive woman beekeeper in this country.

Vera Irene Shelton, the oldest of five children, was born in Ottawa, Illinois in 1891. Her parents were Benjamine and Louise Shelton. Her father was a carpenter. Both parents were of German descent. In the 1800s, Irish and German immigrants flocked to Ottawa, Illinois.

Vera had a ninth-grade education. She married Edward A. Winkler, a man with a medium build, medium height, brown hair and grey eyes, on September 5, 1915. Her husband purchased a farm, and the newlyweds moved to Joliet Will, Illinois. On May 4, 1916, Vera gave birth to a son, Edward, named after his father.

During World War 1, all males from twenty to thirty were required to register. Mrs. Winkler's husband was drafted in early June 1917.

After being away for a year and a half, Mrs. Winkler's husband returned home in 1918. It took him only a brief time to become Joliet's largest beekeeper. He advertised in *Gleanings in Bee Culture*. ("White clover honey extracted in new cans and cases right for prices" Edw. A Winkler Joliet Ill.) Mr. Edward Winkler also authored the article "Cutting Production Cost" (in *Gleanings in Bee Culture*, March 1923).

Edward preached to the farmers to plant Hubam Clover; he firmly believed that the three thousand dollars he invested in growing this cultivar in 1921 was the best investment ever made. Over the years, the seed crops were profitable. The honey he would get from the Hubam Clover covered his expenses.

Mr. Winkler had this to say in the March 1923 *Gleanings*: "It does not require a great deal of time to interest farmers in beekeeping and, with the growing tendency of the progressive class of farmers, it soon becomes evident that they are more dependent on the beekeeper than they had thought."

In 1927, Mr. Winkler had seven hundred colonies of bees. The honey flow was at its height, and he knew there was a possibility of a crop of a hundred thousand pounds of honey if he could get the supers on in time. He knew the bees would get ahead of him. It was all timing. He could lose part of his honey crop, so he had to stay ahead of the bees. Mr. Winkler loaded up his truck and drove off to his outyards.



Mr. Winkler's truck loaded with Hubam Clover.

Crossing a railroad track to reach one of his yards, he was not paying attention- he was eager to get to the bees. A high barrier obscured the railroad tracks. He could not see the fast train traveling at sixty miles per hour at which he was about to cross. A terrible crash ended the hopeful life of Edward A. Winkler of Joliette, Illinois, in June 1927.

Mrs. Winkler's life was irrevocably altered. With the sudden loss of her husband, she found herself a widow, thrust into a world of daunting responsibilities. In an instant, she was left to care for her son, eleven-year-old Edward, her daughter, seven-year-old Shirly and her fifteen-month-old baby girl, Betsy. The future of the beekeeping business, now a heavy burden, seemed uncertain without her husband's guidance and energy.



Mrs. Winkler and her daughters 1930.

Her husband had built and paid for a modern house, but he made the mistake of building another home, a veritable Spanish palace, that threw him heavily into debt. Mrs. Winkler's words, "Had he lived, he would have no doubt made good." (*Gleanings in Bee Culture,* March 1923.)

One of the Winkler apiaries as it appeared at the time of the first extracting, July 6, 1932.



The Winkler Spanish home. The apiary was located here temporarily.



Mrs. Winkler faced the problem of getting the honey supers on the seven hundred hives in time for the nectar flow, not to mention the burdensome debt, which weighed heavily on her shoulders; trembling, she thought, how could she take over the job that only a man like Mr. Winkler could handle with his vision and tremendous energy? Her son, a true reflection of his father, reassured her that they could manage the business together. His words of encouragement were met with Vera's resolute response, "Yes, son, we can and must do it."

Mrs. Winkler undertook a task that would have discouraged most mothers. This is why Mr. Ernest R. Root, the editor of the *Gleanings in Bee Culture Magazine*, referred to Mrs. Winkler as "A Plucky Beekeeping Mother." The term 'plucky' signifies having or showing determined courage in the face of difficulties, a quality Mrs. Winkler exemplified as she faced the daunting task of maintaining the beekeeping business.

Fortunately, Mr. Winkler had shown his wife and son some tricks of the trade in keeping bees. With the experience Mrs. Winkler and her son had, the two tackled the problems they faced.

Her husband had the seven hundred colonies in prime condition, and all that was needed at the time was to give them plenty of room by adding supers. Once the supers were on came the problem of getting honey off the hive and extracting it to sell to the markets.

Fortunately, her late husband taught Mrs. Winkler how to handle the bees.



Mrs. Winkler had heard about the new radial extractors and the uncapping machine and considered getting them. However, the amount she collected from the railroad was minimal, so she decided to save her money and use her husband's equipment, a two-frame extractor and a knife she heated by hand. Her resourcefulness in making the most of what she had is commendable and inspires admiration.

With the help of a hired man and her son, the three of them, "by hand," spun ninety-six thousand pounds of honey for market the year her husband died in 1927. With the proceeds from the sales, she managed to pay off over half of the debt. She relocated her family from the Spanish home to the old house on Plainfield Ave. and rented out the new one, embracing a hopeful outlook.



Mrs. Winkler's son Edward.

Unfortunately, over the years, they did not get as much honey as they did in 1927. Mrs. Winkler and her son surely could not do all the work. Finding help planting the clover and keeping up with all seven hundred hives took more work than possible. Some of the hives died out, and there were several dry seasons, not to mention the Great Depression that had hit everyone hard. Lowering the price of her honey was hard and made it a struggle; it was a good thing her son was growing into manhood and, like his father, was a "chip off the old block."

Mrs. Winkler was an excellent salesperson who found the markets, canned and labeled the honey, calling it "Winkler's Honey Company." Mrs. Winkler's husband was well-known in the United States. He was a successful beekeeper throughout the United States for his exploits in getting farmers to plant Hubam sweet clover. And Mrs. Winkler, well, let us say this: E. R. Root considered Mrs. Winkler the most extensive beekeeper in the country. How ironic is that!

Mrs. Winkler's success in beekeeping was also reflected in her abilities, determination and hard work. If her husband had lived, she would have undoubtedly been a great deal of help to him.

It was finally getting too hard to handle five hundred hives by herself. Mrs. Winkler had been through so much over the years.

She dealt with American Foulbrood in 1930. The bees needed attention; foulbrood had broken loose among them. But keeping the spirit of her late husband with her, Mrs. Winkler conquered it with the old, reliable plan of putting the bees in clean hives and placing them on frames of the new foundation. Then, she put all the treated colonies into a hospital yard for observation.

Each year brought trials and tribulations, and it was getting harder to manage the bees. After all this was Mr. Winkler's business and vision. She did her best to keep his memory and the bees alive for eight years; she had hardships and sacrifices to make as a single mother.

On July 23, 1934, Mrs. Winkler married James T. Beagle. She still had two daughters at home. Her son Edward was married with a family of his own. Her name would change to Mrs. Beagle. They had two residences: Tampa, Florida, and Joliet, Illinois.

It was a bittersweet feeling, but it was time to give up beekeeping. Her son Edward took over the Winkler Honey Company in 1935.

Mrs. Winkler Beagle would be a widow for the second time. Her husband, after a short illness, passed away on December 13, 1947. He was sixty years old. She had thirteen good years with him. Her children were all married with children of their own. Mrs. Winkler, at the age of fifty-eight, was financially secure. She worked part-time as a saleswoman at Goldblatt's Department Store in Joliet, Illinois.

She passed away in 1979, lived to be eighty-eight, and is buried beside her husband, Edward A. Winkler. Her

headstone says, Mrs. Vera I. Winkler 1891-1979. BC



Nina Bagley has been an urban beekeeper in Columbus, Ohio, for over 20 years. Nina worked with a master beekeeper for eight years, raising queens. She has several apiaries in the City, raising her own Queens, and has her own Ohio Queen Bee LLC business. Nina has completed Dr. Joe Latshaw's instrumental insemination class. She completed the Master Beekeeping class taught by Dr. Jerry Bromenshank (Program through the University of Montana.) Nina avidly collects early bee books and history from the 1800s. She writes articles *Bees and Women* for the *Bee Culture Magazine*. Nina has managed the Bee Pavilion at the Ohio State Fair for ten years, sponsored by OSBA. She oversees the State House bees and the Franklin Park Conservatory bees. She also managed the Frank Fetch Park Bees. In 2010 it was the first pilot hive placed in a park in Downtown Columbus, Ohio. She is currently the Franklin County Bee Inspector for Ohio. Nina mentors inner city kids educating them on the importance of honey bees.













Think Inside the Box:
Critical Thinking Skills For Better

Beekeeping is science, skill, art and sometimes a little bit of luck. How can something that appears so simple, so easy be so difficult? Over the last 16 years I've made over 800 beekeeping videos on YouTube. Beekeepers can leave comments on each video, but most comments turn out to be questions, very basic questions. When I see these very basic, fundamental questions from beekeepers it makes me realize that beekeepers are really struggling to understand beekeeping in general and just how to keep their bees alive.

It is understandable that new beekeepers must endure a sharp learning curve. Let's face it, you can attend conferences, read books, take classes and watch YouTube videos but when you open your hive for the very first time, all of what you've learned goes out the window and you're not sure what's going on or what to do next. Just how does a beekeeper arrive at that level of beekeeping knowledge to the point

where they are very comfortable working bees and quickly assessing and evaluating colonies?

Developing critical thinking skills in beekeeping empowers the beekeeper to be able to make accurate decisions based on what they observe in the hive rather than just follow a standard list of items they learned in classes. Let's face it, how often does a colony do everything according to our lists and our books? So, a beekeeper must have critical thinking skills in order to gather all the information observed in the hive, synthesize the information and draw a conclusion as to the colony's health and performance. This is also known as deductive reasoning. However, the struggle in synthesizing the observed data from a typical colony inspection can also be inductive reasoning. This is what makes the learning curve of bee inspections challenging.

Deductive reason starts with a general assertion, applying it to a specific observation to reach a logical conclusion. Inductive reasoning relies on specific observations to infer a general conclusion that is very likely but not guaranteed.

Deductive Example 1:
Premise 1: All bees are insects.
Premise 2: A honey bee is a bee.
Conclusion: Therefore, a honey bee is an insect.
Deductive Example 2:
Premise 1: The queen lay fertilized eggs.
Premise 2: I see eggs.
Conclusion: Therefore, I have a queen.

However, the colony can throw us a curve ball and ruin our conclusion. What if we see eggs, but we do not see the queen and there are multiple eggs in each cell? Did we just miss seeing the queen? Now more bee biology is needed to help us have a more thorough base for our critical thinking skill. Now we will use inductive reasoning with our greater base of bee biology.

Inductive reasoning would be:
Observation 1: My hive has multiple eggs in some cells.
Observation 2: I cannot find my queen.
Conclusion: My hive probably has a laying worker, but other factors could also be a factor.

But as the beekeeper gains additional bee biology, experience and skill, our critical thinking skill is better equipped to make a conclusion based on general rules and observation. We'll use deductive reasoning like this:

Observation 1: My hive has multiple eggs in some cells, but not all. Some are single eggs.
Observation 2: I know this is a newly mated queen based on my log book. I know that new queens can lay multiple eggs in a single cell when they first start laying.
Observation 3: There is still some brood presence from the previous queen, providing pheromones preventing laying workers from laying eggs.

Based on general rules of honey bee biology, observational experience and skill, the conclusion drawn is specific and certain. We have a new queen that has just started laying, and we do not have laying workers.

Developing critical thinking skills in beekeeping means developing the ability to ask the right question, being open minded to several possibilities and making an accurate decision on the evidence provided during the inspection rather than making assumptions.

Without experience or a solid foundation in honey bee biology it's easy to inspect a colony with a bias, seeing what you expect to see or want to see rather than being open minded. As we've seen in the above example, a beekeeper can make a conclusion they have a laying worker instead of assessing they have a new queen. There's a big difference. Critical

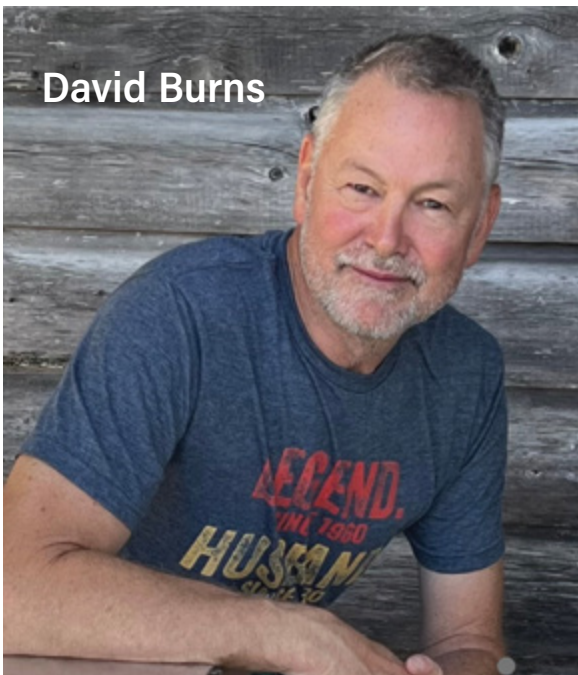


thinking allow us to create an accurate plan of action to solve problems we observe in the hive.

