

HONEY INDUSTRY REPORT

JUNE 2023

Catch The Buzz™

Bee Culture®

The Magazine Of American Beekeeping
www.BeeCulture.com

Heroes to Hives Hot Hive Inspections
Honey Bee Cannibalism



50% OFF
New! **ROOT**
COLLECTIONS

\$4.99

7 35449 28163 9

VARROA TREATMENT THAT GOES DEEPER.

Formic Pro[™] penetrates under the brood cap to target varroa mites where they reproduce, protecting developing honey bees for healthier, more productive colonies.



Organic • No Resistance • Residue



Ask for NOD Apiary Products at beekeeping supply stores across North America.



Healthy Bees. Healthy Planet.

1-866-483-2929 | www.nodglobal.com

APISTAN



beehealth
NORTH AMERICA

PROBABLY THE WORLD'S

NO. 1 VARROA CONTROL

94%
AVERAGE EFFICACY
OVER 9 CLINICAL
TESTS

TEST RESULTS

Apistan, lab study: **95.72%** Varroa mortality
(*Insects*, 2018)

Apistan, field study: **84%** efficacy
(Apiguard: 86%; Apivar: 79%; HopGuard: 64%),
@ Mississippi State University
(*Insects* 2018)

Apistan: **94.90%** efficacy
(2019, Veterinary Bee Inspector, Spain)

Apistan: **96.92%** Efficacy
(2018, Veterinary Bee Inspector, Spain)

Apistan + 50 g Apiguard: **97.97%** Efficacy
(2018, Veterinary Bee Inspector, Spain)

Apistan: **97%** Efficacy (2014, FNOSAD, France)

Apistan: **93%** Efficacy (2015, FNOSAD, France)

Apistan: **91%** Efficacy (2016, FNOSAD, France)

Apistan: **95.22%** (2017, FNOSAD, France)

All new*

Apistan – *it's better*
than ever before!*

* Actually, only the packaging
has changed but if you haven't
used Apistan for some time you may
be surprised at how effective it is.



Apistan, now sold in
North America by
Vita Bee Health, is ideal
for use in your Integrated
Pest Management
system, in rotation with
a completely different
product, such as Apiguard.

Vita Bee Health is a trading name of Vita (Europe) Ltd.

IT'S NOT THE WORLD'S NO.1 VARROA CONTROL PRODUCT BY ACCIDENT!

www vitabeehealth.com VitaBeeHealthNorthAmerica VitaBeeHealth info@vita-europe.com



**Keep your Bees Healthy
& Producing Honey
Eliminate Varroa Mites**

FREE SHIPPING on purchases of \$150 or more. Some items do not apply.



M01465

Formic Pro™ is the next generation in formic acid treatments for mites. Made of all natural materials, this product can be used during the honey flow. Unlike Mite Away Quick Strips, Formic Pro™ has a longer shelf life of 24 months after manufacturing date and no temperature requirements for storage.

M01467



M01464

Api-Bioxal Oxalic Acid

Oxalic acid is a newly registered chemical control for Varroa Mites. Can be used in both drench and vaporization methods. Best used during broodless periods late fall through early spring, in packages, and nucleous colonies. Can't be used on colonies during a honey flow with supers in place. Available in 3 sizes.



M01758 Oxalic Acid - 35 grams

M01763 Oxalic Acid - 175 grams

M01764 Oxalic Acid - 350 grams



M01461



M01460

Mite Away Quick Strips are a Formic Acid polysaccharide gel strip which, when placed in the brood chamber of a honey bee hive, is an organic miticide that kills the Varroa mite where it reproduces under the brood cap.



*A Vita-Europe Ltd. product
by Dadant & Sons, Inc.*

**NATURAL THYMOL
VARROA CONTROLA
SLOW RELEASE GEL PRODUCT**



M01480

- Natural and Non-toxic
- Kills up to 99% of mites in one application

Foil pack contains 10 individual 50g treatments ready for application. Also available in bulk tubs.

M01481



**Authorized distributor
for Apivar®**

M01490



- Kills up to 99% of mites in one application
- Continuously-released in the colony over a six-week period, ensuring healthy and productive hives
- Proven safe and effective for more than 15 years
- Leaves no significant residues in hive products

An effective Varroa mite control strip



www.dadant.com

51 S. SECOND STREET, HAMILTON IL 62341 • PHONE (217) 847-3324 • FAX (217) 847-3660 • TOLL FREE 1-888-922-1293
• CHICO, CA (877) 332-3268 • FRESNO, CA (877) 432-3268 • PARIS, TX (877) 632-3268 • SIOUX CITY, IA (877) 732-3268 •
• WATERTOWN, WI (877) 232-3268 • ALBION, MI (877) 932-3268 • WILLIAMSPORT, PA (877) 532-3268 •
• CHATHAM, VA (800) 220-8325 • FRANKFORT, KY (888) 932-3268 • HIGH SPRINGS, FL (877) 832-3268 •



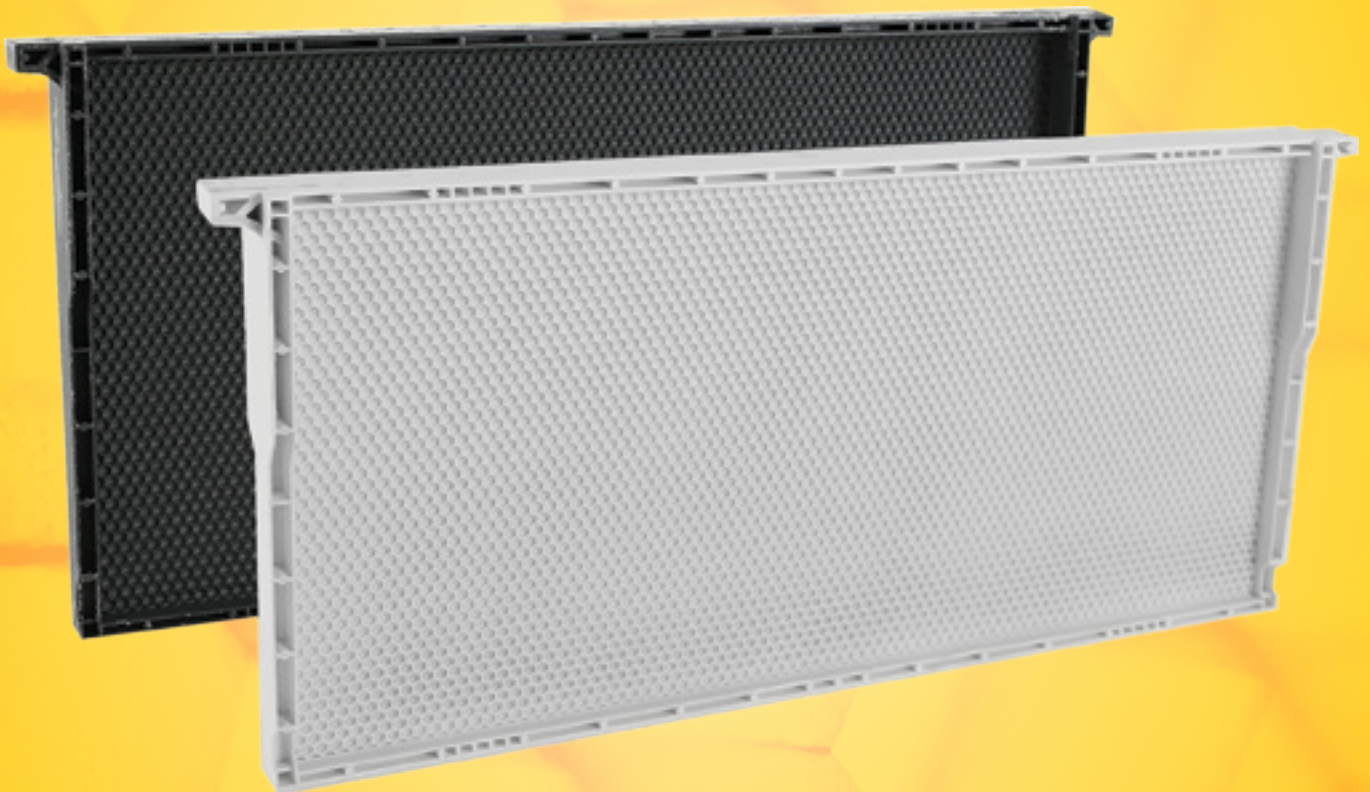
ACORN[®]

BEEKEEPING EQUIPMENT

DESIGNED TO LAST

PLASTIC FRAMES & FOUNDATIONS

Tested for durability and longevity. Trusted for the same reasons.
Choose Acorn Beekeeping Equipment[®] frames.



www.acornbee.com

Table of June Bee Culture...

- 6 **Audio**
Bee Culture Staff
- 6 **Obituary**
OJ Blount
- 7 **New Book**
Honey Bee Biology
Kathy Keatley Garvey
- 8 **Next Month**
- 9 **Honey Prices**
- 10 **Study Hall**
From the Editor
Jerry Hayes
- 12 **Found in Translation**
Teaching Bees New Tricks
Jay Evans
- 14 **Helping Beekeepers**
The marvelous insect never ceases to amaze
John Miller
- 18 **A Closer Look**
Minor Pests of Bees
Clarence Collison
- 23 **Just Blame Dad**
Poor dads...
Stephen Bishop
- 26 **Roles in a Honey Bee Lab**
From the University of Florida Honey Bee Research and Extension Laboratory
Kaylin Kleckner & Marley Iredale
- 32 **Kid's Corner**
All the buzzz...
Kim Lehman
- 34 **Minding Your Bees and Cues**
Leaves of Grass
Becky Masterman & Bridget Mendel
- 38 **Swarm Control**
Honey bees reproduce naturally
Dr. Karén Avetisyan
- 41 **Bee Vet**
AI?
Dr. Tracy Farone
- 44 **Beekeeping's Future**
The climate crisis impacts all beekeepers and honey bee colonies everywhere
Ross Conrad

800.289.7668

Executive Publisher – Brad Root
Associate Publisher, Senior Editor – Jerry Hayes, Jerry@BeeCulture.com, Ext. 3214
Layout and Design – Emma Wadel, Emma@BeeCulture.com, Ext. 3220
Advertising and Customer Service – Jennifer Manis, Jen@BeeCulture.com, Ext. 3216

Contributors

Clarence Collison • James E. Tew • Kim Lehman
Jay Evans • Ross Conrad • Ed Colby

POSTMASTER: Send address changes to
BEE CULTURE, The A.I. Root Co., 623 W. Liberty St., Medina, OH 44256

Subscription Information

U.S., one year print, \$32; two years print, \$58; one year digital, \$22; one year print and digital bundle, \$40; two years print and digital bundle, \$66. All other countries, (U.S. Currency only), one year print, \$72; two years print, \$144; one year digital, \$22; one year print and digital bundle, \$77; two years print and digital bundle, \$154. Send remittance by money order, bank draft, express money order, or check or credit card. Bee Culture (ISSN 1071-3190), June 2023, Volume 151, Issue 6, is published monthly by The A.I. Root Co., 623 W. Liberty Street, Medina, OH 44256. Periodicals Postage Paid at Medina, OH and additional mailing offices.

Subscriptions, Book Orders – www.BeeCulture.com • info@BeeCulture.com

Advertising – 800.289.7668, Ext. 3216; Jen@BeeCulture.com

Published by The A.I. Root Co. Copyright© 2023. All rights reserved.

Cover Photo



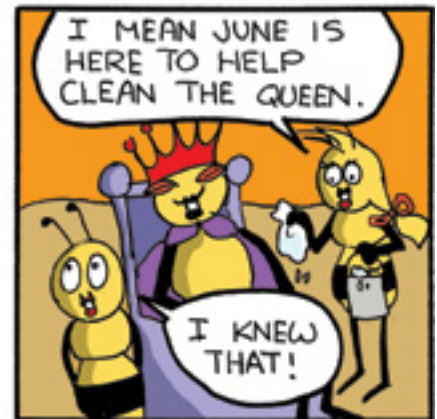
Contents

- 47 **Off the Wahl Beekeeping**
Raising Queens
New(ish) Beekeeper Column
Richard Wahl
- 52 **Selecting Land**
For your Bee Colonies
Ettamarie Peterson
- 58 **Bees and Women**
Susan E. Williams
Nina Bagley
- 62 **Bees' Strategy for Sticky Resin Handling**
Propolis is a sticky resinous substance
Dvykaliuk Roman
- 68 **More Honey**
Less Work
Dirk Vermeulen
- 72 **Heroes to Hives**
Developing Accessible Apiaries
Adam Ingrao & Ned Stoller
- 76 **A New Beekeeper's Journey?**
I have the better part of my first season under my veil
Bill Lallman
- 78 **Hot Hive Inspections**
The thrill of the search
David Burns
- 80 **Swarm Bag**
Pop-up Mesh Laundry Bag
Mike Champlin
- 81 **Swarm Catcher**
A DIY swarm catcher
Mike Champlin
- 82 **Scions**
Getting ready, making some Russian Scions
Mike Champlin
- 83 **U.S. Honey Industry Report**
For 2022
NASS, Agricultural Statistics Board and USDA
- 89 **The IR-4 Project**
Commemorates 60 Years of Impact
Hannah Ross
- 90 **Honey Bee Cannibalism**
And some other quirks of our beloved bees
James Tew
- 93 **Honey Recipe**
Berry Lemonade Bars
Shana Archibald
- 94 **Calendar and Classifieds**
- 95 **Index and Image Contest**
Splitting Hives and Making Nuc Images
- 96 **Bottom Board**
A Run of Bad Luck
Ed Colby

HONEYCOMB

HANNAH

By John Martin



Audio

Bee Culture Staff

Bee Culture Magazine is devoted to bringing each of you the best, most accurate, interesting information possible from the best authors in research, government and the industry. We are all in this together.

To that end, *Bee Culture* is moving forward with technology to connect you not only to a hard-copy article to have in hand or a digital article to read on your phone, tablet or laptop but we have now started an audio connection to monthly articles from Dr. Jay Evans, Ross Conrad and Dr. Jim Tew. Each of these great experts have taken the time to individually read their articles just for you each and every month. Look at the top of their articles and you will see the individual QR code created just for you.

I have heard from many of you that listening is a really enjoyable way to experience the articles from the authors themselves while riding in the car, working outside or in the garage or simply sitting down on a sunny afternoon to relax and listen to real voices, real information and real stories that only Jay Evans, Ross Conrad and Jim Tew can do.



Most of you are familiar with QR codes but many of you are not. To the left is Dr. Jay Evans QR code for this month's article. You

have seen these in many places including advertisements in *Bee Culture*. It's similar to a bar code in that when you scan it, the webpage's link you're looking for pops right up. You may have used QR codes to find a virtual store, scan to pay, at events, on business cards, etc.

But, how does it work? It is a machine-scannable image that can in-

stantly be read using a Smartphone camera. Every QR code consists of a number of black squares and dots which represent certain pieces of information. When your Smartphone scans this code, it translates that information into something that can be easily understood by you... like listening to Jay, Ross and Jim.

On your compatible Smartphone or tablet, open the built-in camera app. Point the camera at the QR code. Tap the banner that appears on the screen of your Smartphone or tablet. And you are there, simple as that.