If you feel that you will never totally understand beekeeping, hang in there. Critical thinking improves with experience. The more you see and observe the more you know. You'll begin to develop and learn patterns and outcomes. Every beekeeper can greatly increase their critical skills with each year of beekeeping by remaining open minded, continue learning more about bees and spending a lot of time in thinking inside the box of the hive.

If you'd like to watch my video on how to raise bees of Winter physiology, visit: **https://www.honeybeesonline.com/davids-youtube-channel**

David Burns is an EAS Certified Master Beekeeper since 2010 and has been beekeeping for nearly 30 years. A life long educator, David's passion in beekeeping is education. He has a popular YouTube channel and podcast, has authored a beekeeping book and speaks all year at beekeeping conferences, conventions and bee clubs.



How to Develop Beekeeping Skills

Same Concentration, Different Outcome:

Understanding Variability in *Varroa* Mite Treatments

Abderrahim Hammaid, DVM, Technical Manager Europe at Véto-pharma

The relentless assault of *Varroa destructor* infestations on honey bee colonies is a global concern, propelling a race towards new pharmaceutical interventions.[1] While conventional wisdom often emphasizes medication concentration as the linchpin of treatment success, the reality is far more nuanced.

A myriad of interplaying factors – from pharmacokinetics and pharmacodynamics to the delicate balance of bee and *varroa* biology – converge to shape treatment outcomes.

Additionally, the potential impacts of increasing medication concentrations on bee health are significant, ranging from immediate effects such as bee mortality to long-term consequences[2], including changes to gut microbiota, and cognitive abilities like olfactory learning and memory.[3–4] Furthermore, increasing the concentration may result in higher residue levels in bee colonies, which can have serious consequences, including the potential development of resistance to the active ingredient.[2]

A higher concentration does not guarantee greater efficacy

Medication concentration, the cornerstone of treatment formulation, defines the potency of pharmaceutical interventions against *Varroa destructor* infestations.[5] However, reaching the optimal concentration levels does not necessarily ensure effectiveness against these infestations.[6] Simply boosting medication concentration isn't the silver bullet either. Unfortunately, this is nevertheless what is regularly observed in the field.

In honey bee colonies, the effectiveness of treatment is influenced by a range of factors including application methods, hive complexities and bee behaviors.

Recent research by Pohorecka et al. (2021)[7] highlighted the complexities of thymol concentration dynamics within honey bee colonies, revealing significant variations based on application methods and environmental factors. These findings underscore the importance of considering different factors in treatment efficacy assessments and formulation strategies. The importance of drug concentration also lies in managing the right balance between efficacy against parasites with the least impact on bee health in the colony ecosystem.

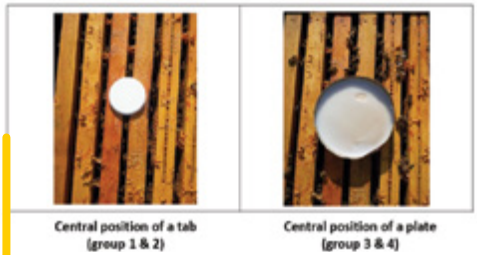
Besides the active ingredient, galenic formulation[8] plays a key role in determining the precise release necessary for effectiveness in the target species.[9]

To illustrate our point, here are two examples of internal studies (conducted by our R&D department), with identical concentrations of active ingredients but different formulations.

Our research and development team conducted these trials as part of a project to reformulate molecules already used in beekeeping, aiming to enhance their effectiveness, speed of action or mode of application.

Study #1: The trial aimed to compare both concentration and galenic form for a same active ingredient: 110 mg or 220 mg, on tab or plate (see photos below).

- **Treatment group #1:**
1 tab of Flash 110 mg for 7 days.
- **Treatment group #2:**
1 tab of Flash 220 mg for 7 days.
- **Treatment group #3:**
1 plate of Flash 110 mg for 7 days.
- **Treatment group #4:**
1 plate of Flash 220 mg for 7 days.



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[1] Cameron J Jack, James D Ellis, Integrated Pest Management Control of *Varroa* destructor (*Acari: Varroidae*), the Most Damaging Pest of (*Apis mellifera* L. (*Hymenoptera: Apidae*)) Colonies, Journal of Insect Science, Volume 21, Issue 5, September 2021, 6, **https://doi.org/10.1093/jisesa/ieab058**

[2] Bahreini R, Nasr M, Docherty C, de Herdt O, Muirhead S, Feindel D. Evaluation of potential miticide toxicity to *Varroa destructor* and honey bees, *Apis mellifera*, under laboratory conditions. Sci Rep. 2020 Dec 9;10(1):21529. **doi: 10.1038/s41598-020-78561-2. PMID: 33299084; PMCID: PMC7726572.**

[3] Motta EVS, Mak M, De Jong TK, Powell JE, O'Donnell A, Suhr KJ, Riddington IM, Moran NA. Oral or Topical Exposure to Glyphosate in Herbicide Formulation Impacts the Gut Microbiota and Survival Rates of Honey Bees. Appl Environ Microbiol. 2020 Sep 1;86(18):e01150-20. **doi: 10.1128/AEM.01150-20. PMID: 32651208; PMCID: PMC7480383.**

[4] Sandoz JC. Behavioral and neurophysiological study of olfactory perception and learning in honeybees. Front Syst Neurosci. 2011 Dec 8;5:98. **doi: 10.3389/fnsys.2011.00098. PMID: 22163215; PMCID: PMC3233682.**

[5] Pharmacology: Principles and Practice ©2009, Elsevier.

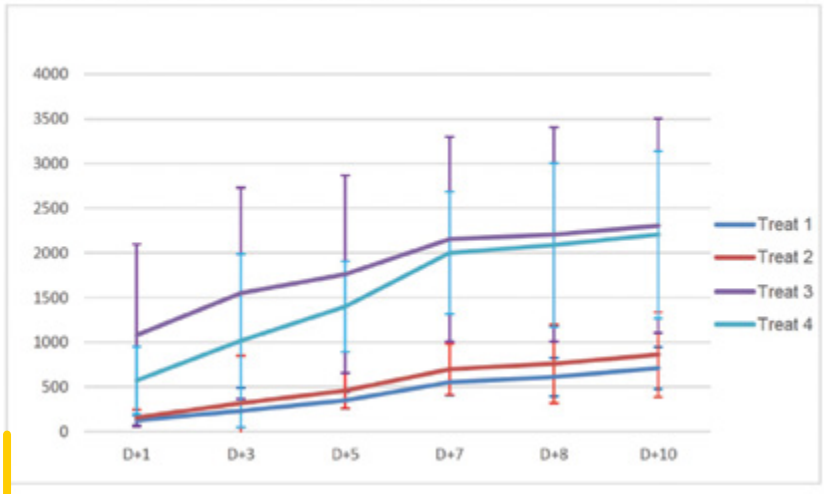
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[7] Pohorecka, K., et al. (2021). Dynamics of thymol concentration in honeybee colonies and its impact on *Varroa* control. Journal of Economic Entomology, 114(3), 1380-1387.

[8] Galenics is the process that turns an active ingredient into a ready-to-use medicine that can be dosed as required. Galenic formulation deals with the principles of preparing and compounding medicines in order to optimize their absorption and forms part of pharmaceutics, the discipline (or science) of dosage form design.

[9] Salkova D, Gurgulova K, Zhelyazkova I (2024): Clinical trial of the efficiency of three different compositions of acaricidal substances against varoosis in honey bee colonies. Ankara Univ Vet Fak Derg, 71 (2), 157-163. **DOI: 10.33988/auvfd.1033097.**

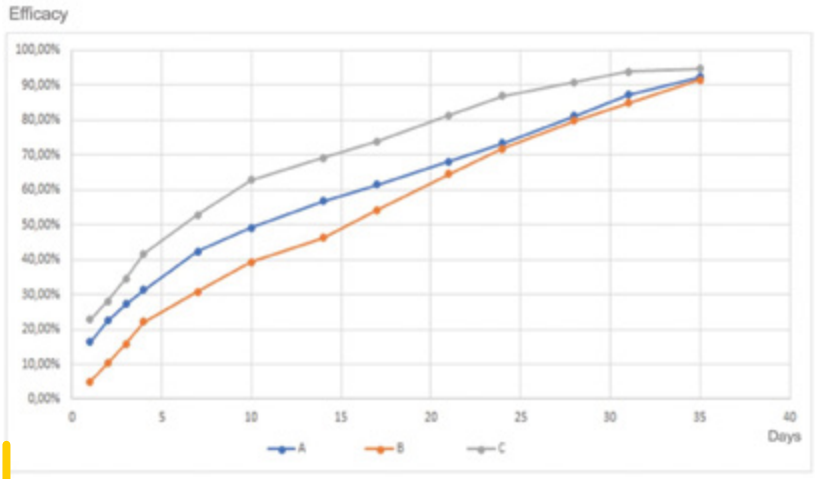
Figure A: Evolution of cumulative varroa mortality.



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The findings suggest a pattern of lower effectiveness in treatments 1 and 2 (tabs) for reducing *varroa* mites compared to treatments 3 and 4 (plates). This illustrates how the same dosage, but with different formulations, can yield markedly different outcomes. Conversely, doubling the concentration in treatment 4 resulted in lower efficacy compared to treatment 3.

Study #2: Comparison of 3 different acaricide strips, based on the same active ingredient, with the same concentration in each strip.



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On this graph, you can see three different acaricide strips based on the same active ingredient, with the exact same dosage. What's the only change? The global formulation of the strips. You can clearly see improved kinetics in strip C compared to strip A.

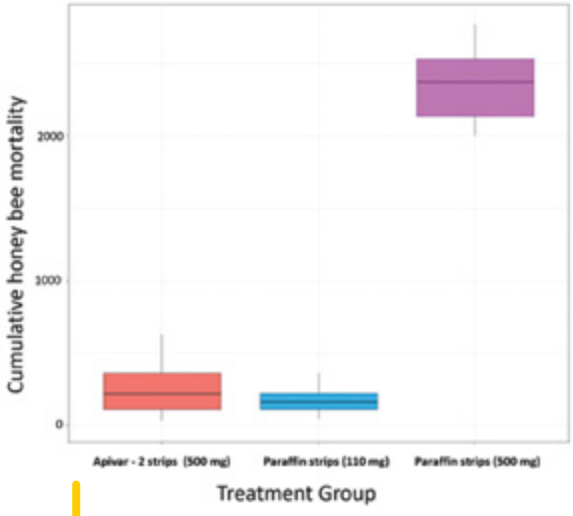
Identical concentration, divergent bee mortality rates

Beyond assessing treatment effectiveness, the formulation of a drug significantly impacts bee colonies. One straightforward method to evaluate this impact is by measuring bee mortality post-treatment.

Our R&D team has conducted numerous tests to work on reformulating active ingredients in *varroa* treatments. For instance, in 2019, we conducted a trial at our R&D apiary in France using 24 colonies, divided into three groups:

- Apivar strips (500mg)
- Paraffin strips with amitraz (110mg)
- Paraffin strips with amitraz (500mg)

Both the colonies treated with Apivar and those treated with paraffin strips at a 500 mg dosage per strip received the same amount of active ingredient. However, the graph shows a significant difference in cumulative honey bee mortality between the Apivar group and the 500 mg Paraffin strips group.



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This inconsistency underscores the significance of the drug's formulation and the manner in which the active ingredients are released within the hive. **It illustrates why selecting a treatment solely based on the highest concentration of the active ingredient can be misleading and why mixing homemade treatments can be hazardous, in addition to being forbidden.**

Understanding the pharmacokinetics and pharmacodynamics

Pharmacokinetics and pharmacodynamics[10] are critical in understanding how *varroa* mite treatments function within honey bee colonies and impact bee health.

[10]Basic Pharmacokinetics and Pharmacodynamics: An Integrated Textbook and Computer Simulations, Second Edition. Edited by Sara E. Rosenbaum. ©2017 John Wiley & Sons, Inc. Published 2017 by John Wiley & Sons, Inc.

Pharmacokinetics, the study of how medications are absorbed, distributed, metabolized and eliminated within both mites and bees, is crucial for developing effective treatment plans that minimize bee harm, reduce residue and lessen environmental toxicity. Key studies like those by Gregorc et al. (2020)[11] highlight the need for treatment plans tailored to bee metabolisms, as formic acid affects worker bees differently from brood. Smart et al. (2023)[12] emphasize aligning treatment timing with colony dynamics to optimize efficacy, integrating complex interactions between treatment concentration, pharmacokinetics and bee biology.

Conversely, pharmacodynamics focuses on action mechanism of a drug while binding targeted receptors. For *varroa* control drugs, the bees' biological responses to these drugs is an additional challenge for evaluating treatment efficacy and safety. Research by Nazzi et al. (2022)[13] on novel acaricides targeting *varroa* mites shows promising control strategies by affecting specific biochemical pathways. However, gaps in understanding the action mechanisms of common treatments pose risks of improper dosages and potential treatment failures.