If you don't have a Smartphone, head to <https://www.beeeculture.com/category/articles/audio/> to see all of the audio currently available.

We want you to have more and easier access to *Bee Culture* and this is just the start. Try it right now and enjoy *Bee Culture* even more. And let us know what you think with the form listed on every audio page! **BC**



Obituary

OJ Blount

May 8, 1926 – February 1, 2023

Long time beekeeper, Mr. OJ Blount, 96, of Andalusia, Alabama passed away peacefully at his residence on February 1st, 2023.

A graveside service with full military honors for his 30 years of service was held in Arkansas at his family plot.

Before moving to Alabama, OJ was an active member of three Beekeeper organizations, Knox, Blount and Sevier counties in Tennessee.

In 2010, he established the Queen's Castle Beekeepers Association in Escambia County, Alabama. In 2014, he was honored with the Alabama Beekeeper of the Year award. In 2016, he published a book titled, *Beekeeping Logic: How a Poor Farm Boy Developed the Queen's Castle*.

His full obituary can be read here: <https://www.williamsmemorialchapel.com/obituary/o-blount> and more stories written by his daughter and others can be read here: <https://www.williamsmemorialchapel.com/guestbook/o-blount>



Here is a video of him giving advice on how to live a long life: https://www.youtube.com/watch?v=Y70-3UuR_3Q as well as other videos of him demonstrating his method of beekeeping.

May his memory be eternal. **BC**

A newly published book, *Honey Bee Biology*, authored by UC Davis honey bee scientist

New Book

Kathy Keatley Garvey

Brian Johnson, a leading expert on the behavior, genomics and evolution of honey bees, was released on June 6th by Princeton University Press.

In the foreword, Thomas Seeley, the Horace White Professor in Biology in the Department of Neurobiology and Behavior at Cornell University, describes the 512-page book as “the most comprehensive and up-to-date general reference book on honey bee biology.”

The book is available for purchase on Amazon at <https://amzn.to/3JOeH1G> for both the hardcover book and Kindle access.

“Honey bees are marvelously charismatic organisms with a long history of interaction with humans,” said Johnson, who received his doctorate from Cornell, studying bee behavior biology with Seeley. “They are vital to agriculture and serve as a model system for many basic questions in biology.”

The book covers everything from molecular genetics, development and physiology to neurobiology, behavior and pollination biology. It places special attention on the important role of bees as pollinators in agricultural ecosystems, incorporating the latest findings on pesticides, parasites and pathogens. The book also sheds light on the possible causes of colony collapse disorder and the devastating honey bee losses underway today.

Bee scientist Brian Johnson of the Department of Entomology and Nematology, University of California, Davis, has authored a book titled *Honey Bee Biology*, published by Princeton University Press. It is billed as “the most comprehensive and up-to-date general reference book on honey bee biology.” (Photo by Kathy Keatley Garvey)



“*Honey Bee Biology* is the first up-to-date general reference of its kind published in decades,” Princeton University Press announced. “It is a must-have resource for social insect biologists, scientifically savvy beekeepers and any scientist interested in bees as a model system.”

The book is drawing praise from numerous honey bee authorities:

“A detailed and meticulously researched summary of honey bees, covering aspects of physiology, behavior, evolution and conservation. *Honey Bee Biology* is a triumph of integrative biology that is notable for its breadth and readability. Highly recommended for biologists and serious bee enthusiasts.”

—Elizabeth Tibbetts, University of Michigan

“A tour de force. *Honey Bee Biology* will be the go-to textbook for college courses and serves as a readable reference for beekeepers who want to learn more about the ‘under the hood’ mechanics of honey bee function, from genomics and neurobiology to foraging and pesticide detoxification. Johnson is to be applauded for assembling and updating centuries’ worth of honey bee science and presenting it as a work of art.”

—Marla Spivak, University of Minnesota

“*Honey Bee Biology* provides an engrossing and comprehensive overview of honey bee biology from a scientist who has dedicated his career to uncovering these mysteries. I thoroughly enjoyed this modern update of an amazing and continuing story.”

—James C. Nieh, University of California, San Diego

“With bees in the spotlight, Johnson has produced an important and timely



Cover of Brian Johnson's book.

book that covers diverse areas of honey bee biology, with incisive synthesis and comprehensive literature reviews.”

—Gene E. Robinson, University of Illinois, Urbana-Champaign

Johnson, an associate professor in the UC Davis Department of Entomology and Nematology, joined the faculty in 2011 after conducting postdoctoral research at UC San Diego and UC Berkeley. He focuses his research on the behavior, evolution, theoretical biology and genomics of the honey bee.

“To date, my research has used a combination of experiments, simulation models and computational biology to explore the evolution of advanced sociality, mechanisms of social organization and self-organization,” Johnson says on his profile page. “Chief amongst my results are that novel genes (orphans) are important for eusocial evolution and task allocation can work via a self-organizing coupled localization diffusion process.”

“Our lab studies the genetics, behavior and evolution of honey bees,” Johnson writes on his website. “We use experimental and theoretical approaches to all the questions we explore. Current work in our lab focuses on the evolution and genetic basis of social behavior using comparative and functional genomics, task allocation using behavioral and theoretical approaches and honey bee health using a combination of genetics, epidemiology and physiological approaches.” **BC**

NEXT MONTH

Region 1

- Sample – Treat – Sample
- Extract early honey
- Inspect colonies top to bottom
- Super, then super some more
- Raise more queens for splits
- Manage for swarming
- Re-queen

Region 2

- Pull honey supers
- Check mite levels
- Check for swarm cells
- Inspect for diseases and SHB
- Queen laying pattern
- Splits, splits, splits
- Mow beeyard

Region 3

- Ensure queen is laying
- Ventilation for hot, humid days
- Have grandkids paint boxes
- Sample and treat for *Varroa*
- Extract
- Prepare for dearth / feed

We've added a couple new categories to the honey report we send every month. You can see those new categories under the Honey Price Report.

For the blossoming and honey flow additions, for now, use it as a comparison. We collect the information about two months prior to the issue so see how you compare to our reporters! Eventually, after a year or two, we're hoping this can be a helpful prediction tool, especially for eager new beekeepers!

With the addition of the mite treatment category, we felt it was important to talk about what that means, why it's important and the correct way to use them.

Varroa mites and the *Varroa* Virus legacy will KILL your honey bees. In order to be a good manager of your honey bee colonies and reduce/stop losses from *Varroa*/Virus you, the beekeeper,

need to be on your 'game' and be a Beekeeper not a Bee-haver.

The Honey Bee Health Coalition (HBHC) has developed the key educational outreach tool for *Varroa* control titled, *Tools for Varroa Management, A Guide to Effective Varroa Sampling & Control*. The latest edition can be found at https://honeybeehealthcoalition.org/wp-content/uploads/2022/08/HBHC-Guide-Varroa-Mgmt_8thEd-081622.pdf. It is based on Federal and State registered, legally approved products which require beekeepers to ALWAYS follow label directions. This is all you really need to successfully manage for *Varroa* control in your colonies.

For more information about these products, look at the guide, or go to this month's Study Hall (next page) for the most need to know information!

Region 4

- Extract honey
- Mite check
- Make sure enough supers are on
- Basswood flow... smile
- Add supers
- Check queen pattern
- Make room, make room

Region 5

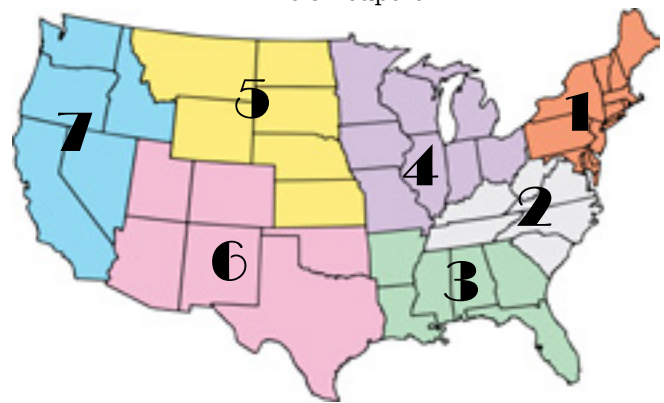
- Monitor for mites
- Provide water for colonies
- Re-queen if needed
- Put supers on
- Still watch for swarming
- Check brood pattern

Region 6

- Put on supers
- Manage for swarming
- Sample and treat for *Varroa*
- In dearth / leave some honey on
- Treat for *Varroa* after taking supers off
- Check for re-queening

Region 7

- Mite check, treat if over 3 per 100 bees
- Combine weak colonies
- Supplemental feeding if necessary
- Add honey supers
- Provide water dish
- Rotate brood boxes
- Pile on supers



Names of Mite Treatment for Each Collected Category in the Honey Report

Oxalic Acid
- Oxalic Acid
- Api-Bioxal

Oxalic Vapor
- Oxalic acid applied as a vapor

Oxalic Dribble
- Oxalic acid applied as a dribble
- Oxalic acid applied in an extended release format

Formic Acid
- Mite-Away Quick Strips
- Formic Pro
- Formic Acid 65%

Thymol
- Apiguard
- Thymovar

Amitraz
- Apivar

Apistan
- Apistan

Other/Non-Chemical
- Screen bottom board
- Brood removal
- Brood interruption
- Requeening with *varroa* resistance stock
- Beetle traps

None
- Treatment Free (not recommended)
- Not currently applying mite treatment due to honey flow, weather, temperature, etc.

JUNE - REGIONAL HONEY PRICE REPORT

REPORTING REGIONS											SUMMARY			History	
	1	2	3	4	5	6	7				Last Month	Last Year			
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS											Range	Avg.	\$/lb		
55 Gal. Drum, Light	3.06	2.20	3.44	2.95	2.69	2.75	3.50	2.00-4.25	3.05	3.05	2.82	3.96			
55 Gal. Drum, Ambr	2.96	2.83	3.00	2.90	-	3.55	3.43	2.00-5.45	3.07	3.07	2.79	3.77			
60# Light (retail)	230.83	293.48	259.80	222.29	235.00	224.02	310.00	120.00-390.00	244.60	4.08	220.53	211.41			
60# Amber (retail)	229.09	273.75	236.00	219.00	360.00	222.07	252.50	120.00-384.00	240.03	4.00	217.27	213.90			
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS															
1/2# 24/case	107.28	112.80	122.00	98.88	64.80	90.00	-	64.80-200.00	105.81	8.82	98.89	100.41			
1# 24/case	166.47	184.80	188.00	136.67	160.06	136.92	144.00	96.00-384.00	161.15	6.71	152.48	149.49			
2# 12/case	155.06	192.00	185.80	124.95	173.76	151.50	156.00	84.00-384.00	155.04	6.46	139.04	139.08			
12.oz. Plas. 24/cs	126.55	148.08	150.25	108.51	89.76	99.92	120.00	58.99-288.00	124.03	6.89	117.85	115.07			
5# 6/case	168.21	240.00	322.21	128.63	123.84	135.00	-	96.00-480.00	170.12	5.67	154.76	150.84			
Quarts 12/case	217.17	203.71	187.33	183.02	192.18	184.44	216.00	120.00-330.00	197.91	5.50	191.79	176.47			
Pints 12/case	119.25	124.80	110.67	105.68	99.00	135.00	-	60.00-180.00	114.29	6.35	115.93	101.54			
RETAIL SHELF PRICES															
1/2#	6.36	7.08	5.59	5.42	5.45	7.75	-	2.99-15.00	6.27	12.55	6.32	5.72			
12 oz. Plastic	8.13	8.07	8.01	7.23	7.25	6.89	6.38	2.99-12.00	7.76	10.34	7.50	6.82			
1# Glass/Plastic	10.39	11.79	10.86	8.21	10.53	8.83	8.00	5.79-20.00	10.23	10.23	10.33	9.06			
2# Glass/Plastic	17.72	20.30	18.81	15.91	21.55	16.70	17.50	7.89-32.00	18.01	9.01	17.45	15.72			
Pint	12.69	12.87	11.45	12.00	11.38	17.33	12.50	7.00-25.00	12.49	8.33	12.32	12.09			
Quart	22.79	23.13	21.23	21.14	19.32	20.60	23.10	10.00-42.00	21.90	7.30	21.79	20.95			
5# Glass/Plastic	35.77	39.60	46.58	31.99	29.43	36.50	-	16.99-80.00	36.51	7.30	35.08	32.19			
1# Cream	11.75	14.29	10.35	10.87	-	17.50	12.00	6.79-25.00	12.11	12.11	12.36	11.94			
1# Cut Comb	14.88	14.74	16.83	14.64	15.00	25.00	-	6.00-28.00	15.31	15.31	14.83	14.43			
Ross Round	13.00	11.43	-	11.50	-	-	16.00	8.00-20.00	12.49	16.65	11.89	15.37			
Wholesale Wax (Lt)	7.60	7.92	6.94	7.13	7.50	4.50	5.38	3.00-10.00	7.15	-	8.10	7.58			
Wholesale Wax (Dk)	5.42	7.98	6.38	6.88	-	3.50	-	3.00-10.00	6.43	-	6.95	6.73			
Pollination Fee/Col.	100.00	71.17	97.50	177.00	180.00	-	117.50	50.00-250.00	111.93	-	105.76	103.82			
Price of Nucs	192.50	189.17	160.63	177.77	203.33	210.00	178.33	87.50-257.50	183.97	-	-	-			
Price of Packages	162.62	143.75	126.67	149.52	149.67	145.00	-	110.00-210.00	151.57	-	-	-			

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 March/April 2023.

Average Honey Flow Time and Amount per Region

Region 1:

Timing of Flow: Early

Amount of Flow: Average

Region 2:

Timing of Flow: Early

Amount of Flow: Average

Region 3:

Timing of Flow: Normal

Amount of Flow: Average

Region 4:

Timing of Flow: Early

Amount of Flow: Equally light and average

Region 5:

Timing of Flow: Late

Amount of Flow: Light

Region 6:

Timing of Flow: Late

Amount of Flow: Light

Region 7:

Timing of Flow: Late

Amount of Flow: Average

Mite Treatment per Region

Region 1: Most used no mite treatment due to cold temperatures and Winter weather.

Region 2: Most used no mite treatment due to either cold Spring temperatures or the start of the honey flow.

Region 3: Most used no mite treatment due to the start of the honey flow.

Region 4: Most used no mite treatment due to cold temperatures and Winter weather.

Region 5: Most used a Formic product.

Region 6: Most used either a Formic product or no mite treatment due to the start of the honey flow.

Region 7: Most used an Amitraz product.

Top Blossoming Plants per Region

Region 1: Dandelion, Maple, Daffodil, Cherry

Region 2: Apple, Cherry, Red Bud, Dogwood, Henbit, Pear

Region 3: Blackberry, Poplar, Apple, Dandelion, Henbit, Privet, Tulip, Wildflowers

Region 4: Maple, Dandelion, Crocus, Fruit Trees, Red Bud, Trees

Region 5: Dandelion, Elm, Maple

Region 6: Apple, Dandelion, Wildflowers, Willow

Region 7: Daffodil, Dandelion, Maple

Overall Top Blossoming Plants

Dandelion, Maple, Apple, Henbit, Cherry, Red Bud, Blackberry, Crocus, Daffodil, Dogwood, Peach, Poplar, Tulip



STUDY HALL

From the Editor, Jerry Hayes

Lots of colony losses once again in 2023. There are three words I want you to remember: *Varroa*, *Varroa*, *Varroa*. And disappointingly, the majority of the beekeeping industry is still not using the Honey Bee Health Coalition vetted, accurate and usable *Tools for Varroa Management Guide*.

Varroa mites and the *Varroa* Virus legacy will KILL your honey bees.

In order to be a good manager of your honey bee colonies and reduce/stop losses from *Varroa*/Virus you, the beekeeper, need to be on your 'game' and be a Beekeeper not a Bee-haver.

The Honey Bee Health Coalition (HBHC) has developed the key educational outreach tool for *Varroa* control titled, *Tools for Varroa Management, A Guide to Effective Varroa Sampling & Control*. The latest edition can be found at https://honeybee-healthcoalition.org/wp-content/uploads/2022/08/HBHC-Guide_Varroa-Mgmt_8thEd-081622.pdf. It is based on Federal and State registered, legally approved products which require beekeepers to

ALWAYS following label directions. This is all you really need to successfully manage for *Varroa* control in your colonies. To get you started, we will share some overview of what you need to think about and actually do.

In the *Tools Guide* each product will have the following individual points in a table: Name, Active Ingredient, Formulation, Route of Exposure, Treatment Time/Use Frequency, Time of Year, Registrant-reported Effectiveness, Conditions for Use, Restrictions, Advantages, Disadvantages, Considerations and a link to a Use Video.

Here we are only going to share Name, Active Ingredient and Conditions for Use, to get you started.

INTEGRATED PEST MANAGEMENT (IPM) is a set of proactive, control methods that offer beekeepers the best "whole systems approach" to controlling *varroa*. See *Tools Guide*, pages 6-12.

ESSENTIAL OILS

Tools Guide pages 19-20

Name	Apiguard and Thymovar
Active Ingredient	Thymol
Conditions of Use	Temperature range restrictions: Apiguard – above 59°F and below 105°F (15°C to 40°C), Thymovar: above 59°F and below 85°F (15°C to 30°C).

Name	ApiLife Var
Active Ingredients	Thymol (74.09%), Oil of Eucalyptus (16%), Menthol (3.73%) = camphor (essential oil)
Conditions of Use	Divide wafer into four pieces and place each piece in a corner of the hive on the top bars. Use between 65°F and 95°F (18°C to 35°C). Ineffective below 45°F (8°C).

NON-CHEMICAL / CULTURAL CONTROLS

Tools Guide pages 26-30

Name	Screen Bottom Board
Conditions for Use	Replace hive bottom; leave space below for trash ('garbage pit').

Name	Sanitation (bee biosecurity) comb management
Conditions for Use	Possible negative effect on bee population if five or more combs are moved at one time.

Name	Drone Brood Removal (Drone Trapping <i>Varroa</i>)
Conditions of Use	Only applicable during population increase and peak population when colonies are actively rearing drones.

Name	Brood Interruption
Conditions of Use	Need a queen or queen cell for each split or division created.

Name	Requeening (Ideally with <i>varroa</i> resistant stock)
Conditions of Use	Works best with proper queen introduction methods.

SYNTHETIC CHEMICALS

Tools Guide pages 16-18

Name Apivar
Active Ingredient Amitraz (formadine acaricide/insecticide)
Conditions for Use Place one Apivar strip per five frames of bees. Place strips near cluster or if brood is present, in the center of the brood nest. Only use Apivar in brood boxes where honey for human consumption is NOT being produced.

Name Apistan
Active Ingredient Tau-fluvalinate (pyrethroid ester acaricide/insecticide)
Conditions for Use Temperatures must be above 50°F (10°C). Do not use during nectar flow.

Name Checkmite
Active Ingredient Coumaphos (organothiophosphate acaricide/insecticide)
Conditions for Use Wait two weeks after use before supering.

ACIDS

Tools Guide pages 21-25


Name Mite-Away Quick Strips
Active Ingredient Formic Acid (organic acid)
Conditions of Use Full dose (two strips for seven days) or single strip (seven-day interval then single new strip for an additional seven days) per single or double brood chamber of standard Langstroth equipment.

Name Formic Pro
Active Ingredient Formic acid (organic acid)
Conditions of Use Both treatment options can be applied per single or double brood chamber of standard Langstroth equipment or equivalent hive or equivalent hive with a cluster covering a minimum of six frames. There should be a strip touching each top bar containing brood. Use when outside day temperature is 50°F to 85°F (10°C to 29.5°C)

Name 65% formic acid
Active Ingredient Formic acid 65%
Conditions of Use Use when outside temperatures are between 50°F to 86°F (10°C to 30°C) and leave hive entrances fully open

Name Oxalic Acid / Api-Bioxal
Active Ingredient Oxalic acid dihydrate (organic acid)
Conditions of Use Mix 35 grams (approximately 2.3 tablespoons) of oxalic acid into one liter of 1:1 sugar syrup. With a syringe trickle five milliliters of this solution directly onto the bee in each occupied bee space in each brood box; Maximum 50ml per colony of oxalic acid in sugar syrup; fumigation of two grams per hive in Canada and one gram per hive box in the U.S.; follow label and vaporizer directions.

Name HopGuard 3
Active Ingredient Potassium salt (16%) of hops beta acids (organic acid)
Conditions of Use Corrosive—use appropriate clothing and eye protection. Might stain clothing and gloves. **BC**



Check out our FREE Beekeeping Resources:

VARROA MANAGEMENT GUIDE

A practical guide and step-by-step demonstration videos featuring safe, effective methods to detect, monitor, and control Varroa mite infestations.

HONEYBEEHEALTHCOALITION.ORG/VARROA

BMPs FOR BEE HEALTH





A guide for beekeepers featuring Best Management Practices on safety, pesticide exposure, bee nutrition, hive maintenance, treatment of pests and disease, and more.

HONEYBEEHEALTHCOALITION.ORG/HIVEHEALTHBMPs

VARROA MANAGEMENT TOOL

An interactive decision tree that provides beekeepers with Varroa management and treatment options based on their specific circumstances and hive conditions.

HONEYBEEHEALTHCOALITION.ORG/VARROATOOL



FOUND IN TRANSLATION

Teaching Bees New Tricks

Jay Evans, USDA Beltsville Bee Lab



Listen along here!



Bees have innate (think ‘ro-bo-bee’) and learned (‘show me, sister’) behaviors. Recent work with bees has explored the boundaries of these two forms. While it is dangerous to put our own biases on animal behaviors, the complex behaviors measured seem to include ‘play’, ‘puzzling’ and ‘dancing’. Oh yeah, and they can count as well, even showing an awareness of ‘zero’ things, but that was yesteryear’s news from Scarlett Howard and colleagues (*Numerical ordering of zero in honey bees*, 2018, *Science*, DOI: [10.1126/science.aar4975](https://doi.org/10.1126/science.aar4975)).

What is fascinating about work coming out just this year is that not only do bees show complex behaviors, but they seem to get better at those behaviors by watching their nestmates. Bee dances will be familiar to most beekeepers and students of animal behavior. Successful foragers often tell their sisters where the good stuff is after finishing their foraging flights. Specifically, foragers signal both direction and distance to flower sources using the waggle dance. True to its name, and shown graphically to the right, this dance involves a bee streaking across the comb and shaking its abdomen for the edification of sister foragers. The angle of this dance on a vertical patch of comb signals the direction of a good food source relative to the current position of the sun relative to the hive. The length of each dance streak provides an estimate of the distance to flower patches (or to sugar baits planted by curious naturalists). By repeatedly dancing, they drum up interest and lead future foragers to a better understanding of how far they might have to fly to get these rewards. The discovery of this dance language is decades old, and justified a share of the Nobel

Prize in Physiology or Medicine in 1973 for Austrian bee researcher Karl von Frisch. The recent work ups the game by showing that much of this behavior is learned by watching older, more precise, dancers.

Shihao Dong and colleagues set out to study *Social signal learning of the waggle dance in honey bees* (2023, *Science*, DOI: [10.1126/science.ade1702](https://doi.org/10.1126/science.ade1702)). Specifically, they judged the dancing skills of self-starters relative to those of bees that were mentored by older, experienced, dancers. To produce a swarm of naïve dancers, they established colonies comprised solely of like-aged bees, so that all bees reached foraging age together and were therefore less likely to benefit from matching the skills of a senior dancer. Bees from these ‘Animal Farm’ colonies were compared to marked bees of the same age which had grown up gazing at the dances of experienced dancers in colonies with a typical age profile. Naïve bees consistently over-stated

the distance they had flown to flowers, in effect telling nestmates to fly right past suitable food sources. They also showed more ‘Dance Disorder’ than both older bees and bees that had been exposed to older dancers. Dance accuracy for all dancers improved over time, it just improved much more quickly when bees had older mentors to watch. So what is the lesson here for beekeepers? No, you can’t force your teenager to watch you dance and expect them to get it, but you CAN see how bees in colonies with an abnormal age structure, thanks to rapid premature death of foragers, might continue to slide by spending unnecessary time looking for food. Long-lived bees are those free of chemical stress, raised with adequate protein nutrition, and arguably bees that have avoided mites and other disease. When you protect your bees from these stresses, just think of how their dance lives will improve.

In a study that, for me, deserved two SMH’s, bees were trained to take on puzzle behaviors, or behaviors that simply don’t present themselves to bees when scientists aren’t around. Working with bumble bees, Alice Bridges and colleagues first taught their bees to open small food boxes by pushing on colored (red or blue) tabs. This a behavior I am not sure I could teach my dog, but she is a bit slow. They then checked to see if bees could follow the lead of a nestmate who had already figured out the box trick. While self-learners emerged in the control colonies sometimes got



the knack for opening boxes, bees who observed a nestmate open a box were more likely to successfully mimic that behavior. Over time, bees with a teacher opened more boxes, faster, and were rewarded with more sugar treats. Honey bees and some other bee species are known to spontaneously 'rob' flowers by chewing directly into nectar pools when those pools are too deep in the flower for their tongues to reach. It would be neat to see if such nectar robbing is also a learned trait, passed on by adventurous foragers who had to learn the trait the hard way. If so, can such teachers target their lessons to their nestmate sisters?

All of these studies push the known boundaries for bee awareness and behavior, showing all the more how lucky we are to have formed bonds with honey bees and other insects. Clever behavioral scientists will no doubt continue to discover profound, and maybe a bit unsettling, awareness by insects. This awareness is likely to be most evident in the highly social honey bees and bumble bees. What's next, spelling bees? Stay tuned. In the meantime, get out, find a friend and improve your dancing. **BC**



B & B Honey Farm

Your Source for One
or a Truck Load!

Beekkeeping Equipment
Woodenware
Glass And Plastic Containers
Candlemaking Equipment
Craft Wax
Packaged Bees, Nucs & Queens

Serving the beekkeeping industry for 45 years!



Order
507.896.3955
800.342.4811

BBHoney@acegroup.cc
www.bbhoneymfarms.com
5917 Hop Hollow Road
Houston, MN 55943
Free Catalog on Request



BEE MORE.

LICENSE LAND WITH RAYONIER TODAY!

With over 2.2 million acres of land across the United States, let us help you find the perfect location for you and your apiaries.

States to choose from include, FL, GA, SC, AL, MS, LA, TX, OK, OR, and WA.

RAYONIERBEEKEEPING.COM

Visit our website to receive more information on locating available land and how to get started today.




FOR ALL YOUR PROCESSING NEEDS

MAXANT
HONEY PROCESSING EQUIPMENT

AMERICAN MADE IN OUR NEW FACTORY

978-772-BEES
www.MaxantIndustries.com

3100 EXTRACTOR
MADE IN THE USA

HELPING BEEKEEPERS

John Miller

“The best-known insect on earth.”

—Thomas D. Seeley.

“Arguably the most beneficial insect on earth.”

—Hannah Nordhaus.

This marvelous insect with whom we are in love never ceases to amaze us; never ceases to engage us. It's how we engage with bees; where the art of beekeeping is often lost with the business of beekeeping.

Lately, I've been tagging along with a professional beekeeper who takes care of other people's hives. Each month, Sandy Honigsberg keeps a route with both bee-havers, and beekeepers.

In some cases, the bee-havers are not capable of keeping bees, but want to have bees on their property. These people sometimes witness, but do not participate in hive management. In some cases, the bee-havers are absent for long periods of time. Hives will perish without husbandry provided by Ms. Honigsberg.

In some cases, aspiring beekeepers do participate – and this participation is preparation for becoming a beekeeper. One-on-one mentoring, beekeeping classes, hive consultations, *Varroa* management, these and other services are available to folks lucky enough to have a professional beekeeper – providing professional services to keep their hive(s) alive. With each visit, hive conditions are noted. The worksheet for each hive contains a lot of information. This is micro beekeeping, as opposed to macro beekeeping. There is a huge difference and opportunity between micro and macro beekeeping.

And it no longer surprises me that a gulf exists between earnest, professional micro-beekeepers and bloodless, ‘industrial beekeepers’, a term coined in 2006 by Hannah Nordhaus in a piece for the *High Country News*. The meticulous record-keeping of individual hives by Ms. Honigsberg is an intimate observation of a hive's condition. Valuable information resides therein. For example, in a recent visit to a Grass Valley, CA hobbyist beeyard, four beehives were worked. One of those hives is pitching zero *Varroa destructor* mites per alcohol/soap wash; has been for nearly

a year. Is this hive, this queen, this hygienic behavior a huge opportunity to advance *Varroa* resistance?

Hobbyists practicing micro beekeeping, or hiring professionals to micro-manage their hives may be a great hive-health resource beekeepers large and small could tap. It is a resource; undiscovered, undeveloped. How to develop this opportunity? Each year, the Bee Informed Project conducts a hive-loss survey. Participants have the opportunity to share their experiences. The Bee Informed Partnership, as envisioned by Dennis van Englesdorp over a decade ago, was great original thinking. Could we enhance that great idea? If you participate in the annual Loss and Management Survey, consider for a moment how much more additional, micro detail professional and hobbyist beekeepers could provide. What if these hives now pitching zero *Varroa*, now undiscovered, made it into a breeding program? What if a hundred of these outlier queens became contributors to North America hive health? We don't know where these mutt queens came from; the other day I saw a BLUE queen. That queen is four years old. Paint does not lie.

What if the Loss and Management Survey became an annual success story. I know good news does not sell – we focus on things lost, the house burned down, the earthquake savaged province, the hives lost – but what if these professional micro beekeepers, these passionate hobbyists – this undeveloped resource began to influence North American hive health?

I believe Ms. Honigsberg is one of perhaps a hundred, maybe several hundred professional beekeepers providing services to bee-havers and hobbyists who themselves are wise enough to know they cannot yet, and maybe won't, become proficient hobbyist beekeepers. Probably in every region of America, there are beekeepers – who really want to strengthen the beekeeping community by mentoring, consulting, teaching and ultimately empowering hobbyists to keep their hives alive.