Furthermore, interactions between acaricides and other hive and environment chemicals, such as fungicides, can complicate treatment effects due to synergistic toxicity, as shown in studies highlighting the role of enzyme induction and inhibition in modifying drug effects.[14–15–16]

The impact of residues on bee well-being and resistance development

Acaricides are crucial for controlling *varroa* mites but their residues in hive products pose risks to bee health, the quality of hive products and the environment.[17] The key challenge is to balance effective mite control with maintaining the health of honey bees. Residues that accumulate in beeswax honey, and bee bread pose ongoing risks, affecting bee development, behavior and overall colony health.[18] These residues act as hidden threats within the hive, contributing to the global decline in honey bee populations.[19–20]

Research has demonstrated that acaricides like tau-fluvalinate, coumaphos and fenpyroximate, when present in the hive and combined with other substances such as fungicides, can exacerbate toxicity, leading to higher mortality rates among adult worker bees.[14–21]

A 2021 study by Benito-Murcia[22] shows that residues of tau-fluvalinate in beeswax can lead to the accumulation of active ingredients in the fat bodies of honey bees. Since *varroa* mites primarily feed on the fat bodies, this could increase their exposure to sublethal dose of the pesticide, potentially enhancing their resistance to it.

This finding underscores the importance of selecting active ingredients carefully and developing new *varroa* treatments that consider the impact of residue accumulation.

Additionally, beekeepers can mitigate these effects by regularly replacing their brood combs.

Key points to remember

- Concentration and dosage alone do not guarantee the effectiveness of the treatment. One treatment may be more effective than another, despite a lower dosage.
- Striking the right balance between *varroa* toxicity and minimal impact on bee health is crucial, as high acaricide concentrations can lead to adverse effects like toxicity, disrupted instinctive and social behavior and the immune system.
- Optimizing medication concentration dynamics and treatment efficacy demands careful consideration of application methods and hive real-life.
- Integrating pharmacokinetic/dynamic principles with bee physiology can enable more targeted and sustainable *varroa* control strategies.
- Monitoring and managing acaricide residue accumulation in hive products is essential to mitigate risks of chronic exposure, potential synergistic toxicity to bees and the development of resistant mites.

Pharmaceutical companies are tasked with developing sustainable treatments for *varroa* mites, but beekeepers also play an essential role in keeping bee colonies below the damage thresholds caused by these mites. We encourage you to actively manage *varroa* through an integrated pest management (IPM) approach that incorporates mechanical, biological and carefully chosen chemical interventions.

Regular counting of *varroa* mite infestations, employing exclusively approved treatments, incorporating biotechnical approaches like colony splitting and drone brood removal, regularly replacement of brood combs, and continuously working to maintain low *varroa* levels throughout the season are fundamental strategies. These proactive steps significantly influence the vitality and productivity of bee colonies, safeguarding their welfare and output. BC

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[12] Smart, M., et al., (2023). Integrating medication strategies with bee physiology for effective *Varroa* control. Journal of Apicultural Research, 62(1), 45-52.

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[22] Benito-Murcia, María, et al., "Residual tau-fluvalinate in honey bee colonies is coupled with evidence for selection for *Varroa destructor* resistance to pyrethroids." Insects 12.8 (2021): 731.

[23] **https://www.epa.gov/safepestcontrol/integrated-pest-management-ipm-principles**

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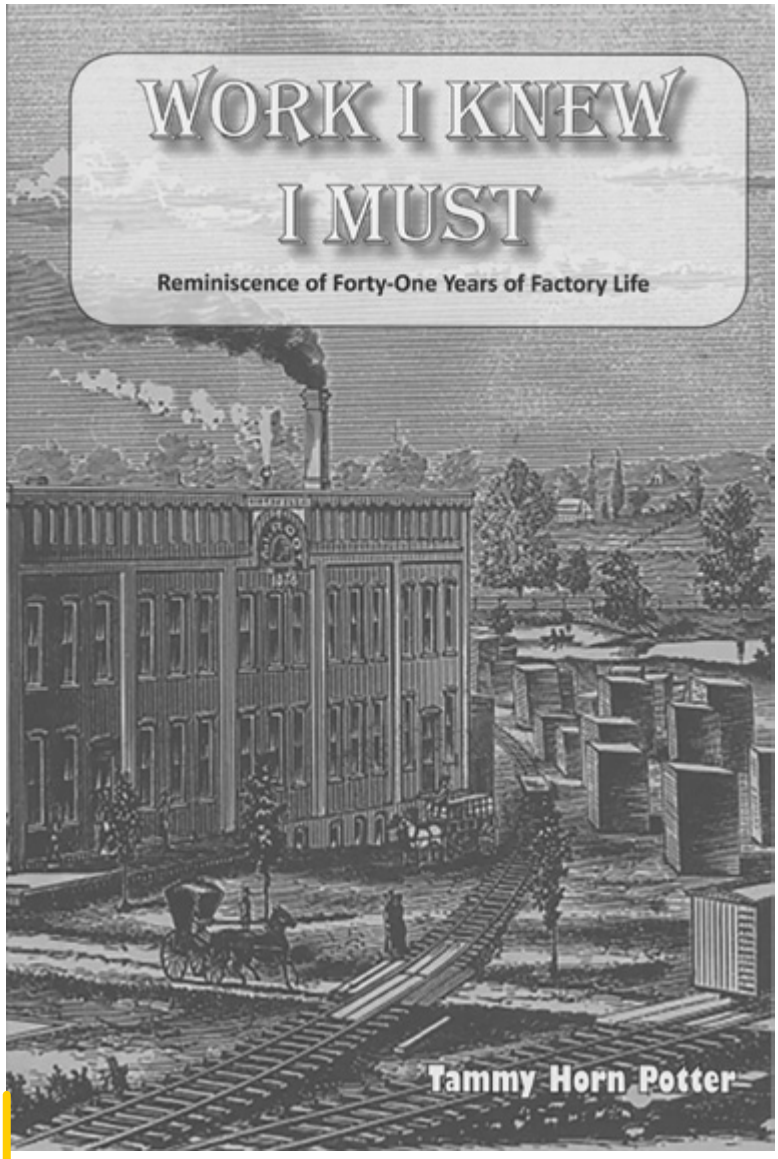
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Who Was the Author Jane Cole?

William Foote



Jane Cole probably about 1880.



Tammy Horn Potter's book, **Work I Knew I Must Reminiscence of Forty-One Years of Factory Life.**

My name is Will Foote, and I am a lifelong beekeeper, as was my dad, Earl Foote Jr. And growing up we all knew about Jane Cole and referred to her as Aunt Jane. She was my dad's great aunt who passed away in 1929 when my dad was just 14. One day a couple years ago, I stopped into the Tri County Beekeepers Association Spring Workshop here in Wooster, Ohio on a whim, not expecting anything out of the ordinary. There I found Kim Flottum selling old books. One comment led to another, and soon I was deep in conversation with his colleague, Tammy Horn Potter the Jane Cole scholar of today.

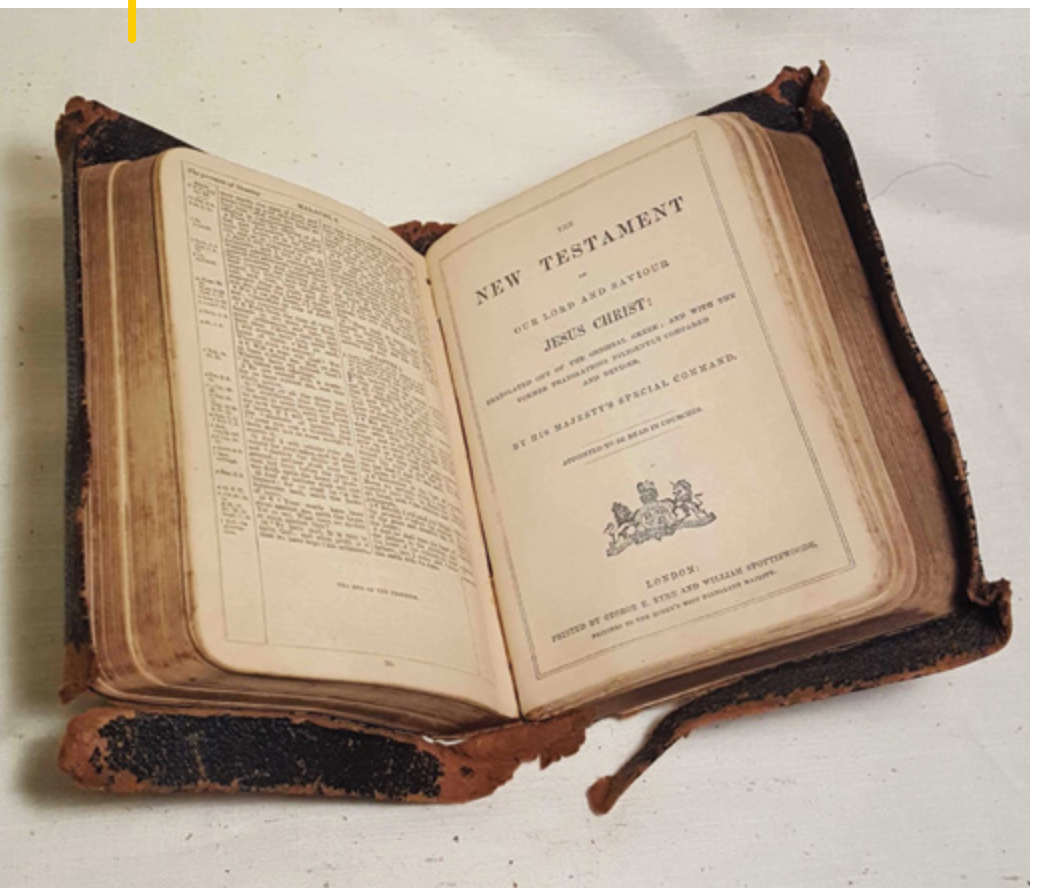
When Professor Potter first wrote about Jane for the *British Bee Journal* in 2006, she stated that nothing was known about Jane beyond *Reminiscence of Forty-one Years of Factory Life*, the autobiography of Jane's life and her work at the A. I. Root Company around the turn of the century. I surprised her by saying that my grandfather Earl Foote Sr, a well-known book seller, was Jane's nephew and he was the actual publisher of her book. He printed one hundred copies in all a hundred years ago this year. I told her that Jane's sister, Henrietta Cole Foote, was a poet, and that she was my great grandmother. My Dad had grown up coming to Jane's house for lunch on school days in Medina in the 1920s with his siblings. He greatly loved and admired her, even long after she was gone. Her quiet dignity in the face of adversity. It was through him that I knew Jane. And much to my surprise, this wider community has now come to know her as well.

Divorced women were not given much of a pass in the 1870s. Yet her family took her back from a disastrous marriage to a returning Civil War veteran, "John". She would form a lifelong working partnership with her spinster aunt, Maria Harrington, who's betrothed had died before they could marry. She helped Maria run her boarding house, often after working in the Root factory all day. Jane taught herself to paint and would do a portrait of Maria and include her in her autobiography. Today when I read Jane's book I think of the family and



Jane's sister Henrietta Cole Foote. Holding her grandson Earl Jr. My dad.

Jane's Bible.



Maria, how they relied on each other. And how ultimately, Mr. Root would come to rely on her as well. And I also recall an old persistent story in the family. In the book it jumps out of the pages at me without ever an actual mention. For the Victorian era did not countenance certain kinds of talk. And "John", Jane's husband of three tumultuous years was worse than a "vagabond" as she described him. And did more than threaten her. The family story was one about a nightgown with a bullet hole, though this would never see the printed page. Her rejection of the world of men, at such a cost, makes sense to us. Yet in our matriarchal families, Jane would have her place. And in a more formal way, with the Root family as well. Indeed, Earl Sr. would wait until the passing of A. I. Root before he would publish Jane's book. Perhaps out of deference to something that was said or implied. Going through Jane's papers would show invitations and the like, that points to her relationship with the Roots.

What else might we discover about Jane, the farm girl from Medina? We know she traveled to the far west to see Yosemite and the Grand Canyon in 1910 and recorded it in an unpublished story. Her namesake was a beloved Scottish servant girl who worked in her grandparents' house so many years ago. And would dramatically tell the children bedtime tales of Robert the Bruce and the brave William Wallace in her Scottish brogue. For Jane's Uncle Jesse Harrington eloquently described this in an epic family poem that goes on to tell how his own grandfather fought the British under Washington at Saratoga. And how he had lost his own son during the Civil War at Andersonville. Jesse's wife was, in fact related to the notorious John of Jane's book. Jane's sister Henrietta gives us a glimpse of what life was like for her and Jane in her poetry. Henrietta's descendants would preserve two of her paintings as well (and a document about the nightgown).