How does our beekeeping community link these professional mi-

cro-beekeepers? How does, for example, The Bee Informed Partnership find these professionals?

I believe that no commercial American beekeeping operation of greater than 5,000 hives is doing micro beekeeping at a micro beekeeping level. Some outfits are practicing a sort of Darwinian beekeeping, funneling down hundreds of hives to a couple dozen hives in an effort to rear better queens. It's good, but it isn't micro-beekeeping. I'm not saying these big commercial outfits are wrong, or bad beekeepers – not at all. Commercial beekeepers are aligned with commercial poultry operations, cattle operations, dairy operations, swine operations, fish operations. Husbandry occurs in order to contain pathogens, parasites, disease – to enable our flocks, our herds and our hives to thrive. It's how commercial scale agriculture obtains the beneficial pollinators, at scale, to pollinate millions of acres of almonds, apple orchards, cranberry bogs, vine crops, it's how ag gets done to feed a hungry planet.

What I suggest is we develop the professional micro beekeeper, who as part of their business model, accumulates valuable data on valuable hives hiding in plain sight. **BC**



Superior Bee

2" thick wall with R8 insulation

Polystyrene Bee Hives
in stock and
Made in the USA

(844)-260-2015
www.superiorbee.com



HiveTech SOLUTIONS

- cold room for overwintering
- hot room for extraction
- sensors and alerts for safety
- lease or buy

The Ultimate Beekeeping Barn

Ask the Experts! info@hivetechsolutions.com
www.hivetechsolutions.com




White Goatskin Beekeepers Gloves

BEEGT Ventilated (XXSmall to XXLLarge)
3 pair @ \$11.75 per pair

BEENV Non-ventilated (Small to XXLarge)
3 pair @ \$12.75 per pair

Freight paid to a single destination in the continental USA. We gladly accept Discover, Visa and Mastercard.

BUCKO **Bucko Gloves, Inc.**
1-800-966-1408
www.buckogloves.com

GLOVES

Promote pollinator landscape




ERNST SEEDS (800)873-3321
sales@ernstseed.com

<https://ernstseed.co/adBC>



Complete Selection of Beekeeping Supplies
Live Bees, Equipment and More!

- Bee Packages (pickup only)
- 5 Frame Nucs (pickup only)
- Mated / Marked Queen races:
 Italian, Carniolan, Russian, Saskatraz
- Local Meyer Bees Stock Available
- Frames & Foundations Including Wax
- Wood & Insulated Hive Box Parts
- Large Selection of Tools
- Protective Suits & Gear
- Feed Items & Supplements
- Treatments for All Seasons
- Queen Rearing Supplies
- Honey Harvesting Items
- Extractors - Manual & Motorized
- Glass & Plastic Bottling Supplies
- Winterizing Equipment
- Honey, Candy & Gifts
- Books & Classes

MEYER BEES

2021 Holt Road • Minooka IL 60447
www.meyerbees.com • 815-521-9116



BASSWOOD
 Split Section Boxes
 for Comb Honey

**“Kelly”
 Size & Style**
for competitions
as well as general
comb production

*shipping to USA locations or visit
 our showroom just 35 miles SW of Chicago*



**American Honey
Producers Association**

**Annual Conference
& Trade Show**

San Diego



December 4 - 7, 2023

Monday - Thursday

Marriott Mission Valley Hotel

CERTAN IS BACK

B402 / Certan
is the most advanced,
effective and economical
product for the protection
of your combs from
damage by wax moth



Proudly made
in the USA



Concentrated
solution of
*Bacillus
thuringiensis*



Completely harmless
to humans and
honey bees



Environmentally
friendly

B402[®]



Efficacy of up to
100% against wax
moth larvae



Leaves no
residues in wax
or honey



Only one application
needed for complete
protection



beehealth
NORTH AMERICA

Vita Bee Health is a trading name of Vita (Europe) Ltd.





A Closer LOOK

Minor Pests of Bees Clarence Collison

Bee Louse – The bee louse, *Braula coeca* Nitzsch is a wingless fly that lives as a commensalist (relationship between two living organisms in which one organism benefits from the other without harming it) in western honey bee, *Apis mellifera* Linnaeus, colonies. *Braula* is presumed to be harmless to its host, though this point is debatable, and some countries recommend *Braula* control. *Braula* has an extensive global distribution, being documented in Africa, Asia, Europe, Australia (Tasmania), North America and South America (Smith and Caron, 1985).

Historically, *Braula* has repeatedly been introduced into the United States on importations of queen bees from foreign countries, and in many cases no effort has been made by the recipients of these queens to remove the parasites before the introduction of the queens. Usually, the parasites disappeared promptly. However, infestations were located in Carroll County, Maryland and also reported to occur in a small area in south-central Pennsylvania (Phillips, 1925).

Braula adults often are found on the heads of honey bee workers, drones and especially queens. While on the head of its host bee, *Braula* will feed on food from the mouth of its host as the host is fed by another bee or is feeding another bee. There is some evidence that adult

Braula can induce regurgitation from bees by stroking the upper edge of a bee's labrum until the bee extends its tongue. Then the *Braula* feeds on food or other secretions that the bee offers (Ellis et al., 2016).

Braula eggs are laid singly under the cappings of honey cells and the larvae excavate branched tunnels, approximately 0.75 mm in diameter, in and beneath the cappings. The tunnels are visible from the surface and spoil the appearance of comb honey (Eckert and Shaw, 1960). Female *Braula* can oviposit many places in the hive (empty cells, brood cappings, debris on the floor) but only eggs oviposited on honey cappings will hatch. Egg incubation periods range from two to 7.4 days, depending on the season. It is believed that *Braula* larvae feed on honey and pollen residues encountered while tunneling under the cell cappings. Larvae pupate within the tunnels, then emerge as adults (Ellis et al., 2016).

The bee louse is a highly specialized flattened, wingless fly that spends its entire adult life on adult honey bees. It feeds by stealing food directly from bees during social feeding (trophallaxis). The *Braula* fly has a preference to infest the honey bee queen. The queen is the most attended individual in the colony but despite this, the adult flies remain undetected by the workers. This is due to *Braula* possessing a cuticular hydrocarbon profile that mirrors that of their host honey bee colony. This chemical camouflage is most likely through odor acquisition from the honey bee host since even small colony-specific differences in the alkene isomer patterns present in the honey bees were also detected in the *Braula*'s profile. This finding further supports the idea that the honey bee recognition cues are contained within the alkene part of their hydrocarbon profile and *Braula* exploit this to remain undetected within an otherwise hostile colony (Martin and Bayfield, 2014).

***Acarapis woodi* (Rennie)** – The honey bee tracheal mite was an extreme problem in North America in the mid- to late 80's. Today, the honey bee tracheal mite is rarely found in beekeeping operations, so is considered to be a minor pest. "*Acarapis woodi* is restricted to the prothoracic tracheae of the honey bee hosts" (Delfinado-Baker and Baker, 1982).

A laboratory bioassay was used to study phenotypic differences in susceptibility of honey bees, to tracheal mites, *Acarapis woodi* Rennie. Significantly different infestation frequencies were found in bees from 23 colonies containing queens that were instrumentally inseminated with single drones. Queens and drones originated from a closed population composed of commercial stock from various areas of the United States. Mites were randomly distributed with respect to right and left prothoracic tracheae. Tracheae containing mites were no more or less attractive to migrating mites than non-infested tracheae. The same quantity of progeny per female was produced in tracheae containing one to three mites. Female mites apparently do not migrate a second time after egg laying begins. The degree of phenotypic variation suggests that selection of honey bees for tracheal mite resistance is feasible (Gary and Page, 1987).

The susceptibility of worker honey bees, as a function of age, to infestation by tracheal mites was investigated. Bees <24 hours old were infested most frequently, and the frequency of infestation declined precipitously thereafter. Bees more than four days old

were rarely infested in colonies during active brood rearing. Only two of 255 bees more than eight days old, and one of 246 bees >16 days old, became infested. Most of the eggs found in bees more than three weeks old were apparently produced by the progeny of the original infestation (Gary et al., 1989).

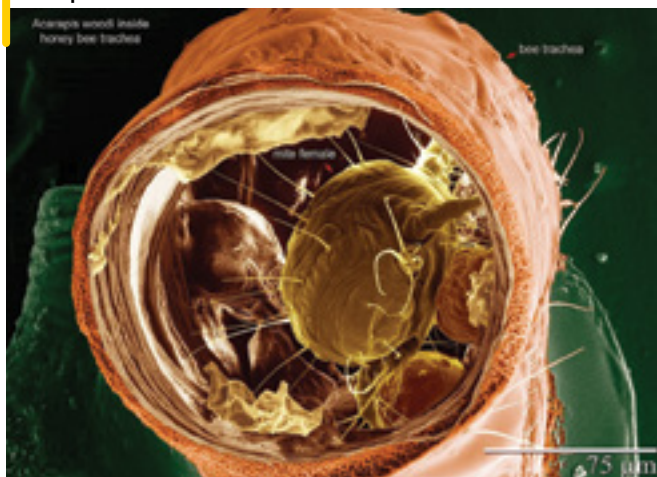
An assessment was made of tracheal mite susceptibility in honey bees pupated at a low temperature. Using a laboratory bioassay, an experiment was conducted to compare the performance of newly-emerged (callow) bees raised at 30°C (86°F) with those raised at the more normal brood temperature of 34°C (93.2°F). The reduced temperature caused a delay of over five days in the emergence of the bees from the brood cells. The callow bees raised at 30°C had over twice the mite prevalence level. The fecundity of the mites in the tracheae was similar for both temperature conditions. Increased susceptibility to tracheal mites resulting from reduced brood temperature may help to explain the mortality, in the temperature-stressed late Winter/early Spring period, of colonies with a moderate mite infestation in Autumn (McMullan and Brown, 2005).

Colonies of honey bees infested with *Acarapis woodi* (Rennie) were studied during the four Winters of 1985-1989 in New York state. Samples of bees were obtained from colonies on several dates from Fall to Spring to determine mite prevalence and mite load scores. Mite infestations were much heavier than those reported elsewhere in North America. Over the two Winters for which adequate data were available (1987-1988 and 1988-1989), colonies with heavy mite infestations had significantly greater mortality. Spring brood areas were negatively correlated with mite prevalence and mite load scores. However, the strength of these correlations varied depending on the month and the year. These results indicate that tracheal mites have a substantial negative effect on colonies of honey bees in New York (Otis and Scott-Dupree, 1992).

Acarapis dorsalis* and *Acarapis externus –

Both mite species are external parasites found on the western honey bee (*Apis mellifera*). "*Acarapis dorsalis* Morgenthaler is found living in the dorsal groove of the scutellum on the thorax. *Acarapis externus* Morgenthaler is found on the ventral side of the neck and in the posterior tentorial pits" (Delfinado-Baker and Baker, 1982). These parasites have been in the United States since the 1930s. In the late 1980s to early 2000s, these two *Acarapis*

Acarapis woodi



Braula coeca

species were frequently detected with *A. externus* being found at higher levels than *A. dorsalis*. The abundance of *A. externus* over *A. dorsalis* may be due to the lack of host age preference by *A. externus* as their prevalence and intensity remained high on bees up to 35 days old. In contrast, infestation rate and mite load of *A. dorsalis* decreased as bees became older. By examining 16,515 worker bees from 2007 to 2019, *A. dorsalis* was detected yearly while *A. externus* infestation was sporadic. The higher frequency of detecting *A. dorsalis* over *A. externus* may be due to their differences in colonization ability. *A. dorsalis* was faster in establishing their population in mite-free colonies than *A. externus* and was also successful in invading *A. externus*-infested colonies. The introduction of 50 *A. dorsalis* in mite-free colonies was sufficient to found a population, while 500 *A. externus* may be too small to establish a population. Variation in responses to parasitic mites by different honey bee stocks also influenced *Acarapis* populations. *A. dorsalis* was most prevalent in the Hastings stock while the levels of *A. externus* were higher on the ARS-Y-C-1, Hastings x ARS-Y-C-1 hybrid and Louisiana stocks. The Russian honey bees also had higher levels of *A. dorsalis* than the Italian honey bees. However, both stocks' responses to *A. externus* were inconsistent. Nonetheless, both ARS-Y-C-1 and Russian honey bees are known to be resistant to another *Acarapis* species, *A. woodi*, which is known to be a more serious parasite of honey bees than these two external *Acarapis*. The potential role of external *Acarapis* in virus transmission especially in *Varroa*-infested colonies needs to be studied (De Guzman et al., 2019).

The biology of the two external *Acarapis* mites of honey bees, *Acarapis dorsalis* and *Acarapis externus* was studied. It was observed that both *Acarapis* species have a similar developmental period (eight to nine days) with males emerging earlier than females. Mite load and infestation rate of *A. dorsalis* decreased as bees become older. *A. externus* remained high on bees up to 35 days old. This observation may indicate that *A. dorsalis* prefers younger bees while *A. externus* seems to maintain its population on older bees. In nucleus colonies deliberately exposed to known populations of both external *Acarapis*

species, infestation by *A. dorsalis* appears to be more rapid than *A. externus*. The introduction of 500 *A. dorsalis* established the highest rate of infestation (17.10%) in a relatively short period of time, i.e., nine to 12 weeks. The highest infestations of *A. dorsalis* were during the Spring months (March to June) and in mid-late Summer (August and September) with the lowest infestation rates in January and July. For *A. externus*, mite population was highest in the Fall (October and November). The lowest infestation was recorded in July. The average female:male ratios observed were 1.9:1 for *A. dorsalis* and 2.07:1 for *A. externus*. No relationship between nectar flow and percent mite infestation was established (Ibay, 1989).

Ants – Ants are ubiquitous within apiaries and are common pests of managed honey bees. Payne et al. (2020) conducted a study in Texas to: 1) survey ants found within or near managed honey bee colonies, 2) document what interactions are occurring between ant pests and managed honey bees and 3) determine if any of six commonly occurring honey bee-associated viruses were present in ants collected from within or far from apiaries. Ants belonging to 14 genera were observed interacting with managed colonies in multiple ways, most commonly by robbing sugar resources from within hives. At least one virus was detected in 89% of the ant samples collected from apiary sites and in 15% of ant samples collected at non-apiary sites. They found that none of these ant samples tested positive for the replication of Deformed wing virus, Black queen cell virus or Israeli acute paralysis virus, however. Future studies looking at possible virus transmission between ants and bees could determine whether ants can be considered mechanical vectors of honey bee-associated viruses, making them a potential threat to pollinator health.

Honey bee-associated viruses are found in various arthropod species including invasive ants. The globally invasive Argentine ant (*Linepithema humile*), which can reach high densities and infest beehives, is associated with pathogen dynamics in honey bees was examined. Viral loads of deformed wing virus (DWV), which has been linked to millions of beehive deaths around the globe, and black queen cell virus significantly increased in bees when invasive ants were present. Microsporidian and trypanosomatid infections, which are more bee-specific, were not affected by ant invasion. The bee virome in Autumn revealed that DWV was the predominant virus with the highest infection levels and that no ant-associated viruses were infecting bees. Viral spillback from ants could increase infections in bees. In addition, ant attacks could pose a significant stressor to bee colonies that may affect virus susceptibility. These viral dynamics are a hidden effect of ant pests, which could have a significant impact on disease emergence in this economically important pollinator (Dobelmann et al., 2023).