Jane and most of the family were American Baptist. Recently a cousin sent me a drawing Jane made when she was young that absolutely floored me. A drawing of Adoniram Judson, the first American missionary to the East and a towering figure in the American Baptist Church at that time. Her drawing was a copy of a well-known portrait she probably saw every Sunday. So why would such a thing affect me so, at this late date? The answer lies with Earl Sr., Jane's nephew and publisher, and his lifelong best friend, Reverend Willis Webb, an American Baptist minister. For these two men were my grandfathers. The story of Adoniram and his wife Ann, the missionaries, would grace our home and the pulpit my entire growing up time. The expectations their life held up for the rest of us was something none of us would discount. Including Jane, I'm sure. I do not know if Jane and Willis ever met or crossed paths. I can only speculate. But Jane's influence on my life is not up for speculation, with all the optimism and perseverance of the missionary, the faithful, come what may. BC

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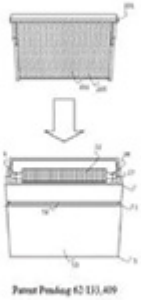




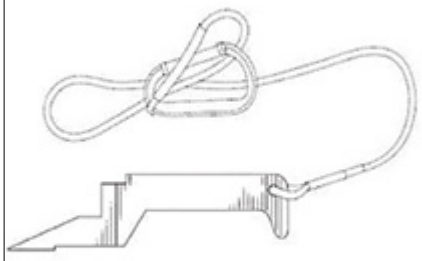
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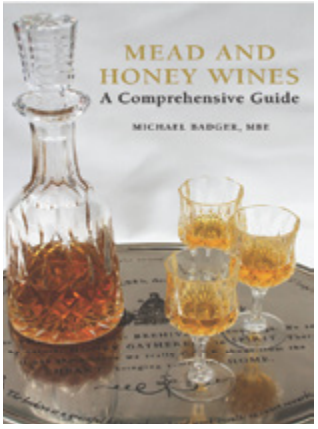
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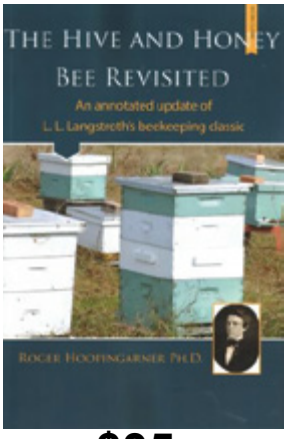
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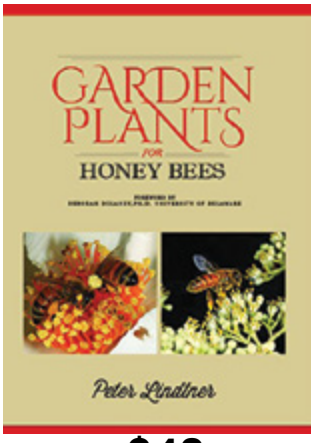
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The Root Bee Smoker and Reconditioning Part 1

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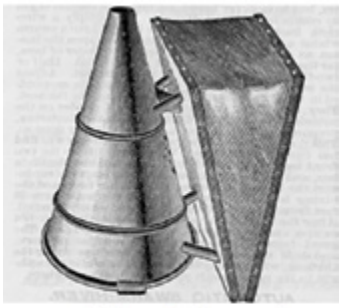


The first *bellows* smoker was invented by Moses Quinby in 1873.

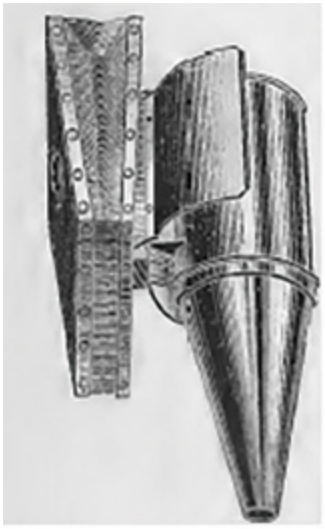
Did you know that A. I. Root originally preferred to work his bees without a veil, smoker and hive tool? That is why he designed and built the Simplicity Hive. It would allow him to work the way he wanted. However, by 1879 he started using the Simplicity Smoker, which was also available in a larger size by special order. The Simplicity Smoker had several repair parts available. Bellows (complete), Tin Case, Leather (for the bellows), Pair of Steel Springs, & Top for the tin cases were listed in the catalog.

In the 1888 Root catalog, a Clark's Cold Blast smoker with a six sided bellows was offered. You could purchase the following repair parts for it: Bellows (complete), the tin case for fuel, Leather (for the bellows), and the coiled wire spring. You will find that there were several styles of Clark's Cold Blast smokers as the plans for making them were in *Gleanings* and in *The ABC XYZ of Bee Culture*. Also in 1888, you could purchase a Bingham smoker.

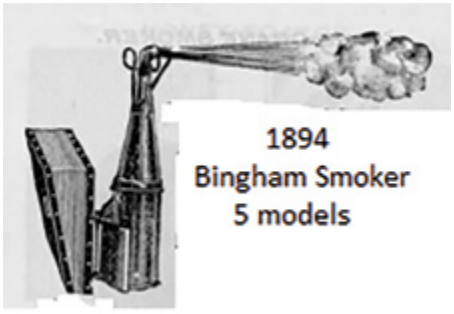




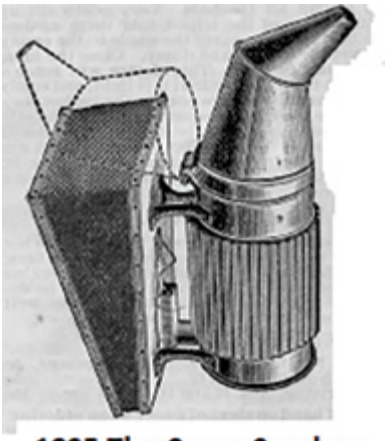
1894 Clark's Cold-Blast Smoker
notice rectangular bellows



1891 Bingham Smoker shown in the way it was to be held.



In 1894, the smokers sold by Root were: Clark's Cold Blast with a rectangular bellows, six models of the Bingham smokers, and five models of the Quinby smokers. It is interesting to note, that on some smokers the bellows seem to be reversed. The manufacturer decided that the wide part of the bellows operates better if it is up. So now you know which way your smoker was intended to be held. The Quinby Smokers would drop hot coals and ashes and Bingham Smokers had a curved snout to be a spark or ash deflector that clipped on the nozzle. Some of the Quinby Smokers had a reversible tube converting it from a cold blast to a hot blast smoker. A hot blast smoker allows the air to be passed through the fire chamber while the cold blast passes air above the fire.

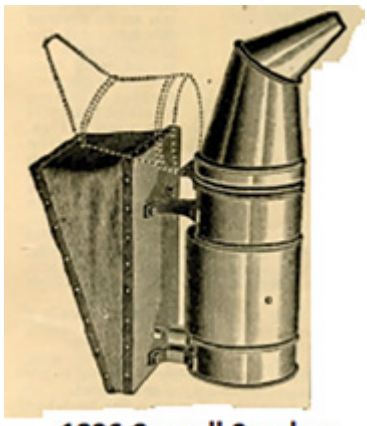


1895 The Crane Smoker

In 1895, the Crane Smoker was added to the Root line. Its claim to fame is the protection of the beekeeper's hands by having longer "legs" between the bellows and the canister and insulation around the fire chamber.

In 1896, the Cornell Smoker was added to the Root line. The nozzle on this smoker would swing way back, allowing easier loading of fuel for the smoker. The Bingham smoker line dropped one model and the Quinby smoker line added one model in three sizes to the Root line.

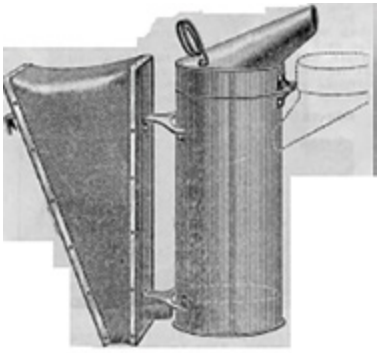
In 1903, the Cornell Smoker redesigned the snout to be a single taper and the hinge was moved to the front of the canister. Added to the line, was the breech-loading Vesuvius Smoker. Another feature of the Vesuvius smoker was that the snout was permanently mounted on the canister. The Vesuvius smoker was dropped from the Root line the following year.



1896 Cornell Smoker



Quinby Smokers available in three sizes and in double or single blast



1903 Cornell Smoker
Available in three sizes
Notice the nozzle change



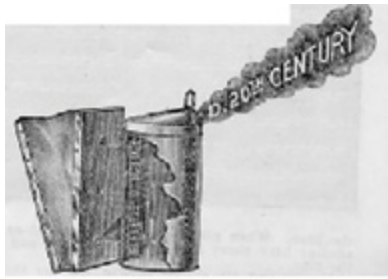
1903 Breech-loading
Vesuvius Smoker



Our three sizes of Root Smokers. Patented Sept. 22, 1903 and Sept. 5, 1905.

1905, the redesigned Cornell smoker was available in three sizes, patented September 22, 1903 and became known as Root smokers in 1906. The Bingham smoker was available in five models and the three larger sizes could also be ordered in Brass or Copper for an extra charge. All Bingham smokers had inverted bellows.

1906, the Root smoker line consisted of three sizes, and also offered were the Clark Cold Blast Smoker, and a Danzenbaker Twentieth-century Smoker. The Danzenbaker smoker had a perpendicular grate dividing the blast, making it a combination cold and hot blast smoker.



1906 Danzenbaker Twentieth-century smoker

In 1907, the Root smoker line was the same as 1906, but the Bingham smokers were listed this year and had five models of tin smokers and the three larger sizes could be ordered in heavy copper at 50 cents each extra. A copper smoker does not rust, however it must be handled with care for it dents easily.

In 1911, the catalog showed the Root smoker line consisted of the three Root smokers, Danzenbaker smoker and five models of the Bingham smokers. The Jumbo and Standard Root smokers could be ordered in copper at a price of 50 cents extra. The largest three Bingham smokers could be ordered in heavy copper for also 50 cents extra.

In 1912, the Root Company had three sizes of tin smokers, two sizes of copper smokers, a Clark Cold Blast smoker, five Bingham smokers and two sizes of Danzenbaker smokers: 3 ½ x 6 and 3 ½ x 7 ½ . The three larger Bingham smokers could be purchased in copper for 50 cents extra each.

In 1915, the two Root copper smokers were replaced with "non-rust metal" containing nickel, commonly called German silver. It was a harder metal and wouldn't dent as easily. However the non-rust metal smoker was not listed in the catalog as copper smokers were listed again and were available until 1941.



1924 Big Jumbo with shield.



1925 Simplicity Smoker
3 1/4" x 7"

In 1924, the Big Jumbo with shield was added to the Root line.

In 1925, a new smoker was introduced called the Simplicity smoker which is different from the Simplicity smoker of 1879. It had a friction top. This smoker was not listed in the 1929 catalog.

In 1927, it was finally stated, that the bellows were made of an excellent grade of sheep skin.

In 1937, the material that was used in the bellows was changed to be a much more water resistant material and more durable than leather. In the 1939 catalog, it tells of the testing of this bellows material for durability.



1958 Smoker with Valve

In 1958, a valve on the Jumbo smoker was added to make an easier action and continued to be a feature until 1982.

How can one find out when the smoker was made? You can't. You can make a guess by the Logo that is printed on the back of the bellows, but that logo was silk screened on with black ink and over the years much of it has been cleaned or worn off. Secondly, the smokers were made in such quantity that they may have been on the shelves for many years before they were sold. The same smoker may have issued a different stock number for the different years, so the best way is to have an invoice or a post marked package that the smoker came in. Before 1920, you had to describe the item you wanted as there was no stock numbers. In 1920, the items had an "A" followed by a six digit number, "B" in 1921, and so forth until 1924. Then in 1925, the letter was an "F" and the number was a three digit number. Then each year after, the letter increased until 1927 when the letter was "H". In 1928, the catalog number was an "A" again and a three digit number followed. Starting in 1929, all items were just a three digit number and that continued until 1943. In 1944 the smokers had an "N" and a number and that catalog number remained the same as long as Root sold bee supplies.

Let's look at the Logos that were used. The A. I. Root Company Clover was used from 1879 to 1919. On the 1905 smokers, the logo had two patent dates while on the later smokers all three dates were used. A color clover decal was used on extractors, settling tanks and some hives.



The quality logo is said to have officially started in 1920, but there were some smokers in 1918 that had the logo with cautions. This logo continued to 1958, when the valve was added to the bellows on the Jumbo smoker, just the plain quality logo was used and continued until 1982.



Softening the leather

Sometimes the leather on the bellows becomes stiff. You may process it similarly to the way car buffs soften the leather seats in their cars. First, clean the leather with leather cleaners. Secondly use saddle soap. Thirdly, apply mink oil. However mink oil has a tendency to darken, it is not recommended on light colored seats or in your case, light colored smoker bellows. The main idea is to have the ingredients soak into the leather, so it is not a matter of wipe on and off.

The products used by car buffs are: "Obenauf's Leather Oil," "Nanolex Textile & Leather Sealant," "Chemical Guys Leather Cleaner and Conditioner", "Leather Honey Leather Conditioner," and "Multipurpose Leather Repair Kit".

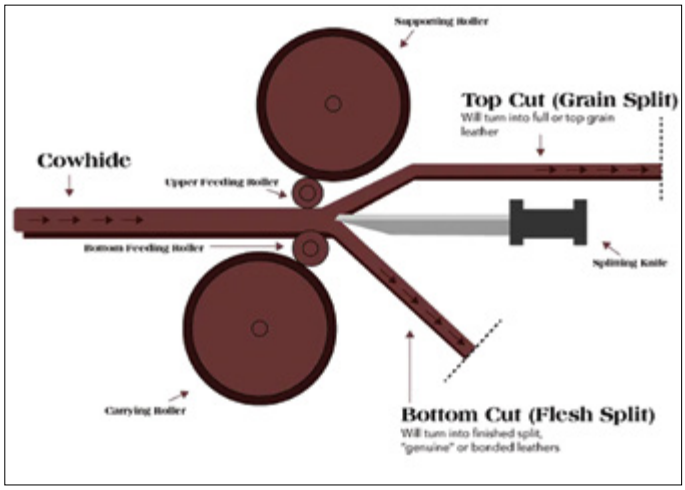
Leather Discussion

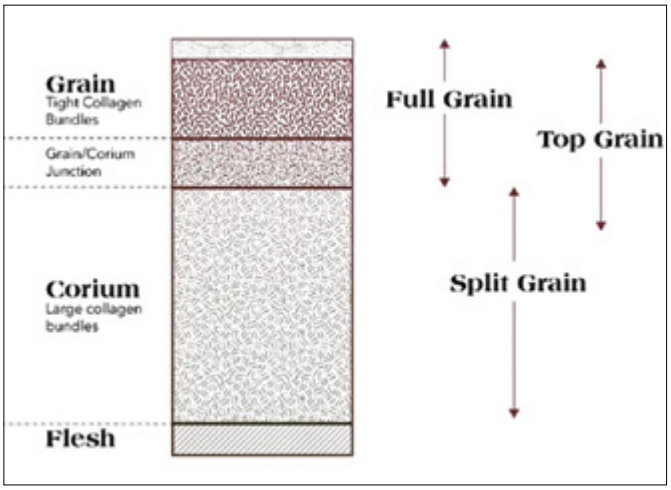
Since leather was used on the smokers until 1927, I'll mention a little bit about cowhide because it is the most widely used leather. Keep in mind that the original leather in Root smokers was sheep skin. 40 years ago, I recovered the bellows of a Quinby smoker with Deer skin, and later in this article I will use goat skin on the bellows of a copper smoker. Leather may be obtained from practically every animal, fish, snake and fowl. Some terms are used interchangeably such as leather, skin and hide. There are five different terms or grades of leather: Full-grain leather, Top-grain leather, Split-grain leather, Genuine leather and Bonded leather. There is no universal grading system for leather as it is up to the individual tanneries. Cowhide or sometimes called Rawhide can be from 6 mm to 10 mm thick. Thus the leather goes through a splitting process. The following chart gives some suggestions to the different weights.

Table

Full Grain leather and Top Grain Leather are considered the most valuable and are above the splitting blade. Full Grain is usually considered better than Top Grain, as top grain may contain scar marks, blemishes, insect bites, branding and stretch marks. The tannery usually has a corrective process which may include sanding, buffing and coloring of the hides. Some of this corrective process also seals the pores making it resistant to stains and spills and the leather is less breathable.

The leather that is below the splitting blade is considered lower in quality and durability, but useful





1 ounce	1/64"	0.016	0.41 mm	Linings, Shoes, Boots, Pouches, Purses, Gussets, & Garments Upholstery = 1.2
2 ounce	1/32"	0.031"	0.78 mm	
3 ounce	3/64"	0.047"	1.19 mm	Belts = 3.2 to 4
4 ounce	1/16"	0.063"	1.60 mm	Purses, Shoes, Boots, Pouches, Aprons, Chaps, and Knife Sheaths
5 ounce	5/64"	0.078"	1.98 mm	
6 ounce	3/32"	0.094"	2.39 mm	
7 ounce	7/64"	0.109"	2.78 mm	
8 ounce	1/8"	0.125"	3.18 mm	Belts, Saddlebags, Bridles, Halters, and Dog Collars
9 ounce	9/64"	0.141"	3.58 mm	Straps, Scabbards, Holsters, Sheaths, Tool Pouches, & Slings
10 ounce	5/32"	0.156"	3.96 mm	Heavy Belts & Strap Goods, Gun Belts, Stirrup Straps, Cattle & Horse Halters, and Leads
11 ounce	11/64"	0.172	4.37 mm	
12 ounce	3/16"	0.188"	4.78 mm	
13 ounce	13/64"	0.203"	5.17 mm	
14 ounce	7/32"	0.219"	5.57 mm	Safety Belts, Harnesses, Stirrup Straps, Saddle Skirting, Soles and Heels
15 ounce	15/64"	0.234"	5.95 mm	Gun belts and Machine Belting
16 ounce	1/4"	0.250"	6.36 mm	Safety and work Harnesses, Saddle Skirting, Soles and Heels.

items are made of it. The first "grade" is Split-Grain leather which sometimes is called suede or Bicast leather which may have a coating of plastic.

Then there is Genuine Leather which consists of the leftovers held together with polyurethane and is a marketing strategy to make people think that they are really getting a good deal.

Finally there is Bonded Leather which consists of leather scraps and slurry. Real thin leather (up to 20%) is added to the bonded leather and held there with a polyurethane binder. Because of the 20%, it is considered leather.

If you think that the use of leather is fairly modern, history shows that stone scraping tools for leather were found 400,000 years ago in Hoxne, England. Different methods have been used to tan leather such as fats, oils & tree bark high in tannins; "Brain Tanning", vegetable tanning and Chrome tanning.

Artificial Leather Discussion

From the 1937 to 1982, the Root smokers were made with artificial leather or synthetic leather. Artificial leather is known by other names, such as artificial leather, "leatherette", "Fabrikoid", "fake leather", "faux leather", "Leathersoft", "Naugahyde", vinyl, reconstituted leather, composite leather", "vegan leather", "PU leather" and "pleather".

The first artificial leather was probably made in 1731 when the people in Quito, Ecuador, South America put the sap/liquor from the "Hevea" tree on to a cloth to waterproof it. The liquor would blacken and turn hard and boots could be made of it. When the boots were blackened in smoke, they looked like leather.

In 1846, German professor, F. J. Otto produced 'gun cotton', 'pyroxylin' and 'collodion' which is a cotton fabric coated with nitrocellulose. Nitrocellulose is highly flammable; thus a test for synthetic leather is, does it shrivel and burn? Real leather is very fire-resistant.

The 1920s saw fabrics coated with nitrocellulose and marketed as Fabrikoid. Fabrikoid was used for upholstery, luggage, book bindings and car convertible tops. It was used until the 1940s when other vinyl materials were developed.

Du Pont developed Corfam which was a leather-like vinyl. Years later Du Pont terminated the production of Corfam, when Naugahyde became the preferred fabric.

Naugahyde, developed by Byron A. Hunter, senior chemist of the U.S. Rubber Company in 1914 as a synthetic rubber substitute during

World War II for rain coats, tents, field bags and upholstery for military vehicles. Its name and trademark were first used in 1936 and developed in the town Naugatuck, Connecticut. During the 1950s it gained more popularity when color and other uses were found. During the 1960s, Naugahyde became even more popular when it was advertised that no animals were killed to make the material, except for the mythical creature, Nauga.

Naugahyde has an expanded polyvinyl chloride (PVC) plastic coating on a knit fabric backing. Some advantages and disadvantages are less maintenance than leather, it does not crack or fade easily, but it doesn't breathe.

Environmental impact

During the production of PVC, carcinogenic byproducts are produced and PVC does not decompose when placed in land fill and which is dangerous to water and soil.

Brand names and types of some other synthetic leathers

1. Tea leather (Teather) made from the by-products of fermented green tea. Developed by Young-A Lee and her team at Iowa State University. The tea leather has a green tea-based cellulosic material with a hemp-based lining and is eco-friendly.
2. Muskin leather made from mushroom caps that we don't eat. Two of the brands are Nat-2 and MycoWorks. The caps are treated non-chemically to become water resistant.
3. Malai, cream of the crop, coconut leather is made from the cell wall of the coconut water and banana fiber that are normally discarded.
4. Cork leather is made from the bark of the cork oak tree and is considered sustainable as the tree doesn't need to be cut down to harvest the material. Cork leather is waterproof, stain resistant and easy to maintain. It has been on the market in Portugal and Spain for decades.
5. Pineapple leather (Pinatex) is made from the fibers extracted from pineapple leaves. This leather is known for its softness, durability and flexibility.
6. Soy leather is made from soybeans and is made of food waste. It was created in Indonesia by XXLab. The liquid waste is boiled with vinegar, sugar and bacteria until it becomes microbial cellulose.
7. Zoa bio-leather is made from bio-fabricated materials with no animal products or toxic chemicals. A special strain of yeast produces the collagen used in this leather.
8. Cartina-recycled paper leather has remarkable durability and softness.
9. Coffee leather made of recycled coffee, coffee beans and coffee plant. It was developed in Germany.
10. Grass leather is made from recycled hay, grass and flowers.
11. Wine leather (Vegea) uses the skins, stalks and seeds of grapes.
12. Apple leather
13. Teak Leaf leather is made from fallen leaves soaked in water, dyed, arranged flat to dry and mended together with cotton.
14. Clarino: manufactured by Kuraray Co., Ltd. of Japan
15. Lorica: manufactured by Lorica Sud, an Italian tannery
16. MB-Tex: used in many Mercedes-Benz Base trims
17. Rexine: a British brand
18. Kirza: A Russian form developed in the 1930s consisting of cotton fabric, latex and rosin
19. Paguro: made from recycled rubber

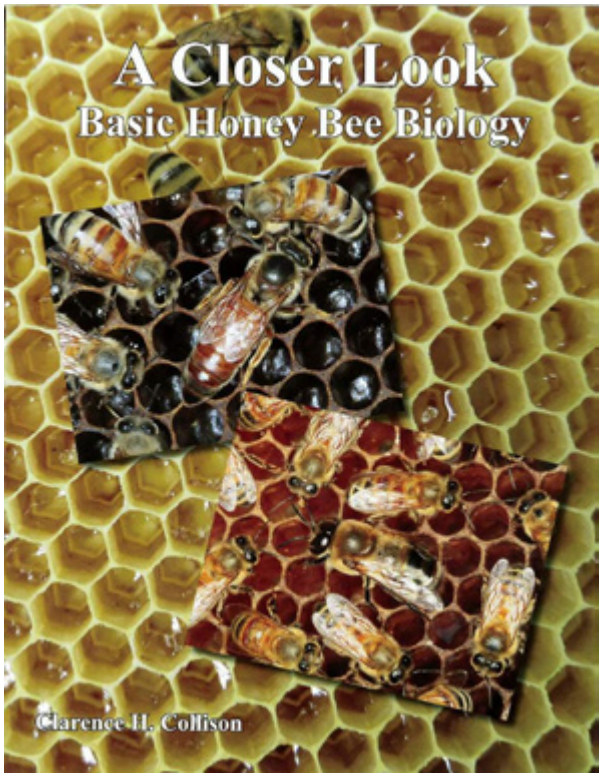
To reduce waste, you can stagger the bellows pattern on the synthetic fabric. I have noticed that even the new smokers may have a plastic type material. The plastic material may work fine right now, but I wonder just how long will they last?

With so many types of artificial leather, it is getting hard to know what you are buying these days. BC

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Substitute Leathers.pdf
Vegan Leathers.pdf





Bee Culture®
The Magazine of American Beekeeping

Written by Clarence Collison, Professor Emeritus and former Head of the Department of Entomology and Plant Pathology at Mississippi State University and the former beekeeping/pollination specialist and livestock entomologist at The Pennsylvania State University.

Professor Clarence Collison has performed the meticulous scholarship so desperately needed by beekeepers and scientists alike. He has reviewed the vast body of research: the biology, physiology, biochemistry and behavior of *Apis mellifera* and presented it in an concise and objective manner. This book will be required reading of all serious bee scientists, and on the desk of every beekeeper for fact-checking and scientific clarification. (Lawrence John Connor)

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The Rainbow World of Bees & Their Honey

Faith Harron



The author's mother captured her very own photo of a red-striped bee recently, perched atop a vibrant sunset-colored marigold.

The Summer air is warm and still. A bee meanders through a mixed flowerbed, the small buzz emanating across the stacked rocks to reach my ears. But when I take a closer look, I'm startled to realize the bee is *red* and black, no yellow in sight.

I run toward my mother, weeding in the garden, to tell her the news – I've never seen a red bee before; have I discovered a new species? – but she doesn't "bee-lieve" me. Bees are black and yellow, she says calmly, but I'm sure I didn't imagine the red one I saw.