Emerging infectious diseases are often the products of host shifts, where a pathogen jumps from its original host to a novel species. Viruses in particular cross species barriers frequently. Acute bee paralysis virus (ABPV) and deformed wing virus (DWV) are viruses described in honey bees (*Apis mellifera*) with broad host ranges. Ants scavenging on dead honey bees may get infected with these viruses via foodborne transmission. However, the role of black garden ants, *Lasius niger* and *Lasius platythorax*, as alternative hosts of ABPV and DWV is

not known and potential impacts of these viruses have not been addressed yet. In a laboratory feeding experiment, we show that *L. niger* can carry DWV and ABPV. However, negative-sense strand RNA, a token of virus replication, was only detected for ABPV. Therefore, additional *L. niger* colonies were tested for clinical symptoms of ABPV infections. Symptoms were detected at colony (fewer emerging workers) and individual levels (impaired locomotion and movement speed). In a field survey, all *L. platythorax* samples carried ABPV, DWV-A and -B, as well as the negative-sense strand RNA of ABPV. These results show that *L. niger* and *L. platythorax* are alternative hosts of ABPV, possibly acting as a biological vector of ABPV and as a mechanical one for DWV. This is the first study showing the impact of honey bee viruses on ants. The common virus infections of ants in the field support possible negative consequences for ecosystem functioning due to host shifts (Schläppi et al., 2020).

The free-foraging honey bee visitation rate and visitation duration to aloe flowers with and without Argentine ants (*Linepithema humile* (Mayr)) in a drought-stressed environment study found that bees actively avoided foraging on the ant-occupied flowers. To determine the mechanisms of avoidance, their subsequent experiments assessed visitation in the absence of ants and compared visitation in the absence of ants and compared aloe flowers treated with ant pheromone to unmanipulated flowers lacking ant pheromone. Bees approached all flowers equally, but accepted flowers without ants at a higher rate than flowers with ants. Visitation duration also increased twofold on ant-excluded flowers, which suggest that Argentine ants may limit resource acquisition by bees. Honey bees similarly avoided flowers with Argentine ant pheromone and preferentially visited unmanipulated flowers at threefold higher rate. This study demonstrates that honey bees avoid foraging on floral-resources with invasive Argentine ants and that bees use ant odors to avoid ant-occupied flowers (Sidhu and Rankin, 2016). **BC**

References

- De Guzman, L.I., T.E. Rinderer, D.M. Burgett, and A.M. Frake 2019. Understanding the trends in prevalence and abundance of *Acarapis dorsalis* and *Acarapis externus* in *Apis mellifera* colonies. Trends Entomol. 15: 85-98.
- Delfinado-Baker, M. and E.W. Baker 1982. Notes on honey bee mites of the genus *Acarapis* Hirst (Acari: Tarsonemidae). Int. J. Acarol. 8: 211-226.
- Dobelmann, J., A. Felden and P.J. Lester 2023. An invasive ant increases deformed wing virus loads in honey bees. Biol. Lett. 19: 20220416
- Eckert, J.E. and F.R. Shaw 1960. Beekeeping. Macmillan Co., New York, 536 pp.
- Ellis, J.D., A.N. Mortensen and C.M. Zettle Nalen 2016. Bee louse, bee fly, Braulid, *Braula coeca* Nitzsch (Insecta: Diptera: Braulidae). EENY472.
- Gary, N.E. and R.E. Page Jr. 1987. Phenotypic variation in susceptibility of honey bees, *Apis mellifera*, to infestation by tracheal mites, *Acarapis woodi*. Exp. Appl. Acarol. 3: 291-305.
- Gary, N.E., R.E. Page Jr. and K. Lorenzen 1989. Effect of age of worker honey bees (*Apis mellifera*) on tracheal mite (*Acarapis woodi*) infestation. Exp. Appl. Acarol. 7: 153-160.
- Ibay, L.I. 1989. Biology of the two external *Acarapis* species of honey bees: *Acarapis dorsalis* Morgenthaler and *Acarapis*

externus Morgenthaler (Acari: Tarsonemidae). Master Of Science Thesis, Oregon State University, 48 pp.

Martin, S.J. and J. Bayfield 2014. Is the bee louse, *Braula coeca* (Diptera) using chemical camouflage to survive within honey bee colonies? *Chemoecology* 24: 165-169.

McMullan, J.B. and M.J.F. Brown 2005. Brood pupation temperature affects the susceptibility of honey bees (*Apis mellifera*) to infestation by tracheal mites (*Acarapis woodi*). *Apidologie* 36: 97-105.

Otis, G.W. and C.D. Scott-Dupree 1992. Effects of *Acarapis woodi* on overwintered colonies of honey bees (Hymenoptera: Apidae) in New York. *J. Econ. Entomol.* 85: 40-46.

Payne, A.N., T.F. Shepherd and J. Rangel 2020. The detection of honey bee (*Apis mellifera*)-associated viruses in ants. *Sci. Rep.* 10:2923.

Phillips, E.F. 1925. The bee-louse, *Braula coeca*, in the United States. *USDA Circ.* 334.

Schläppi, D., N. Chejanovsky, O. Yañez and P. Neumann 2020. Foodborne transmission and clinical symptoms of honey bee viruses in ants *Lasius* spp. *Viruses* 12: 321.

Sidhu, C.S. and E.E.W. Rankin 2016. Honey bees avoiding ant harassment at flowers using scent cues. *Environ. Entomol.* 45: 420-426.

Smith Jr. I.B. and D.M. Caron 1985. Distribution of the bee louse, *Braula coeca*, in Maryland and worldwide. *Am. Bee J.* 125: 294-296.

Clarence Collison is an Emeritus Professor of Entomology and Department Head Emeritus of Entomology and Plant Pathology at Mississippi State University, Mississippi State, MS.



HUMBLE ABODES
 manufacturers of quality apiary woodenware
 636 Coopers Mills Road Windsor, Maine 04363
 (207) 549-5501 | 1(877) 4-BEE-BOX

- frames
- hive bodies & supers
- bottom boards
- outer covers
- inner covers
- hive stands



1-877-4-BEE-BOX • 1-877-423-3269
 humbleabodesmaine.com




DESIGNS **Feed Me!**
 SIMPLY BETTER BEEKEEPING PRODUCTS



DIRECT FEEDER **UNIVERSAL FEEDER/WATERER**

Available at Dealers Nationwide www.beesmartdesigns.com
 Made in USA with Recycled Materials • 1-800-600-7446



**KONA
 QUEEN
 HAWAII**

808-328-9016






CALL NOW FOR KONA ITALIAN & CARNIOLAN QUEEN BEES
 INFO@KONAQUEEN.COM | WWW.KONAQUEEN.COM | @KONAQUEENHAWAII



LOHMAN APIARIES

Thank you for your inquiry about our
OLD WORLD CARNIOLAN QUEENS

Types of Queens:

-  Carniolan's
-  Italians
-  Carniolan Hybrid



- Queen sales start last week of March, weather permitting.
- Queens are shipped UPS Next day Air.
- Payment: We currently take business or personal checks, Visa, Mastercard, Apple pay, & Discover.

ORDER NOW
(530) 476-2322

APIARIES.LOHMAN@GMAIL.COM

For pick up orders

7072 Perkins Rd. Arbuckle, CA 95912



Packaged Bees
available

2 lb / 3lb / 4lb

*availability starting April

Just Blame Dad

Stephen Bishop

Poor dads—all they receive is blame. As much as I'd like to say thank you and take responsibility for my abnormalities (beekeeping being one of them), I'm obligated, as a child, to place blame squarely on my dad. He had even stranger tendencies than I do. To name just one, he searched for junk in the ground. "Beep! Beep! Beep!" and my dad was digging up a fine specimen of pull tab, rusty nail or contorted piece of unidentifiable scrap. He took me to some swell trash heaps to metal detect. Ever since, junk has been in my blood (for which I've had many tetanus shots).

In all fairness, my mom should shoulder some blame. For Christmas, she gave my dad the metal detector because he needed a tenth hobby. And she also took away good practical gifts right after my dad gave them to me. She confiscated, in an hour, my first pocketknife. The knife was a little red beauty and so was the wound. I could barely quit crying I was so elated. The thought of a legitimate scar was exciting enough, but showing off stitches would make me the most popular boy in second grade. "What did you get for Christmas?" I imagined my friends asking. I would hold out my hand stoically, three stitches in my forefinger. My friends would clamor in envy.

My dad, however, vetoed the Christmas-morning trip to the emergency room for stitches. He was too busy sanitizing a fishhook in a lighter flame and tying on a small length of ten-pound monofilament. He already had the kitchen table prepped for an inpatient procedure, not wanting to pay emergency room costs. Alas, before he could perform surgery, he stopped the bleeding with superglue, which wasn't nearly as cool as stitches made of fishing line.

I waver on whether to blame my dad for genetics. It's not like he chose to pass on the specific genes for my high-viscosity cholesterol. It probably wasn't smart that he weaned me with bacon, but a boy's gotta eat. According to my mom, he sprinkled bacon bits on baby food to improve the taste and lower the volume of my shrieking (I think parents may go to jail for that now). Still, it's easy to blame my dad for my cholesterol, especially when I'm torturing myself by exercising and eating salads. But he's been torturing himself by eating grilled chicken sandwiches for decades, ever since he had a stent put in when I was in high school. Mutual torture to stave off bad genetics is a great way to bond. There's nothing like eating a salad together when you'd both rather have baby food sprinkled with bacon.

Though I'm trying to postpone the inevitable for as long as possible, I hope he's around for my first stent. The thought of having it done without him is frightening. Bonding over a stent is surely better than bonding over a salad. Maybe I'll have some of the same doctors and nurses he did. Maybe they'll recognize some similarities in our blockages. We could both blame our forefathers.

If you still have your dad around, blame him for your beekeeping abnormality while you still can. Maybe you can even invite him to don a bee veil and blame him in the beeyard.

But really, it's best to blame him while taking part in *his* hobby, whether it's beekeeping or metal detecting or hunting or fishing. He'll appreciate it, even if he doesn't say "I blame you" back. For instance, he may merely grunt and go about his business of tying on a fishhook, which is something else I blame my dad for: He never taught me proper knot-tying. He just made up combinations of loops and twists and gave them a name.

"This is the swallow tail knot," he would say, after just watching barn swallows skim the pond surface. Later, I realized no one else had heard of a swallow tail knot. That's probably how all knots were invented though. Some dad somewhere was just trying his best to impress his offspring when he happened upon a combination of loops that actually held.

All I know is, trying his best is one thing you can't blame a dad for. Nor is tying his best, especially if the knot holds. **BC**





BEEKEEPING **INSURANCE SERVICES**

APICULTURE INSURANCE PILOT PROGRAM **A Specialized Program for Beekeepers**

Available Nationwide

We are Proud Members & Sponsors of:

- * American Beekeeping Federation
- * California State Beekeepers Association
- * Idaho Honey Industry Association
- * Minnesota Honey Producers Association
- * North Dakota Beekeepers Association
- * Tennessee State Beekeepers Association
- * Washington State Beekeepers Association
- * American Honey Producers Association
- * Florida State Beekeepers Association
- * Michigan Commercial Beekeepers Association
- * Montana State Beekeepers Association
- * South Dakota Beekeepers Association
- * Texas Beekeepers Association
- * Wisconsin Honey Producers Association, Inc.

Kevin Rader: Buzzus@beekeepingins.com
www.beekeepingins.com



Beekeeping & Honey Bees
- Our Business Since 1863

FREE SHIPPING on purchases of \$150 or more. Some items do not apply.



3 lb. Plastic Jar
with Hexagon

Glass Skep Jars



2 oz.
Clear Bear
w/Snap Cap



Honey Bears

**HONEY
CONTAINERS
MAKE
THE SALE**



Hex Jars



Muth Jars



Inverted
Plastic Jars



Classic Plastic Honey Jars

3 lb. Glass
Round Jars
(Quarts)



Queenline Glass
Honey Jars



www.dadant.com



51 S. SECOND STREET, HAMILTON IL 62341 • PHONE (217) 847-3324 • FAX (217) 847-3660 • TOLL FREE 1-888-922-1293
• CHICO, CA (877) 332-3268 • FRESNO, CA (877) 432-3268 • PARIS, TX (877) 632-3268 • SIOUX CITY, IA (877) 732-3268 •
• WATERTOWN, WI (877) 232-3268 • ALBION, MI (877) 932-3268 • WILLIAMSPORT, PA (877) 532-3268 •
• CHATHAM, VA (800) 220-8325 • FRANKFORT, KY (888) 932-3268 • HIGH SPRINGS, FL (877) 832-3268 •

From the University of Florida Honey

January: Overview of the HBREL at UF

February: Honey Bee/Beekeeping Teaching Programs

March: Research on Honey Bees

April: Apiculture Extension (Part 1)

May: Apiculture Extension (Part 2)

June: Roles in a Typical Honey Bee Lab

July: How Labs are Funded

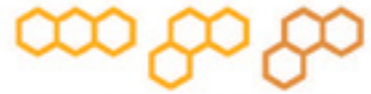
August: The Lab's Physical Infrastructure

September: What it Take to Run a Laboratory Effectively

October: Professional Development in the Lab

November: Members of the HBREL Team and What They Do

December: The HBREL's Most Notable Successes/Contributions to the Beekeeping Industry



HONEY BEE RESEARCH & EXTENSION LABORATORY

It may seem like an obvious metaphor, but there isn't a group that more closely resembles a honey bee colony than the members of a laboratory. Laboratories are busy places that could not function without many individuals efficiently working together. Numerous laboratories study honey bees around the world. Some are as small as a backyard beekeeper's garage. In contrast, others are established in large institutions, like universities and government agencies. The number of people and their roles vary between and within institutions – no laboratory structure is the same! Similarly, the nature of large institutions is fluid, and the members of a laboratory might change frequently. No matter the size, various diverse roles make a laboratory function harmoniously. In this article, we will overview laboratory members' different responsibilities and provide a snapshot of the UF/IFAS HBREL team as it exists today.

The UF/IFAS HBREL comprises a growing core team of 15 people that hold positions as faculty members, students, postdoctoral researchers and staff (Figures 3 and 4). Additionally, we could not operate without our volunteers and supporters. You'll meet every member of the UF/IFAS HBREL in November's article entitled, *Members of the HBREL team and what they*

Introductions & overview

Welcome back to another peek “under the lid” of honey bee laboratories. This month, we will describe the roles people typically hold in these dynamic and diverse places. This article is written by two graduate students at the University of Florida's Institute of Food and Agricultural Sciences Honey Bee Research and Extension Laboratory (UF/IFAS HBREL). Let us introduce you to both of us, one at a time (Figures 1 and 2).

“Hello! My name is Kaylin Kleckner. I started as a volunteer at HBREL washing dishes and counting mites over four years ago. I've transitioned through various roles in the laboratory and am excited to share what I've learned about each of them in this article.”

“My name is Dr. Marley Iredale, and I am a veterinary pathologist studying the diseases of honey bees. I have learned so much about bees in the short time I have worked in the lab, and I am already in love with these charismatic creatures.”