That bees only come in black and yellow varietals is a common misconception, born of public familiarity with the cartoon bee and memorable representations across literature and art. A Google search for the word "bee" will give you black-and-yellow stripes galore. But with more than 20,000 species of bee to choose from, there's a plethora of additional colors and markings to enjoy. Likewise, the variety of flowers enjoyed by bees can create differences – sometimes bright ones! – in the color of their honey. Ultimately, both honey and the honey bees who make it can appear in a multitude of shades, and together they compose a pretty beautiful rainbow.

Below please find a tribute to the colorful world of honey bees and their honey – and how they got their colors in the first place.

Honeybees & human skin: The importance of melanin and its different forms

Remember melanin? It's a molecule found in humans that helps decide your hair, eye, and skin color.

It's also a molecule found in bees of all kinds – though bees express two main forms of melanin, whereas humans have five. The two types of bee melanin to know are eumelanin (responsible for brown-black) and

pheomelanin (responsible for yellow-red).

Current scientific understanding maintains that the main coloring of bumblebees and honey bees is from these two types of melanin. Lighter colors like white likely derive from a lack of pigmentation entirely – akin to albinism in humans – or other, non-melanin pigments yet to be explored, according to a trio of Spanish scientists in their PeerJ-published article.

While our focus here is on honey bees, other bees have even brighter colorings – like the metallic sheen of the green sweat bee. Rather than melanin pigmentation, these bees obtain their bright blue-green color from so-called "structural coloration," zoologist Luis Villazon tells BBC. This happens when light reflects off tiny ridges on the exterior of their bodies, bouncing the light around and separating it into individual colors much like a prism might. You can see another example of this with how a CD reflects shimmering colors as it twists in the light.

Honey bees & their honey: a rainbow world

Now that we understand how bees get their coloring, it's time to take a deeper look at the spectrum of shades honey & honey bees come in, from rusty red to pale blue-violet (skipping indigo) and from black and white to brown and gray.

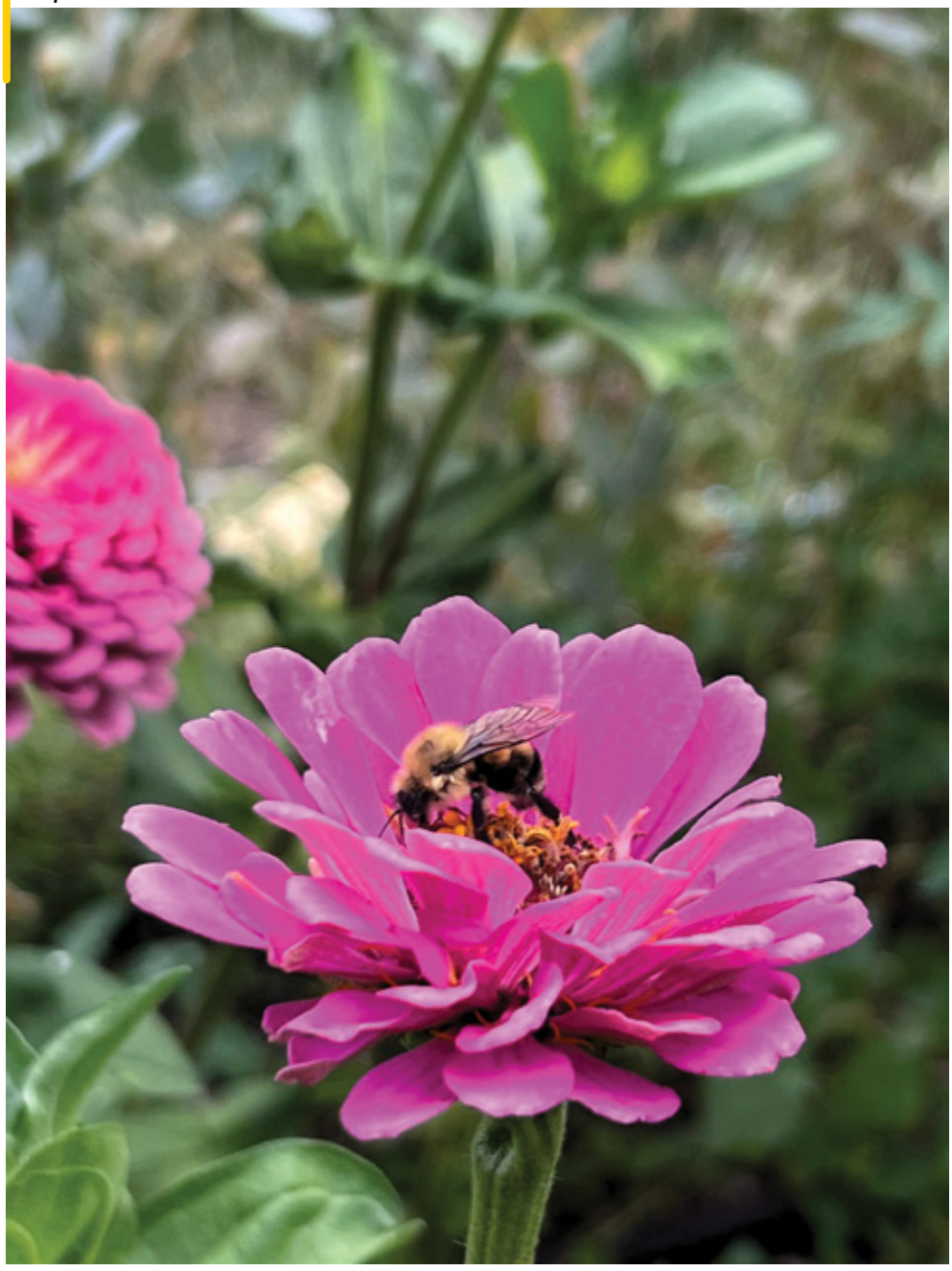
1.**Red: Red dwarf honey bee *(Apis florea)***

The red dwarf honey bee may well be the closest we come in modern times to the original honey bee. As likely ancestral descendants of the very first queen from honey bee species gone before us, these tiny bees are critical pollinators across Asia and Africa, from Sudan to the forested Middle East down through India and to the Philippines, as published in the Kansas Entomological Society's journal. As *A. florea* worker bees age, their abdomens typically darken until they display a distinct red band; they are unique not only for this color but also for their small stature. At just 7-10 millimeters – more than a quarter and less than half an inch long – they could comfortably rest on the average person's fingernail, with room to spare. Their honey also provides sustenance for hungry monks, according to Apiology – honey's classification as a "tonic" and therefore allowed any time of day means these religious figures can consume offerings of *A. florea* honey in-between their last meal of the day, lunch and before the next meal they consume: breakfast the following morning.

2.**Orange: European honey bee *(Apis mellifera)***

About double the size of the red dwarf honey bee, the European honey bee – also known as the western honey bee – is present on every continent save Antarctica. Their coloring ranges, but typically is yellow-orange, orange-brown or even darker. In 2006, they received the distinct honor of having their entire genome mapped, becoming only the third insect to complete such a feat (the

The Harrons' North Dakota garden is home to a variety of bees attracted to its mix of brilliantly-colored flowers, like this pink zinnia.



other two being the less attractive, but ubiquitous, fruit fly and mosquito). Though commonly known as the European honey bee, there's been a worrisome decline in Europe's honey bee populations, both managed and wild, that likely started in the 1960's and has continued to fall since. A group of European scientists recently confirmed a loss of genetic diversity amongst European honey bee populations, possibly contributing to their recent struggles. Their last known feral holdouts in Europe appear to be beech forests in Germany, and probably as-yet-unstudied woods in Central Europe.

3.**Yellow: Buckfast bee *(sub-species of Apis Mellifera Mellifera)***

Buckfast bees are often known as the beekeeper's bee, a title well-earned through their favorable qualities developed over generations of selective and highly reproducible breeding programs. In fact, Buckfast bees have been the subject of several interesting research studies in the past few decades to understand these traits and behaviors in comparison to other common strains of bees. Many such studies have occurred in Poland in particular, as access to Buckfast bees became easier after Poland's inauguration as a member nation of the European Union, when Polish beekeepers began to commonly cultivate the breed.

A 2012 paper undertaken by the University of Life Sciences in Lublin, Poland, evaluated Buckfast bee colonies against Caucasian-European Black bee hybrids along dimensions of Winter hardiness, development of Spring colonies, swarming tendencies, honey yield, and colony strength. In all measures, Buckfast bee colonies were superior to their hybrid cousins, with the exception of similar Winter hardiness. Importantly, the Buckfast bee colonies also displayed lower variability across measured factors than the hybrids, indicating that their traits are likely more predictable and therefore favorable for beekeepers, especially when it comes to honey production. Indeed, the hybrids collected just 74% of the honey that Buckfast bees did – an overall mean honey yield of 32 kilograms, versus 43 kilograms from Buckfast bee colonies. Another Polish study added that the Buckfast's syrup storage and processing efficiency were higher as well when compared with other, Norwegian Black bee hybrids.

More about the unique story behind the creation of the first Buckfast bee can be found in "It Began with Brother Adam," another *Bee Culture* piece, published in 2021.

4.**Green: Green honey**

Though honey bee relatives like the glistening metallic sweat bees can themselves be green, there are no naturally-occurring green honey bees. That doesn't mean, however, that the honey *produced* by honey bees can't be green. Besides a memorable honey incident in France in 2012, when bees produced dark green-blue honey because they were feeding on industrial waste from the production of M&M candies, green honey can be a natural result of pollen obtained from certain flowers – purple loosestrife and yellow star thistle are two examples.

Matthew Hoepfinger mentions in his blog post for *Bee Informed* that green-hued honey coming from the yellow star thistle has been popular with beekeepers, as the thistle imparts a unique flavor and its distinctive color can command a higher price.

Unfortunately, this honey comes with an environmental cost – yellow star thistle is invasive and currently outcompeting many native plants in parts of the American West, with Yosemite National Park calling it one of their "most problematic weeds" and spending considerable resources in attempts to limit its spread. It thrives particularly well in California's Central Valley, a similar climate to its original birthplace in the Mediterranean.

5.**Blue & violet: Purple-blue honey**

Beekeepers in North Carolina were surprised the first time they saw it – honey with an unmistakable blue-purple tinge and a sweet, complex flavor profile. As Occam's razor states, the simplest solution is most likely to be true and beekeepers agreed, believing at first that nearby huckleberries were the reason for this particular shade of honey – but scientists conducting tests in the 1970s weren't convinced.

A professor at N.C. State University, John Ambrose, conducted experiments that confirmed flowers with higher aluminum content – taken up by plants like sourwood from the soil in North Carolina's Coastal Plain – could make blue honey in certain cases. Though the bees didn't return to the hive carrying blue-tinted nectar in their stomachs, they left the hive carrying it. Further testing determined that aluminum in the flowers' nectar mixed with the acidity from bee digestive fluids creates a reaction that produces a blue color in hive honey.

Still, though this is a possible and likely explanation for the rare blue-purple honey, opinions remain mixed on whether this accounts for all blue-purple coloration. Lively discussion amongst beekeepers has resulted in conclusions that bees are potentially feeding on kudzu, elderberries, huckleberries, blueberries and more to produce this beautiful honey.

Beekeepers at Appin Bees, a North Carolina-based operation that collected the dark purple comb below, have seen purple honey just twice in 13 years – their latest harvest yielded a medium box from one hive out of 24 in the yard. Their theory holds that it's a rare combination of nectars working together to create the singular color and "fruity grape" taste of this honey.

6.**Black: Black dwarf honey bee *(Apis andreniformis)***

The black dwarf honey bee, sister to the red dwarf discussed above, is yet smaller – commonly as small as a quarter-inch – but no less vital a honeybee to the local ecosystems it frequents. According to the University of Florida's Entomology and Nematology Department, one of its most distinctive traits is the nests it builds: the small colonies construct open-nest configurations on twigs, the single comb with simple supports appearing like a crest along streams in shady groves. Plant resin usually attaches it to common shrubs and trees in the region, like those that produce bamboo, coffee or bananas, doubling as an effective deterrent for potential attackers.

Black dwarf honey bees dance, too, but not perhaps in the expected way. Rather than directional waggle dances based on vertical positioning, including reference to gravity and the sun in the sky, their dances point like an arrow in the direction of the resources indicated.

Honey itself, too, can be black in color, or very nearly so, if it's produced from buckwheat. This is



North Carolina-based operation Appin Bees harvested this frame of purple honey from one of their 200+ hives. Those who've enjoyed this treat say the honey has fruity notes of grape and huckleberries.

said to impart a particularly robust and rich earthiness to the viscous liquid.

7. **White: Crystallized honey**

Ever pulled out a jar of honey and seen it solid and white? That's crystallization, a natural process that nearly all untreated, pure honey will undergo over time – and generally is an indication that the honey is at its most healthful and wholesome.

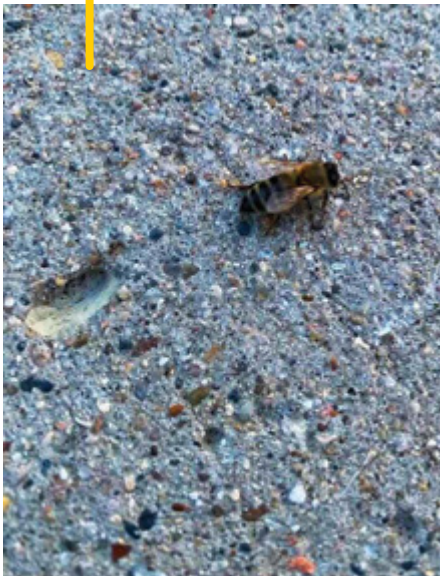
Crystallized honey can be found in cabinets across the world, depending on the house temperature and time since it's been purchased, but it's also been discovered in more unique locations, like stored away for thousands of years in King Tut's tomb. As with salt, honey is a natural preservative, both maintaining its own properties over time as well as assisting other objects to do so too. In one notable case, a Bronze-Age burial mound unearthed in the country of Georgia contained a plethora of objects preserved over 4,000 years by honey: from rich, molasses-scented ground cherries embalmed in the substance to hazel nuts, weavings and the long-dead themselves. Archaeologists found scraps of bee bodies and pollen amidst the piles of bones in the mound.

8. **Brown & gray: Caucasian honey bee *(Apis mellifera caucasia)***

The Caucasian honey bee's territory nowadays is vast, but its central origin stems from deep in the Caucasus region, cradled between two inland seas, the Caspian and the Black Sea. These honey bees played a variety of roles in the history of the region, from the preservative power of their honey in ancient graves to the development of wild beekeeping methods like 'tekne' in Azerbaijan.

Today, their frequent usage in Turkey has links to a dangerous substance called "mad honey," which gets its name from the neurotoxins it contains. Just a few drops produces a numbing effect, while a teaspoon can induce spinning, intoxicating effects, stemming from the poisonous rhododendrons that these honey bees feed on and transform into honey. Historically, this mad honey was used not only recreationally and medicinally, but also as a biologic weapon of war in the ancient world. An invading army of Roman soldiers was slaughtered in the region in 67 B.C. when large numbers of them unknowingly consumed

North Dakota's open plains and prairie provide an excellent environment for bees of all kinds, such as this one captured by the author's brother near her home.



mad honey strategically placed by loyal, crafty locals.

Still legal in Turkey today, where it's known as *deli bal*, small amounts of mad honey are used to treat various ailments and diseases on a regular basis.

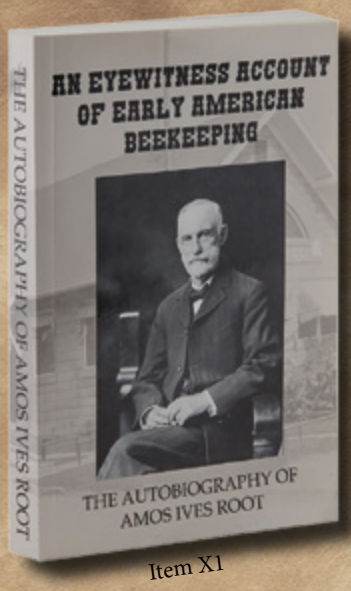
Though in this article we've touched on honey bees and honey spanning the wide swathe of rainbow shades, there's always more to learn and discover from the colorful world of bees, whether it's history and culture, genetics and cuisine, or something else that suits one's fancy.

On a personal note – I'm pleased to say my family believes me about the red bees nowadays. Next up: convincing them about the purple bees. BC

Linked sources, in the order in which they are used:

1. **Eumelanin and pheomelanin are predominant pigments in bumblebee (Apidae: Bombus) pubescence - PMC (nih.gov)**
2. **Why do some insects look metallic? - BBC Science Focus Magazine**
3. **Conservation of Asian honey bees | Apiology (apidologie.org)**
4. **47_Distributions of recently recognized species of honey bees. pdf (iisc.ac.in)**
5. **European honey bees | CALS (cornell.edu)**
6. **Insights into social insects from the genome of the honeybee Apis mellifera - PMC (nih.gov)**
7. **Declining genetic diversity of European honeybees along the twentieth century - PMC (nih.gov)**
8. **ANNALES UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA LUBLIN POLONIA - PDF Darmowe pobieranie (docplayer.pl)**
9. **[PDF] Foraging and hoarding efficiency in buckfast purebreds and Norwegian black bee [A.m.mellifera] hybrids. Part.1. Annual honey yield versus results of field flying cage and laboratory tests | Semantic Scholar**
10. **It Began with Brother Adam | Bee Culture**
11. **These bees made blue honey after visiting an M&M factory (zmescience.com)**
12. **Yellow Star Thistle Produces Green Honey – Bee Informed Partnership**
13. **Yellow Star-Thistle: A "Wanted" Weed - Yosemite National Park (U.S. National Park Service) (nps.gov)**
14. **The Mystery of Blue Honey | Our State**
15. **Kudzu: the weird dark secret of purple honey? - Honey Bee Suite**
16. Short personal interview with Appin Bees, conducted by author
17. **Apis andreniformis - black dwarf honey bee (ufl.edu)**
18. **Honey, I'm Dead | Out of Eden Walk (nationalgeographic.org)**
19. **(PDF) Honey Bee Biology In Turkey (reserachgate.net)**
20. **Caucasian Mountain Honey - Presìdi Slow Food - Slow Hoof Foundation (fondazioneslowfood.com)**
21. **The Strange History of 'Mad Honey' - Modern Farmer**

TAKE A STEP BACK...



Item X1



One day in August 1865 a stray swarm of bees passing through the air attracted his attention. That evening, after hiving the swarm, other books and papers had to be laid aside in favor of anything pertaining to bees and bee culture. From that time on he was a student and breeder of the honey bee. It has been said that he did more than any other man in America to commercialize beekeeping. Take a step back in time and follow his journey and see how his quest for knowledge and profound religious conviction helped shape American beekeeping.

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https://www.beeculture.com/the-language-of-beekeepers/ **Listen along here!**

Bee speak

Though one is not always aware of it, most of us speak more than one language. I suppose it could be called "*technical English*" or "*specific English*" – I don't know. For example, in my hobby woodworking life, I leave a joint "*proud*" and I use "*witness marks*" to know where to place a saw "*kerf*" that will "*celebrate*" a joint that I have "*sneaked up on*". I really can't think of one occupation that does not come with some jargon required to communicate and function within that area. Farmers, computer programmers, carpenters, steel workers, drug dealers, physicians, movie producers, the U.S. military and librarians are just a few quick, albeit unrelated, examples of industries or groups that would have a language unique to their craft or profession.

If I said, "*We really need to get out to the Metz yard and super-up with foundation. Maple's about to pop and the bees are already broody,*" would any rational person have more than an inkling of what I was saying? It's annoying, isn't it, when someone uses jargon that he knows won't be clearly understood by another?

In plainer English what I said was, "*We really need to go to the beeyard at Mr. Metz's farm and put extra boxes on the bee hives. Those boxes should only have beeswax templates in each of the ten racks on which the bees can build new comb. It's the time of the year when Maple trees are nearing bloom so they will be producing nectar from which the bees will produce honey and feed back to the baby bees that are already nearly developed.*" The major difference between the way I wrote it the first time and the way I wrote it the second time is that I took nearly triple the number of words to say it simpler – but I think more non-bee people would understand my second statement more clearly. (I think that's a conundrum – to say it simpler takes triple the words.)



Medium brood foundation

I realize now, that as with many other terms, words often have their original meaning deeply rooted in history. Specifically, I remember a term strange to me as I began to study beekeeping - "*medium brood foundation*". The foundation part was easy enough. Foundation is a beeswax sheet embossed with the imprint of honey bee worker cells. When bees build comb on this printed pattern, we (usually) get nice, straight comb – which allows us to put these straight combs in an extractor.

The "*medium-brood*" part was what made no sense to me. Why would I want "medium-sized brood? If I was going to raise bees, I wanted large – or even extra-large brood so I would have large bees – ergo large honey crops. Well, silly me. It's not small, medium, and large brood foundation, but rather light, medium, and heavy brood foundation. It seems that in equipment production years gone by, bee supply companies made brood foundation in different weights. Heavier brood foundation could stand more jostling and manipulation stress than the lighter foundations but cost more. In later years, as foundation became wire-reinforced or strengthened with plastic sheets, the need for differing weights of foundation passed except for one category – "medium brood foundation."



Figure 1 The strange geometric beauty of comb foundation. In the early years, these foundation mills were hand cut. How tedious that must have been.

Ironically, today there is a new term that evolved about fifteen years ago – foundation inserts. These are plastic sheets that are embossed with worker-sized templates. Installing eyelets and then wiring the frame were eliminated by the heavier plastic sheets that are beeswax coated. Though not without issues, I like these sheets and the ease of installation. Medium brood foundation is passing into beekeeping oblivion.

Super

One of the most unique words in beekeeping parlance is the term "*super*" used as a noun. "*What supers does that commercial outfit run?*" would be a possible question one beekeeper would ask another. In archaic English the word "*super*" had a few different meanings than are commonly used now. Near the turn of the century, one of the more common definitions for super was "*something in excess of*" or "*something paid over and above*". The older term appears to be all entangled with the word "*supernumerary*". So, like some botanical hold-out from a past geologic era, the term "*super*" is still used by beekeepers today as it was many years ago.

And then there are the myriad sizes and names for supers along with all

the contorted reasons for the different sizes and names. Dadant-depth, 6 & 5's, shallows, half-depths, medium depths and deep supers (sometimes called a full-depths), are some of the names that one may come across in some of the old literature. Essentially, the primary reason for the varying depths of supers (width and length were always the same for all boxes) was the milled width of pine boards.



Figure 2 Where are the supers? (My hives may not look good, but my bees do.)

Anyone who commonly buys lumber today knows that a 1x6 pine board is anything but 1 inch by 6 inches. As the mill-width of lumber changed, so did the depth of supers. A second reason was weight. A full, deep super can weigh 70 pounds or so and is picked up with the fingertips. That can make for a long day and some real sore fingers.

Cutting a full depth super in half (or some other measurement less than a full-depth super) would lighten the load one must bear when lifting full boxes. The disadvantage of smaller and smaller supers – still today – is the cost to purchase and maintain all the extra boxes that would be required to give a bee colony the same amount of space as the deeps would give. But then again, back surgery can be terribly expensive in its own right, too, so factor that in.

Apparently, the early outer dimensions and depths were developed by manufacturers to minimize production costs. I was told by now long-gone beekeepers that the box sizes were determined so wood scraps could be used for some other hive part. Hypothetically, a 1x8" pine board would be cut down to 6 5/8" in order for the remaining scrap strip to be used for the wood rim on an outer cover. The bees never really had a say in the box size matter.

Mindless ramblings

My grandfather, born in 1898, died many years ago. With his passing, and all the others of his generation, so passed parts of our language. It wasn't just the words alone that were different, but it was also the phraseology. It generally was not a good thing to do when one "*sashayed*" at a church social. As a young kid, one of the worst things I could do was to visit someone's home and "*plunder*" while I was there. Young couples would find a secluded spot and "*spark*" – while in my day, young people "*necked.*" I don't know what the word my grandkids would use today. (I don't really want to know.) Someone could be teched (tetched) meaning "*touched in the head*". When you had the *croup*, you had a loud, horse, barking cough and you hung your clothes in the *chifforobe* (which was in the same room as the *chiffonnier*).

I'm annoyed with myself. When I hear these old terms, I remember my grandfather's language, but I've forgotten most of it. When I hear a word used like "*smelt*" (somewhat archaic past tense use of "*smell*"), I always think, "*Now there's a word I haven't heard in a long time.*" Our language is always changing and it should so it can adapt and stay alive. Enough of this.

Brood

The sex, amount and condition of the "*brood*" in the colony is of frequent discussion in beekeeper circles. A hive can have "*open brood*" (either eggs or larval stage), "*sealed brood*" (developing bees that are in the pupal stage and have a wax covering over them) and sealed brood can be either worker or drone sealed brood. In fact, *sealed brood* may be called *capped brood*. One might say of a colony after a Spring inspection, "*That colony had seven frames of brood – most of it sealed. I even saw some drone brood. That hive's going to be busting strong – if it doesn't swarm."*

She vs. he

Speaking of brood, you may recall that all worker honey bees are sterile females. These females are the only ones that sting. Therefore, never say, "*Watch out! He'll sting you*!" Males can't sting. It is always, "*She will sting you*" or "*Yes, she stung me.*"

Queen

The queen always excites interest. *"Hey! Wanna see the queen?"* is an exclamation commonly heard in bee classes and gatherings. The queen is the only fertile female in the colony. She has a sordid sex life – but only briefly – and that mating event lasts her a lifetime (maybe one to three years). If a colony is *queen-right*, it has a queen in the colony. Seeing single eggs in numerous cells is a dead giveaway that she's on the job. If the queen is being (or has been) *superseded*, she is being replaced by colony decree. A queen can be a "*fertile queen*" or a "*mated queen*" (look for eggs) or she can be infertile or a "*virgin*".