Figure 1. Kaylin Kleckner, author of this article.



Figure 2. Dr. Marley Iredale, author of this article.

Bee Research and Extension Laboratory

Roles in a Honey Bee Lab

Kaylin Kleckner & Dr. Marley Iredale

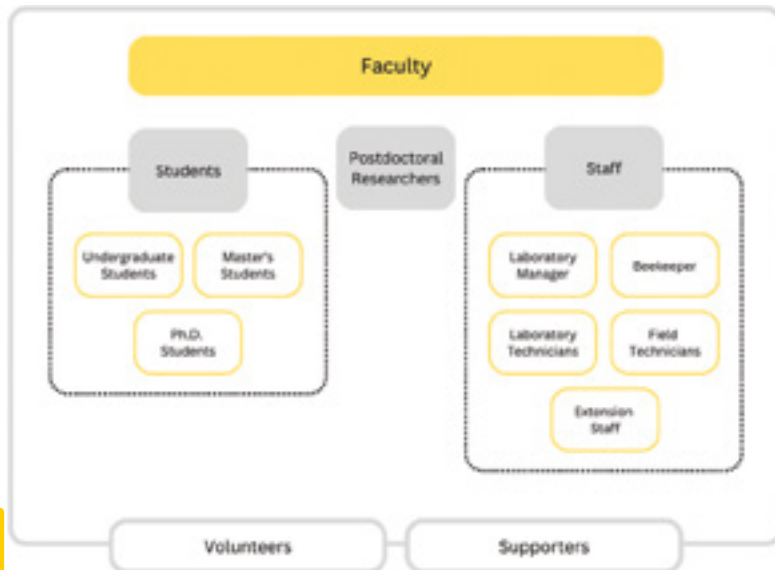


Figure 3. Overview of a typical honey bee laboratory structure. Faculty manage various types of students, postdoctoral researchers and staff.

do. Here, we will highlight a few individuals to help describe their various roles. Our laboratory is established at a land-grant university with a federal-state-county partnership with the University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS). Simply put, the laboratory has attributes of both an academic and publicly funded institution and has

the same, no two faculty members have the same job. Faculty members hold permanent positions at academic institutions and often fill governing roles in their respective departments. Faculty participate in teaching, research, extension or combinations of all three. Faculty members can teach a variety of audiences, such as undergraduate and graduate students, in both in-person and distance education programs. Faculty members with research interests often head their own laboratories dedicated to advancing their field. With a team of people, these faculty work to gain new understandings, applications and achievements. Lastly, faculty engaged in extension may build programs to assist a target audience, inform the general public with outreach events

Figure 4. Members of the UF HBREL team at the 2022 Summer Bee College in Panama City. Photo credit: UF/IFAS HBREL



three core missions: research, teaching and extension. Supporting this diverse vision requires people with various backgrounds and areas of expertise. Our team collaborates to advance research, instruct university students and spread knowledge to beekeepers globally. And we have a lot of fun doing it! Let us introduce you to our team's roles, starting with our faculty.

Roles as faculty

When you think of a professor, you likely envision someone who lectures in large classrooms full of college students and has long Summer vacations. This stereotypical image of a professor is just one type of faculty. While some faculty teach college students, others never set foot in a classroom. While some faculty may get the Summers off, many work year-round. Confusing, right? So what ARE faculty members? Just as no two laboratories are

(Figure 5) and bridge the gap between researchers and industry members.

Faculty members in many honey bee laboratories, like the UF/IFAS HBREL, participate in teaching, research AND extension. The UF/IFAS HBREL is unique in that it is led by three faculty members, Dr. Jamie Ellis, Dr. Cameron Jack and Ms. Amy Vu. You've met each of these individuals through previous articles in this series. This trio defines our team's goals, culture and organization. Behind the scenes, our faculty work tirelessly to obtain funding, complete necessary paperwork, communicate with collaborators, review articles for publication – the list goes on! Among their many responsibilities, faculty members oversee their prospective teams, composed broadly of students, postdoctoral researchers and staff.

Roles as students & postdoctoral researchers

Most students contributing to a honey bee laboratory are undergraduate and graduate students. Undergraduate students first come to mind when hearing “college kids.” Undergraduate students are pursuing their Associate's or Bachelor's degree. They are at the beginning of their career, thus often studying a wide range of topics. This is an opportunity for young people to try new things, develop new skills and discover their interests. This happens within the bounds of structured academics and through student clubs and university-run organizations. Beekeeping clubs are becoming increasingly popular at colleges and universities, and many of our volunteers are UF Honey Bee Club members! Undergraduate students can contribute to a honey bee laboratory by taking courses offered by the laboratory's faculty members, completing supervised research projects and volunteering their time. Undergraduate researchers are the driving force behind several of the active research projects at the UF/IFAS HBREL. Students interested in research can perform independent projects for course credit, which often helps make their resumes stand out to future employers. Ms. Kathryn Naherny is one undergraduate student conducting independent research at the UF/IFAS HBREL. Kathryn planned and executed a series of five experiments investigating the



Figure 5. Young boy interacts with an observation hive from the UF/IFAS HBREL at an outreach event. Photo credit: UF/IFAS HBREL

effects of lovebug presence on honey bee foraging. Research projects often lead students like Kathryn to present their work at local, state, national and even international conferences. At these meetings, they compete for scholarships and connect with experts in their areas of interest. Many students find mentorship this way, and some develop relationships that lead them to their eventual careers. Some students even dedicate enough time and effort to have their research published in peer-reviewed journals, one of the currencies of academic careers! At the UF/IFAS HBREL, undergraduates who demonstrate an aptitude for beekeeping and research are often hired as part-time staff or continue their education as graduate students on the team.

Graduate students in honey bee laboratories are completing their Master's or Ph.D. degrees. Graduate students are typically advised by a team of faculty members comprising a committee but often led by one or two individuals, the chair or co-chairs. These people are faculty members and are often principal investigators (a fancy name for “head”) of their own laboratories in the student's department. Masters students typically spend two to three years completing their degree, while Ph.D. students can work for three to five or more years completing their degree. The difference in time commitment reflects the difference in the breadth and depth of their research. Ph.D. students complete more complex projects, so the degree takes longer to complete and often has the prerequisite of a Master's degree or equivalent. Graduate students in honey bee laboratories work to plan, conduct and write about their research on various honey bee-related topics. This can be anything the student is interested in, from behavior to physiology to ecology and many other disciplines! In addition to conducting research, graduate students take coursework in relevant fields and often assist in teaching other students. Each student's coursework consists of core classes that are the same for each student pursuing a particular degree and electives to support a student's interests. Many graduate students work as teaching assistants to support coursework for undergraduate students and other graduate students. This gives graduate students experience in instruction and helps them develop interpersonal and leadership skills; this is important as many graduates become faculty members themselves.

At UF/IFAS HBREL, graduate students are advised by Dr. Jamie Ellis and Dr. Cameron Jack. Dr. Marley Iredale and Ms. Kaylin Kleckner (the authors of this article!) are advised by Dr. Jamie Ellis. They study honey bee diseases and wild honey bee ecology, respectively. Ms. Breonna Davis is advised by Dr. Cameron Jack to investigate small hive beetle control methods. Recent

graduates from the UF/IFAS HBREL studied royal jelly, pollen patties and *Varroa destructor* control. You might be wondering what graduate students do after completing their degrees. Our graduates graduate to faculty positions (like our very own Dr. Cameron Jack!), go on to study honey bees worldwide and sometimes continue to additional graduate degree programs. Some may jump straight into a permanent job in their field of interest. In contrast, others take on a short-term position, like a postdoctoral researcher.

Are you familiar with medical residents? After graduating from medical school, doctors work as residents to gain specialty experience before transitioning to a more permanent position. In laboratories, postdoctoral researchers are equivalent to residents. Postdocs (for short) have earned their Ph.D. but have not transitioned into a permanent role, such as a faculty member. Unlike graduate students, postdocs do not take any formal coursework. Their sole responsibility is to conduct research for one to three years in a given laboratory. During this time, they deepen their

knowledge of a particular aspect of their field and gain technical knowledge that will help them in their careers. Some postdocs volunteer to teach in department courses to gain experience if they plan to pursue faculty positions. At the UF/IFAS HBREL, we currently have one working postdoc, Dr. Jose Marcelino, who uses molecular tools to identify honey bee taxa, pests and diseases. Dr. Marcelino has conducted research all over the world on various topics. We are always thankful to our postdocs for sharing their rich knowledge and experiences with us during their time at the UF/IFAS HBREL.

Roles as staff

Staff is the final and most diverse category of roles in a honey bee laboratory. Generally, staff members are employed as part-time or full-time support for the laboratory. Unlike faculty, staff positions are not always permanent. Many staff positions are seasonal or project-dependent. Additionally, staff report to the faculty members overseeing the laboratory, while faculty are often the head of their laboratory. Two staff positions our honey bee laboratory cannot do without are a laboratory manager and a beekeeper.

If you can imagine the responsibilities of running a small business, you can develop a good sense of the role of a laboratory manager. A laboratory manager does exactly what the title implies – they keep the laboratory running! More specifically, a laboratory manager handles the logistics of a laboratory, such as ordering supplies, organizing volunteer help and upholding laboratory safety. However, in addition to administrative roles, laboratory managers may be asked to assist with research projects or may even do their own research. They often provide an important perspective on the laboratory's overall operation and how all the moving pieces fit together. Our laboratory manager comes with the added perk of being a beekeeper himself! It requires a lot of dedication to manage a laboratory as large as ours, but we're grateful to have one of the best.

At UF/IFAS HBREL, Mr. Chris Oster is our laboratory manager and go-to person for any and all needs (Figure 6). Chris first came to UF/IFAS

Figure 6. The UF/IFAS HBREL laboratory manager, Chris Oster, bringing in supplies in the rain. Photo credit: Bori Bennett



HBREL as a volunteer years ago and is one of many examples of dedicated volunteers that migrate into new positions. Evidence that hard work and perseverance pay off! After working as an Apiary Inspector for the Florida Department of Agriculture and Consumer Services, Chris returned to the UF/IFAS HBREL in his new role. His background makes him incredibly adept at his job, and he has extensive expertise that contributes to all facets of work at the laboratory.

A laboratory beekeeper is the role with which you, the readers of *Bee Culture*, may be most familiar. For many years the UF/IFAS HBREL did not have a dedicated beekeeper. Instead, various students and staff cared for the laboratory colonies. Today, UF/IFAS HBREL is thankful to have Mr. Steven Keith as our beekeeper. Steven manages all HBREL colonies, equipment and apiaries (Figure 7). At any one time, Steven (alongside a small team of dedicated staff and volunteers) is likely managing somewhere between 50 and 300 colonies! He routinely completes inspections, performs splits, supplements feed and brood, replaces queens and manages pests when needed. Steven works closely with all other laboratory members to ensure honey bee colonies are available for use in research projects and assists in implementing those projects. Imagine needing to consider all laboratory projects to estimate the allocation of resources while keeping dozens of colonies happy and healthy enough to participate in said experiments! Most faculty members and researchers around the world must do this themselves, so we are fortunate to have Steven and Chris with us.

Two more broad categories of staff help conduct research in a honey bee laboratory. Field and laboratory technicians work to meet specific research goals set by their supervising faculty. The only difference between these roles is where the work takes place. Laboratory technicians primarily work in the laboratory on a wide range of topics. One kind of laboratory-based project is toxicology bioassays. Those are two fancy words for seeing how toxic something is to a subject in a controlled environment. At the UF/IFAS HBREL, laboratory technicians conduct bioassays with bees, small hive beetles and *V. destructor* to screen new po-

tential chemical controls (Figure 8). These experiments often require knowledge of common laboratory techniques utilized in biology and chemistry. Our technicians are smart cookies! Additionally, laboratory technicians may process samples collected in the field, like counting mites in a mite wash. And our lead technician, Ms. Julia St. Amant, even painted many of the hives in our apiary. While more rigidly controlled work occurs in the laboratory, field work happens in the apiary (Figure 9). Fieldwork tends to be messy, with many factors, like weather, that cannot be controlled. Field technicians do their best to conduct these



Figure 8. Laboratory technician Julia St. Amant treating individual *Varroa destructor* with chemical compounds as part of a toxicology bioassay. Photo credit: Hannah Gurland

Figure 7. The UF/IFAS HBREL beekeeper, Steven Keith, assembling a hive box. Photo credit: Cat Wofford, UF/IFAS Communications





Figure 9. Colonies set up for a field study. Photo credit: UF/IFAS HBREL

means beekeepers like you! Extension staff members often have strengths in communication, media and design and the field they serve. You may be familiar with the UF/IFAS HBREL Extension events, like Bee College, from previous articles. It takes people like Amy Vu and her team to organize event agendas, advertise and even ensure you have a splendid breakfast when you arrive at the next Bee College. On top of events, UF/IFAS HBREL Extension staff develop content for online learning programs, like the Master Beekeeper Program, manage all social media pages and produce episodes for our podcast, *Two Bees in a Podcast*. Ms. Mary Bammer, a program coordinator with UF/IFAS HBREL is a great example of a team member who contributes to online content, overseeing grant projects and more. While these are all examples of extension activities specific to our laborato-

ry, numerous honey bee laboratories make extension programs that require supporting roles. If you have contacted our laboratory with questions, you likely have spoken to one of the UF/IFAS HBREL Extension staff.

outdoor experiments utilizing their beekeeping skills. Mr. Devan Rawn is one of the most recent additions to the UF/IFAS HBREL team. Devan will use his queen-rearing and colony management skills to execute many interesting field projects. In the past, our field technicians have sampled for pests and diseases, compared types of supplemental feeds and tracked long-term colony survival under various stressors.

Here we have clearly separated the work of laboratory and field technicians, but the lines are often blurred. To complete a single project, a technician may work both in the laboratory and the apiary. Many field and laboratory technicians employed at the UF/IFAS HBREL were once volunteers, and many go on to graduate school, careers in industry or work with government agencies. Ms. Julia St. Amant, for example, started working in the laboratory as an undergraduate and will soon transition into a new role as a Master's student advised by Dr. Cameron Jack.

We've focused a lot on research, but staff members are hired at honey bee laboratories to complete other tasks, such as extension work. Extension staff members are employees dedicated to developing programs to educate and aid the public. For honey bee laboratories, that usually

Roles as volunteers & supporters

Any laboratory could not function without the assistance of volunteers. Volunteers are unpaid and generously dedicate their time to complete miscellaneous but essential tasks. Volunteers often assist graduate students, post-docs and technicians with research projects. Large projects with thousands of samples would not be possible without the hands of volunteers passing over each one. However, volunteers also often carry out the necessary support tasks in a lab, such as fabricating and caring for equipment and facilities. Volunteers help researchers have more time to tackle complex problems, and that's one of the ways we all work together to advance science! While volunteers lack an hourly wage, they often gain valuable experience that allows them to move into future roles. If you ever attend a public tour at the UF/IFAS HBREL, you will likely be led by one of our dedicated volunteers (and UF Master Beekeeper!), Ms. Susan Harris.