A queen can *fail* (a clue for a failing queen would be few to no eggs being present). A *foreign queen* (a queen that was not "*introduced* or *installed*" in the colony) will be "*balled*" or "*balled up*" (attacked by resident workers bees). Virgin queens "*emerge*" from their cells and fight amongst themselves. To find each other in the dark hive, they "*pipe*" which is a tiny tooting sound. Virgins not yet emerged from their cells but already mature, will toot in response to the call-to-battle, but their tiny toot sounds more like a tiny quack. So, "*rival*" queens pipe and quack to find each other in the dark hive. These sounds can be heard from outside the hive. I promise that this is true.

Flow

A lot of things "*flow*" in beekeeping – not the least of which is money – and that usually flows the wrong way. Aside from that, nectar "*flows*" from blossoms in the Spring. Bees collect nectar and process it into honey resulting in a "*honey flow*" from the hive. Though not exactly correct, pollen can even flow – but all beekeepers in the know will know what you mean. Normally, pollen "*comes in*" the hive. For example, while looking concerned and knowledgeable, one would say, "*It's been warm for four days now. Are they bringing in pollen?"* Processed honey flows from the "*extractor*" (not the honey spinner), after *frames* (not racks) have been uncapped (not decapped). Don't extract "*green*" honey (honey that is uncapped; therefore, not ripe) for it will ferment.

More mindless ramblings

These comments have absolutely nothing to do with beekeeping directly. I've just got these thoughts on my mind. I took a formal course in electricity in undergraduate school. During labs, we were occasionally required to "*work with one hand in our pocket*". The reason was (supposedly) that it would



Figure 3 Apple blooms to most people, but to beekeepers this is a nectar and pollen flow.

be more difficult to electrocute one's self (I never have known if I believed that or not). The class helped, but I certainly didn't learn all there was to know for though the years, I've tripped more circuits and trashed more fuses than should have been my lot.

My Dad was always the one elected to plug in some "*repaired*" electrical device while the rest of the us would stand by with our fingers in our ears. Having left home years ago to establish my own home, that somber task was transferred to me. Having recently tried to wire around a broken lightening arrestor in an old radio – it literally detonated when I plugged it in. So, I was a bit more cautious when a 20-year-old drill abruptly died. One second it worked fine while another second later it could not have been any deader. I tore the drill into a hundred small "*drill pieces*". No obvious problems. Must be the variable-speed switch.

I opened the "*black-box*" switch mechanism to a fiddle-bump's worst nightmare. Springs, contacts, and copper things went flying. Though a bad situation, I'd been in situations like this before (e.g., I once opened the mechanism of a 35 mm single-lens reflex camera. Two weeks later I finally got it put back together). I carefully, carefully searched for parts in the vicinity that looked as though they could have come from the innards of an electric drill and came up with a few tiny pieces.

After two days of studying wear patterns and electrical pathways, I had the switch re-assembled except for one piece. It looked like an electrical contact of some sort, but after studying the drill's switch mechanism for hours. I admitted defeat. I gave up.

As is my retentive habit, I reassembled the drill anyway – minus one body part. With the dead radio on my mind, I tested the drill and to my absolute surprise, it worked. I mean all features of the drill functioned. I have never known of a situation when one could have parts left over and something still work correctly. Even so, later today, I'll be stopping by to check out new drills.

Acquired skill

Learning to speak "beekeeping" is an acquired skill. Last Spring, my oldest grandson abruptly decided to take up beekeeping. He commonly makes beekeeping jargon misspeaks, but I pick and choose the ones that I correct. I don't want to embarrass or overload him with picayune details. It is helpful for me to review when bee terms are misused and how those new to beekeeping can form their own "*bee speak*."

Thank you

I hope you know that I am always appreciative of the time you spend reading and listening to my ramblings. Thank you. BC

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To add a sweet zing to your usual Thanksgiving dinner, try Crabapple Jelly containing honey to add a real buzz to the chatter! Use crabapples from your own trees or from a friend who knows that they are safe to eat. Dolgo crabapples make especially good jam.

This recipe was taken from the book *The Vermont Beekeeper's Cookbook* written and created by the Vermont Beekeepers' Association with the assistance of the Vermont Department of Agriculture. No date is written in the book but it is likely to be 30 or more years old.

Ingredients

□ 3 lbs of crabapples, washed, stemmed and cut in half
□ 4 cups of water
□ Light flavored honey



Directions

Step 1
Boil crabapples in water until soft, about 15 minutes.

Step 2
Strain juice and measure. You will need to know the number of cups of juice to know how much honey to add.

Step 3
Boil 2-3 cups of juice at a time, depending upon the surface area of the pan, until the liquid is reduced by half.

Step 4
Add the honey. For each cup of juice you will need 2/3 cups of honey.

Step 5
Cook the honey and juice mixture and cook rapidly until the jelly thickens and reaches 220°F.
Pour into sterile jam jars and seal for later, but save some for Thanksgiving Dinner! BC



Photo By Olivie Strauss on Unsplash

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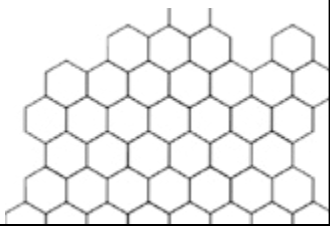
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CALENDAR

COLORADO

Colorado State Beekeepers Association (CSBA) will hold their Winter Meeting on November 2, 2024 in Berthoud, Colorado.
Guest speakers, Presentations, Hands-On activities, and Bee Talk.
For more information go to:
https://coloradobeekeepers.org

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ILLINOIS

Illinois State Beekeepers Annual Meeting will be Saturday, November 9, 2024.
Do you want to?

- Learn more about Small Hive Beetles?
- Be able to recognize and understand queen events and possible actions a beekeeper can take?
- Identify stressors of a honey bee colony and what to do in order to address them?
- Learn more about sustainable beekeeper?
- Learn about toxic chemical reactions in a honey colony and why and when to rotate out old comb in order to have a healthier colony and what synergistic chemical reactions occur in old comb?
- Learn more about the special qualities in honey?
- Enter your honey product (s) into the November 8, 2024 ISBA Honey Judging Competition?

Featured speakers are Dr. Jamie Ellis and Bob Binnie
More information and the presentation topics for the two featured speakers (Dr. Jamie Ellis & Bob Binnie) for the 11/9/24 meeting can be found at **www.ilsba.com** the **Summary of Events** page.

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REGIONAL

American Beekeeping Federation Conference and Tradeshow will be held January 7-11, 2025 at the Peppermill Resort Spa in Reno, Nevada.

There is a reserved block of rooms at the Peppermill Spa for a discounted rate of $120 a night (plus applicable tax, fees, and a $10 resort fee). The hotel is located on 2707 South Virginia St., Reno, NV 89502. Parking is free and there is a complimentary shuttle to and from the Reno-Tahoe International Airport. This event's topics target each level of beekeeping on a three-track schedule.

Keynote speakers include: Dr. Marla Spivak from the University of Minnesota, Dr. Geoff Williams from Auburn University, and Dr. Scott McArt from Cornell University.

This year as a special bonus, Project Apis m. will be presenting Thursday morning followed by a luncheon. Lunch will be a ticketed event. In addition, Apiary Inspectors of America and ABRC will again be in attendance.

Pre-registration for the American Beekeeping Federation 2025 Conference and Tradeshow is now open. Visit: **https://abfnet.org/2025-abf-conference/**for more information.

You may direct conference questoins to Dan Winter/ Debbie Seib at **abfnet.org@gmail.com**.



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Image Contest – Splitting & Nucs

We've started an image gallery! This month, we want to see any and all pictures you have of your **Splitting Hives and Making Nucs**. Please make sure that your image is nice and big! We may pick your image for the gallery, or you have the chance to get on the cover! So get creative.

How To Submit:

Email your images to **Stephanie@BeeCulture.com**
Use the subject "**Image Gallery**"
Please include in your email:
- The image as an attachment (we will not consider it if it is embedded)
- Your First and Last name
- Your mailing address
- Your renewal code (if you know it)

If your image is chosen:

For the Gallery:
You will get three months added to your current subscription.
For the Cover:
You will get twelve months added to your current subscription.

A couple of days after Paul had his hand surgery, I called him up. "Let me know when you can fish again," I said. It was his casting hand. I figured it would be weeks if not months.

Paul's comeback: "I can go Sunday or Monday. I'm not supposed to get my hand wet, but Nanci says she can make me a waterproof bandage." Nanci runs a wildlife rehabilitation center, so she knows how to put on a bandage that stays.

Paul excels at whatever he sets his mind to. I was lucky. He taught me to keep bees and to fish. But he's the master. I remain the apprentice. Now we're both deep into overtime on our brief forays on this sweet Earth.

He sold the bee business to Derrick, so Paul's retired, sort of. He still has a mission, a blinding passion. He lives to fish. He out-catches me five and sometimes even ten to one, and he generally gets the big one.

Last year wasn't so bad for *Varroa* mites, but this year it's a pandemic. A colony that tested at one mite in a 300-bee sample on July 4 tested at 20 a month later. Big numbers pop up when and where I least expect them. The conventional wisdom is that *Varroa* within a hive naturally double their numbers in 30 days, so going from one mite to 20 in a month makes no sense, unless those mites are coming from other colonies, or my testing is somehow off.

Then going into Fall, bee numbers decline in preparation for Winter, while mite populations continue to climb. This can lead to mite/honey bee Armageddon and subsequent colony collapse.

Derrick relates the severity of his *Varroa* infestations to the condition of his colonies when they get back from the California almonds in March. If his little darlings are positively bustin' out of their boxes, that's good, right? Now wait a minute. Monster Spring colonies mean that they've been on a big honey flow, which implies that queens have been laying prodigiously. The ensuing big batch of brood makes fertile ground for mite reproduction.

This leads to a disturbing conclusion: Strong colonies can make lots of honey, which we beekeepers want. But these powerful hives also produce big crops of *Varroa*, which we don't want and which can decimate those colonies. So if you have a bumper honey harvest you in all likelihood have a big mite problem. I'm sorry if I just wrecked your day, but that's the way it is.

Sure, you can knock down big mite populations with beekeeper interventions, but the sad truth is that the treatments don't always work. Amitraz, oxalic acid, formic acid, thymol, Hopguard – I've seen some of them work and all of them all fail, and increasingly so. Of course in the long term chemicals aren't the answer, but when your house is on fire, the long term is not the issue. We beekeepers struggle to keep our bees alive today – right now – and we do what we have to do.

The Asian super-mite *tropilaelaps* is about to land on our shores. We just don't know when or where. Globalization brings us cheap Asian goods, but with all those ships tying up in Seattle and Long Beach, it's only a matter of time before one docks with a stowaway hive of tropi-laden honey bees on board. While they're in port, they might decide to throw a swarm. Will we be prepared for such a calamity? Of course not. We have our bee-veiled heads buried comfortably deep in the sand. We'll wait until disaster strikes. Then we can hit the panic button. This is human nature but not sound strategy. What's your bee club doing now to support a strategy to deal with *tropilaelaps*?

The other day one of my landowners flew a drone over my bee yard. He reported that bees attacked it! He said it was 80 feet in the air. I Googled this and confirmed that honey bees apparently do sometimes go after drones. *Why* is anybody's guess.

Then a couple of hours later the landowner got stung twice, weed-eating 100 feet from my hives. This surprised him, and it surprised me. But as we all know, bees that get all fired up can stay that way for awhile.

There are some interesting bees-attacking-drone videos on the Internet, but remember, honey bee colonies have their own drones. So when you type in "bees attack drones," what initially pops up might not be what you're looking for.

Finally and most importantly, I trust you're planning to vote or that you already have. Think how lucky we are to live in America! But this fragile imperfect democracy of ours is not for spectators only; its continued survival requires our active participation, and that means – at a minimum – our willingness to cast a ballot. Your failure to support your country by bothering to vote would also make you a patriotic slacker. So just make up your mind and do it, OK?

When the votes are counted on Election Day, we won't all be pleased. But we the voters will have done our duty. We might not get what we want, but I'm confident we'll get what we deserve. BC

Gentle reader, did you find this poor epistle amusing, heartwarming, instructive? Contact Ed Colby at **Coloradobees1@gmail.com**. *Ask him to promptly mail you an autographed copy of A Beekeeper's Life, Tales from the Bottom Board -- a collection of the best of his Bee Culture columns. Price: $25. Satisfaction guaranteed or your money back!*

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$98.95 / 200 Ct. Case
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b DECO EMBOSSED JUGS
5 LB - $103.95 / 72 Ct. Case
3 LB - $127.95 / 126 Ct. Case *No Caps*
1 LB - $140.44 / 300 Ct. Case *No Caps*

c CLASSIC PLASTIC JARS
32 oz - $79.95 / 110 Ct. Case
No Caps
16 oz - $138.03 / 321 Ct. Case
No Caps

d SQUARE PLASTIC
16 oz - $259.95 / 343 Ct. Case
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e GLASS 3 OZ. MINI MASON
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f GLASS 12 OZ. HEX EMBOSSED CYLINDER
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g 12 OZ & 3 OZ GLASS SKEP JARS
12 oz Skep Jars $16.95 / 12 Ct.
3 oz Skep Jars $14.95 / 24 Ct.
Gold Metal Lids Included

h MUTH JARS
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