And last but certainly not least, all honey bee laboratories need their supporters. You, readers of these articles and attendees of our events, are essential to achieving our goals and, thus, assisting beekeepers. At the UF/IFAS HBREL, we attribute our successes and the very building in which we work to our supporters. You'll find us thanking you all often throughout these articles. We mean it each and every time.

Conclusion

You've just gotten a small glimpse into the various roles in a honey bee laboratory. Hopefully, you've gained some understanding of what parts are needed and what those job descriptions entail. If nothing else, we hope you appreciate the complexity and diversity of the roles required to run a successful laboratory. In our laboratory's history and in other laboratories around the world, many roles are fulfilled by a single person. Today at the UF/IFAS HBREL, different individuals often hold these roles. No matter the number of people, dedicated individuals fill the necessary positions to safeguard honey bee health. Thank you all for following along on this journey. We will see you next month for a glimpse into how laboratories are funded. **BC**

All The BUZZZZ in...



Hello Friends,

Have a great summer exploring the outdoors!

Bee B. Queen

Bee B. Queen Challenge

Clare, 7, TX

Make a list of all the insects you see this summer.



Animal Protection

Why Do Bees Sting?

Honey bees don't want to sting you. They just want to protect themselves and their hive full of food and babies. There are many dangerous things out there for bees. Bear and badgers break into beehives to steal honey. Skunks will go to a weaker hive, scratch at the entrance of a hive and when the bees come out, the skunks will eat them. Birds, frogs, and spiders catch and eat honeybees. Other creatures like mice, wasps, ants, beetles, and moths will break into a hive to get honey.



honey bee stinger



What bee can you pass around that does not sting?

I don't know. tell me



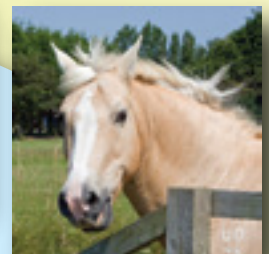
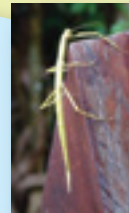
A Fris-Bee!



Help! Danger!

When a bee stings it gives off an alarm pheromone (a scent) that warns the hive that danger is near. It is way to call for help. Other bees will come out to defend the hive.

A drone bee does not have a stinger!



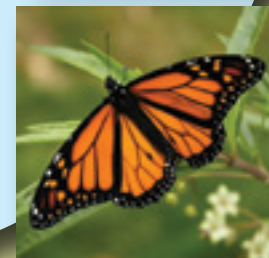
How Do Other Animals Defend Themselves?

Match the animal with the way they protect themselves then match the photo to the animal. Can you name other animals that match the defense mechanisms listed below?



1. Skunks
2. Turtle
3. Monarch butterflies
4. Snakes
5. Horses
6. Opossums
7. Porcupines
8. Walking stick
9. Rabbits
10. Bees
11. Woollyworms

- A. Plays dead
- B. Hide or camouflage
- C. Bites
- D. Hard shell
- E. Too fuzzy to eat
- F. Run away
- G. Bad taste
- H. Kicks
- I. Offensive odor
- J. Spines
- K. Stings



... BEE kid's CORNER



Buzz Off

Honey bees need to protect themselves from these intruders. Circle the words in the puzzle.

- ANTEATERS
- ANTS
- BADGERS
- BEARS
- HUMANS
- MICE
- OPOSSUMS
- RACCOONS
- ROBBERBEES
- SKUNKS
- WASPS



Produced by Kim Lehman

www.kimlehman.com

www.beeculture.com

June 2023



Become a Bee Buddy

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

Name
Address
Age
Birthday Month
E-mail (optional)



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

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

Light It Up

Celebrate Pollinator Week, June 19 - 25, by asking local establishments and buildings to light up yellow and orange in support of pollinators! www.pollinator.org

Easy Bee Sting Cake (Bienenstich Cake)

There is a very old legend that a town fought off a raid from neighboring villagers by launching beehives at them. Bakers created this cake as a way to celebrate their victory. Enjoy this simpler version of this classic German cake.

Batter

- 4 large eggs
- 1 cup powdered sugar
- ½ cup all-purpose flour
- 1 tablespoon baking powder
- ½ teaspoon salt

Topping

- 1 cup sliced almonds
- 2 tablespoons sugar - granulated

Filling

- 2 cups heavy cream
- 1 package instant vanilla pudding mix



The Filling

Beat instant pudding mix and heavy whipping cream until the mixture has a buttercream-like consistency.

Putting It Together

Remove the springform baking pan and allow the cake to cool completely. Use a long serrated knife to cut the cake horizontally into two layers. Cover the bottom layer with cream filling. Place the top layer back onto the cake. Done!

The Cake

Beat eggs and powdered sugar for several minutes until very creamy. Add flour, baking powder, and salt to the egg mixture. Pour batter into a greased and floured 9-inch springform pan. Top with almonds and sugar. Bake the cake until golden brown at 350° Fahrenheit for 30 minutes.

Minding Your Bees And Cues

Leaves of Grass

Becky Masterman & Bridget Mendel

Commonly referred to by their nickname “grass,” leaves of grass have not been so controversial since Walt Whitman shocked the public in 1855 with the provocative publication of his book, “Leaves of Grass.” Confusingly, that book was not about grass; it was about sensual pleasure.

But in modern times, grass itself has moved from the realm of metaphor to become literally controversial. All over America, a turf war is raging. It’s a turf war about whether turf is good or evil. Turf is actually neutral; it’s just a bunch of innocent leaves of grass poking up out of the ground.

But the history of turf is charged with all sorts of social, political and ecological issues: land ownership, indigeneity, migration, the relationship between pesticides and war, gender politics, the role of government, morality and the ethics of environmental stewardship. This is all fun stuff that our outer word-count limit doesn’t allow us to dwell on, so we recommend the book *The Lawn*, by historian Virginia Scott, (which, while lacking narrative thrill, really digs into the shocking origins of America’s obsession with green lawns. It might be out of print, but your collective interest, dear readers, could change that).

The small corner of the turf war that we want to engage in today is personal to our careers at the U of MN Bee Lab, that is, the bees’ perspective on lawns. We are proud of our Bee Lab research colleagues who are responsible for the incredible science behind the Bee Lawn movement, and we are proud of ourselves for casually coining the slogan “Slow Mow Summer.”

Yes, we are engaged in a semantic competition with the concept “No Mow May.” While impressed with the impact this alliterative slogan has had on us all, leading many bee advocates to try mowing less and experiment with a more riotous and flower-friendly lawn aesthetic, we have science backed reasons to move beyond it, because people: the No Mow May movement got too literal. Many folks misinterpreted (understandably) the spirit of the movement, which was about letting important early May flowers in lawns bloom for bees, and took it to mean instead that somehow not mowing at all from May 1st to June 1st was specifically necessary to help the bees.

The focus on May is good, because early pollen and nectar for bees is particularly important as the majority of bee species are emerging at this time, at least in our temperate climate. But, scientists and bee nerds like ourselves began to worry that the effort folks were going to change city ordinances to support “No Mow May” missed the bigger, better picture, which is that mowing less and leaving grass higher all season is better than an arbitrary marathon of not mowing at all for 31 days. Turf nerds worried that not mowing in May at all would end up damaging lawns, which would have a negative environmental impact, as leaves of grass actually serve an important role in sequestering carbon and mitigating erosion. If you let your lawn grow a foot high, then chop it all the way down, it actually damages the plants, not to mention your mower.

Slow mow Summer is about really considering the overall sustainability of lawn care practices. Letting flowers bloom in your lawns is key. But it’s also key to set yourself up for mowing less by choosing the right turf. Fine fescues are wonderfully drought tolerant and don’t require much irrigation. And they require less mowing. Planting fine fescues along



A pro-pollinator yard option is to replace turf with flowers and embracing the lawn-free lifestyle. Photo credit: Bridget Mendel

Parks and Recreation in Saint Paul, Minnesota embracing a slow mow Summer and allowing the dandelions to bloom prior to mowing. Photo credit: Bridget Mendel



with flowers ensures low climate impact, and high pollinator impact.

“Slow Mow Summer” is trying to build on and slightly redirect the “No Mow May” movement. First, your lawn won’t help many bees if it doesn’t have flowers in it. Let clover or dandelions bloom before mowing, or add in self-heal or creeping thyme (we will share a link to learn more about installing “bee lawns”).

If revamping your lawn to be more florally fecund, remember that the grass variety itself is hugely important to ensure your lawn can be sustainably managed; look for deep-rooted, slow growing and drought resistant fine fescues to

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



plant. Keep your lawn chemical free of course, because we’re talking bees here. Or go for a lawn-free lifestyle with gardens and blossoming trees. Or better still, do a little of everything, and add in “messy corners” of leaves, sticks and stumps to make sure the bees have somewhere to go home to after foraging on those unmowed flowers. Slow Mow Summer promotes flexible, long-term focus on supporting bees, and invites everyone to participate at whatever level they want, from just waiting to mow until lawn flowers bloom, to converting your whole property into a prairie and selling your mower on Craigslist.

Slow Mow Summer certainly could get misinterpreted too. People may start mowing very slowly—possibly even breaking for bees. Teens paid by the hour could really take advantage of this viral trend, and blame the bees for increased wages. But we think that’s okay, and we hope the slow mowers will also be stopping to smell the roses this Summer. **BC**

Resources:

Pollinator Lawn – Blue Thumb
Planting and maintaining a bee lawn | UMN Extension

Acknowledgments and suggestions:

The authors would like to thank Dr. Marla Spivak for helpful edits and suggestions.

Project Apis m.

Your “go-to” non-profit honey bee research organization, with programs in the USA & Canada

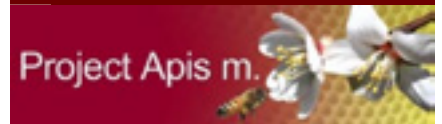
PAm is dedicated to enhancing the health of honey bees while improving crop and honey production.



PAm has infused over \$6 million to support honey bee health since 2006:

- * Funded BIP Tech Transfer Teams
- * Produced BMPs
- * Scholarships for PhD students
- * Expanding forage resources
- * Invested in new technologies
- * Discovered new pathogens
- * Supporting long term stock improvement, bee germplasm preservation, new Varroa controls

You can help support PAm
www.ProjectApism.org





Want to produce beautiful Comb Honey? But DON'T want to Wire Frames?

PROBLEM SOLVED!
*Try our Innovative, NEW
 Foundation Grippers*



- ★ Fast & Easy. **STURDY!**
- ★ No Wires and No Tools Required
- ★ Available in Shallow & Medium Depths
- ★ Made in USA, Patent Pending

www.AnthonysBeehive.com/waxgripper

ALSO CHECK OUT OUR PATENTED HONEY STRAW FILLER!



Genuine Pierco
Manufactured in-house

FOR ALL YOUR BEEKEEPING NEEDS

CHECK OUT

 www.Pierco.com



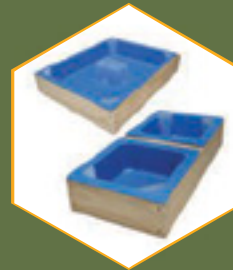
AgriSea Bee Nutrition

- ✓ Essential Amino Acid Profiles
- ✓ Individual Bee Mass (weight) Improved
- ✓ Reduction of Nosema
- ✓ No Residues in Honey
- ✓ Nutrients Sustaining Cell Metabolism

 **Exclusive Supplier**
of AgriSea



MITE CONTROL TOP FEEDERS EXTRACTION



BEEKEEPING KITS



IN-HIVE FEEDERS



PROTECTIVE WEAR



WE OFFER
**DOUBLE
& TRIPLE
WAX**



Frames - Plastic

- ✓ Super Strong & Durable
- ✓ Safe - FDA food grade plastic
- ✓ Easy to use - No Assembly Required



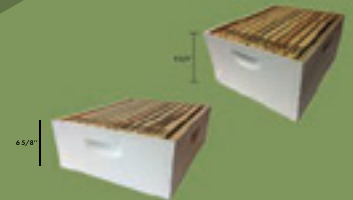
Frames - Wood

- ✓ Stronger than Industry Standard
- ✓ New 1/2" thick end bars - 3/4" top bars
- ✓ Assembled, Glued, and Stapled



Snap-in Foundations

- ✓ Impervious to wax moths, rodents, and hive beetles
- ✓ Preferred by Professional Beekeepers
- ✓ Precision molded, perfect cells
- ✓ Easy to use - Snaps into wood frames



Commercial Grade Boxes

- ✓ Honey Supers & Hive Bodies
- ✓ Added Strength 1 - 5/8" Top Joint
- ✓ Honey Supers & Hive Bodies
- ✓ Added Strength 1 - 5/8" Top Joint

FREE SHIPPING *See website for details

Bees Love 
Global Patties

You will too



Keep your hives strong and healthy with less effort and low cost
Reduce winter loss and see faster spring build-up
Help your bees thrive despite drought and stress from mites and disease

Two North American Factory Locations

Plus depots across the U.S. and Canada to Serve You Best

BAY 2 - 8 East Lake Way NE, Airdrie Alberta T4A 2J3

Phone: 1-403-948-6084 - Fax: 1-403-948-6901

150 Parkmont West, Butte Montana 59701

Ph: 1-406-494-4488 - Fax: 1-406-494-3511

Call Us Toll Free in North America at 1-866-948-6084

We make protein and pollen patties to your specifications
using only fresh, high quality, proven ingredients. Satisfaction guaranteed.

Be sure to visit our website

www.globalpatties.com

For our locations, news, ideas, specials, and much more...

Your bees will thank you

Swarm Control

Dr. Karén Avetisyan

Honey bees reproduce naturally through swarming. This instinct developed on the long way of evolution. It occurs when there is not enough work for bees and the bee population is too dense; when a queen is old; and when the honey bees' genetics dictate a high swarm instinct in their colonies. The swarm can leave the hive with a mated or virgin queen. Depending on bees' swarm instinct level, other swarms may fly out again from the same colony after a week, or the swarm can give another swarm.

For what reasons do honey bees swarm?

Bees swarm because the hive is overpopulated and cannot accommodate all of the bees. Or, the bees do not have enough space to store their honey. Often, climate is a common cause of bee swarms. Each bee needs more space in the beehive to maintain a lower temperature when it is hot outside. Due to poor ventilation and high humidity, especially after rain, the bees find these conditions to be intolerable and prepare to swarm.

The old queen is another problem. She may have a tendency to produce insufficient numbers of eggs while a honey bee colony is producing a lot of honey. In this case, the bees require a new queen that can satisfy the requirements of their colony and may swarm depending on how strong that instinct is in their genetics.

Why is it important for beekeepers to avoid having swarmed colonies and add the quantity of hives by swarms?

When trying to add the quantity of hives, it is not a good idea to rely on swarming. As swarming is uncontrollable, beekeepers cannot plan and catch the swarms. For instance, if a beekeeper owns 10 hives, and wants to make it 15 in this year, no one can really tell how many swarms will fly out and how many can be caught. In addition, doing that a lot, increases bees' propensity to swarm, which will eventually overwhelm the apiary with uncontrollable swarms. Swarming weakens the colony. The population of bees in the hive that produces the swarm is approximately half of what it was before the swarm. The honey bees there don't work well that year and become "sluggish". That hive will not produce a good amount of honey or any other byproducts of bees in that year.

How can we understand that bees will swarm?

The hive is going to swarm if the bees are bearding (early stage sign and fixable), the population of bees is too dense (early stage sign, fixable), there are a lot of open and capped queen cells, especially at the bottom edge of the frames, the bees are chewing the hive entrance, they aren't working well (late sign) and the bees aren't actively flying out of the hive.

How can bees be prevented from swarming at different stages of instinct development?

A beekeeper needs to take several steps at once to prevent swarms. That includes adding

an upper box when open brood (eggs and larvae) can be seen on seven frames out of 10 in the brood box, keep young queens, not more than two years old (for backyard beekeeping), don't use queens or queen cells which are originated from swarmed colonies, use queens from subspecies which are less inclined to swarming, ventilate well the hives in Summertime or when bees are "bearding", use a screen board and a quilt box, make one inch diameter holes attached with mash on the upper boxes, pay attention to the hives immediately next to the swarmed colonies, as they may swarm later, even in a month. The reason is that swarming bees give information to their neighbor bees and depending on the level of this colony swarm instinct, they can awaken them.

If there are already queen cells, a beekeeper can cut them off and insert beeswax foundation sheets after each comb. Another method is to take a big split (share the colony) and give the main hive a lot of beeswax foundation sheets. Only cutting off the queen cells will not help.

If previous-mentioned methods don't help, by using a ramp as shown in Picture 1, a beekeeper can remove swarming bees from the hive. At the bottom of the ramp, the swarming bees will congregate and the hive will be attended by normal bees. The bees under the ramp should be accommodated into the new hive by giving them beeswax foundation sheets, open brood (eggs, larvae) and honeycombs per their population.

If bees are already swarming, what should a beekeeper do?

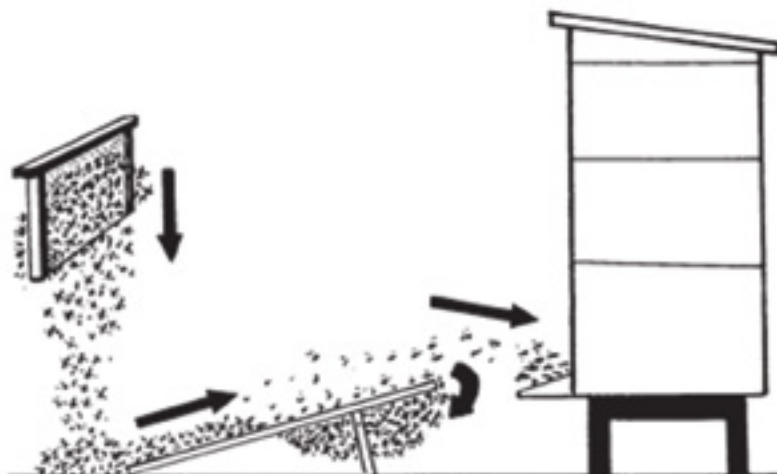
Narrow the hive entrance so that you can easily catch the queen when she comes out. Cage her and bring a new hive to the area where swarming bees are flying (close to the colony that is giving the swarm). Use a few beeswax foundation sheets and install the caged queen into the new hive. Give the latter some open brood and food frames after the majority of bees have gathered around the queen. Close the hive up. At the end of the day, the beekeeper can release the queen or let the bees do that. If the new hive remains in the same apiary location, it can be moved 1.5 to 1.7 feet daily towards the desirable place. **BC**

By Dr. Karén Avetisyan

Bee and Comb, LLC

Email: karen.avetisyan@beekeepingservices.com

Picture 1. Separating swarming bees.





DISCOVER AN OHIO ORIGINAL

It all started with a swarm of bees.

Over 150 years ago, Amos Ives Root was inspired to start a beekeeping business when a swarm of bees landed on the window of his jewelry store. That simple event created a company that has become synonymous with beekeeping, honey, pure beeswax, and the highest quality candles.

A Root candle is clean burning, long lasting, elegantly designed, and luxurious. It is a candle burning experience unlike any other.



623 West Liberty Street
Medina, Ohio 44256
330-723-4359
rootcandles.com



SAVE 20%

on your total purchase
at RootCandles.com!
Now through
June 30th, 2023.

USE PROMO CODE:
CatchTheBuzz2023



We love bees...

Root is actively involved in advancing the knowledge and science of beekeeping.

We proudly call out our “Bee Friendly” products and services.

Journey to the coast, offering peaceful harbors, serene sunrises, and the perfect breezy beach retreat.

Introducing three new limited-edition fragrances inspired by popular coastal getaways, perfect for the spring and summer seasons. The Summer Collection features Coastal Sunrise, Seaside Harbor and our newest fragrance Salt Mist & Sand.

KEEP YOUR BEES INSULATED WITH OUR

BeeMax Polystyrene Hives



EASY TO ASSEMBLE

FITS 10 LANGSTROTH FRAMES

NO NEED FOR WINTER WRAPPING

LIGHTWEIGHT WITH A HIGH 6.5 R-VALUE

HELPS BEES STAY COOL IN THE HOT SUMMER MONTHS

CUSTOMIZABLE KITS TO ACCOMMODATE YOUR PREFERENCES

CALL US: **800-632-3379**



SHOP ONLINE: betterbee.com

Need a filling solution ?

We have it !



North American Distributor
info@propolis-etc.ca | 1 888 660-6665 | propolis-etc.com



swienty
for better honey

BEE YET

AI?

Dr. Tracy Farone



Greetings beekeeping enthusiasts! Today, we'll dive into the world of artificial intelligence and explore its application in the beekeeping industry. Specifically, we'll discuss ChatGPT, an innovative technology developed by OpenAI, and how it can help promote honey bee health and management.

First things first, let's define what ChatGPT and OpenAI are. OpenAI is a research organization dedicated to

How will more AI affect our honey bees...

developing advanced artificial intelligence in a safe and beneficial way. ChatGPT, on the other hand, is a language processing model developed by OpenAI. It uses deep learning algorithms to analyze vast amounts of natural language data and generate responses that closely resemble those of human conversation.

Now, you might be wondering how ChatGPT can be useful in the beekeeping industry. Well, let's take a look at how AI has already been used in this field. In recent years, AI has been used to develop sophisticated monitoring systems that can track various aspects of bee colony health and behavior, such as population size, hive temperature and humidity. These systems have been instrumental in identifying potential problems in the hive before they become serious, allowing beekeepers to take preventive measures.

But what if beekeepers could access all this information and more simply by asking a question? This is where ChatGPT comes in. By using natural language processing, ChatGPT can be programmed to understand and respond to beekeepers' queries in a way that mimics human conversation. For instance, a beekeeper could ask ChatGPT about the health of a specific colony or inquire about the best way to treat a particular bee disease. ChatGPT could then provide a response based on the latest research and data, helping beekeepers make informed decisions about the health and management of their hives.

However, as with any technology, there are pros and cons to consider. One of the advantages of ChatGPT is that it can save beekeepers time and money by providing quick answers to their questions without the need for extensive research. Additionally, it can improve the accuracy and consistency of the information beekeepers receive, as ChatGPT's responses are based on objective data rather than personal opinions.

On the other hand, there are concerns that relying too heavily on AI could undermine the importance of hands-on experience and intuition in beekeeping. Additionally, there are issues surrounding data privacy and security that must be addressed to ensure that beekeepers' information is protected.

Despite these concerns, it's clear that AI has the potential to revolutionize the way beekeepers manage their hives. By combining AI with traditional beekeeping practices, we can achieve a more sustainable and efficient approach to honey bee health.

In conclusion, ChatGPT is a cutting-edge technology that has the potential to transform the beekeeping industry. Its natural language processing capabilities can help beekeepers access vital information about the health and management of their hives in a quick and convenient way. However, as with any technology, it's important to weigh the pros and cons and ensure that it's used responsibly and ethically. With the right approach, AI can help us achieve a more sustain-





There is a hazy line defining the future of AI use

able and successful future for honey bees and the beekeeping industry as a whole.

If you made it this far in the article, congratulations! You were reading the ramblings of a computer. What did you think? Are you surprised? The above text was generated with me working with ChatGPT utilizing the following prompt:

“Write up to a 2,000 word article starting with: a brief introduction and definition of what ChatGPT and Open AI are, what ChatGPT can do and the pros and cons of this technology. Then give an overview of how AI has been used in the beekeeping industry and how it may be used in the future to promote honey bee health and management. Write the entire article in the style of Dr. Tracy Farone, author of the *Bee Vet* column in *Bee Culture Magazine*. Dr. Farone’s writing style is conversational but scientific. Do not introduce Dr. Farone in the article, the audience will know who she is. Do not end the article without completing a sentence but finish with a conclusion.”

This was the eighth prompt and try of Chat to get to a writing of this

quality. Previous times the instructions were not followed, the article stopped in midsentence, information given was superficial and the tone was cheesy car salesman at times. The word count is still only 517.

In the computer-generated writing, as a critical human thinker, I believe one can see how much Chat thinks of itself – it’s quite the happy narcissist! It claims to be objective, but I think the biggest worry is “garbage in, equals garbage out”. The potential for bias, dangerous bias, is a large concern. However, objective truth is anything but simply objective anymore. True science is about the ability to ask questions and critically reason through them. It is the line between AI and self-awareness...

Even though ChatGPT has access to and the ability to compile millions of data sources, Chat left out a few things in its article. It did not discuss automated beehives in detail (from Beewise to Beehome) or various in-hive monitoring devices or apps considered to be forms of AI. I find anything that could make improving hive health to be well worth a try but, of course, it must practically work and make economic sense as well.

Many are praising the technological capabilities and applications of this new birth of AI, considering it just something we will have to adjust to like the Internet and social media (Have the pros outweighed the cons here?). Others, including key developers like Elon Musk, are calling for a pause in this rapid pace of the development of technology before we can fully understand what it will do in our world. A few abilities of Chat GPT that are being promoted but also cause concern include:

- 1.The ability to create malware endlessly. AI does not need to sleep, eat or take out the garbage.
- 2.Pretending to be someone (human). For example: dating apps (creeeepy!), better phishing/scam messages, writing resumes.
- 3.Assisting in cheating in school, college, graduate school, medical schools...
- 4.Giving advice to the user on relationships, psychological support, even medical advice.
- 5.Being a friend or companion to the user.
- 6.Taking over multiple human jobs.

A few weeks ago, I sat in a room full of college faculty listening to our

computer science department give a presentation about what ChatGPT/Open AI is and what it can do. I was hoping to get some answers about how we handle this new technology. To be honest, the mood in the room was grim. From a teaching perspective, this technology brings up huge ethical and cheating concerns, as Chat can write original papers for students, do their homework for them and some claim, even write PhDs. Technology to detect such shenanigans is available but unable to keep up with the latest Chat versions developing by the day. How are young minds ever going to develop critical thinking and acquire knowledge if a computer can simply do it for them?

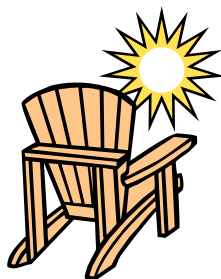
At the meeting, the suggestions we received suggested going back to paper and pencil writing in-class assignments, exams and oral examinations for true assessments of student knowledge. Great... advancement leads to going back in time. Clearly these methods are not practical in large classes, primary writing courses or online classes. However, after playing around with Chat for this article, I was a bit relieved that, at least for now, those of us humans with functioning brains may still have the upper hand. I will leave you with one last conversation I had with Chat...

Me: How do you get out of a cardboard box?

ChatGPT: As an AI language model, I do not have a physical body, so I cannot get out of a cardboard box. However, if you find yourself stuck in a cardboard box, the best way to get out would be to push or pull the flaps open from the inside or cut the box open with a sharp object. It's important to be careful when cutting the box to avoid injury.

Me: So, a person would use their brain to figure it out.

ChatGPT: Yes, that's correct. A person would use their problem-solving skills to figure out how to get out of the cardboard box. **BC**



Swarm Catcher

a new, must-have gadget!

\$14



order it at
www.swarmreacher.com



Are you subscribed to Catch the Buzz? It's our daily email blast. If not, scan the QR code or go to



www.BeeCulture.com/Catch-Buzz/Subscribe-Newsletter

Your Complete Bee Hive Supply Company



- All woodenware available assembled and painted
- Hives are constructed using precision box joints.
- Our hand hold cutter leaves no tear-out!

Made with Eastern White Pine

Shipping Available

- Unassembled Frames
- Assembled Frames
- Wax Foundations
- Shallow Super & Illinois Super
- Hive Body
- 8 Frame Equipment
- Deep and Medium Nuc Boxes
- Honey Processing Equipment
- Smokers, hive tools and much more.



Forest Hill
WOODWORKING

1985 Mine Road • Paradise, PA 17562
717-806-0193
Manufactured in Lancaster County, PA
www.ForestHillBeeSupply.com



Listen along here!

Beekeeping's Future

Much has been written and said about the numerous pesticide, pest and pathogen issues beekeepers are wrestling with, as it should be. What has gotten somewhat less attention is the threat that impacts all beekeepers and honey bee colonies everywhere in the world because it threatens everyone, everywhere: the climate crisis. Across the globe, climate-induced temperature extremes, droughts and floods have in some cases had a positive impact on crops. Unfortunately, the general effect of climate destabilization has been an overall reduction of crop yields (IPCC, 2022). Reduced yields lead to increases in hunger, and the resulting malnutrition related diseases, poverty and dislocated populations of climate refugees worldwide.

Bees sip rather than gulp

To date, beekeeping and honey production has proven itself to be more resilient to climate disruption than other agricultural crops. Of course apiaries can be devastated by floods that wash away hives, or wildfires that turn colonies to ash, but bees handle drought better than other agricultural pursuits. This is because they simply require less water than most crops and livestock.

For example, farmers in Zimbabwe have found that honey production is proving to be relatively stable even while crop production in general has decreased, or in some cases totally failed (Mambondiyani, 2023). This has led to an increase in beekeeping in parts of the African continent. A side benefit from the proliferation of beekeepers is that African apiaries are helping to conserve precious

vegetation in arid regions, as villagers avoid cutting trees near apiaries out of fear of the bees.

Diverse forage

One of the reasons beekeeping is proving itself to be more resilient to our changing climate is because bees often forage on wild plants and are not totally dependent on agricultural crops. This is an important trait since feral and native vegetation are often more drought tolerant than cultivated crops. Wild and indigenous plants can make up for decreased foraging opportunities when agricultural crops suffer reduced nectar and pollen production from a lack of water. The wide foraging area that honey bee colonies utilize (over three miles in every direction) helps ensure that any plants within foraging range that do have access to water and are in bloom, will be discovered by the bees.

Modest land requirements

Compared to other agricultural endeavors, beekeeping activities require the least amount of land, so farmers are often able to add honey production to their farm plan without sacrificing space for other crops. Apiaries can also utilize infertile land, or areas otherwise not suitable for other forms of agriculture.

Since beekeeping doesn't modify or permanently alter the area in which it is carried out, it is fairly easy for an apiculturist who doesn't own property to find land owners that are happy to provide apiary accommodations on their property. This helps make beekeeping the most accessible of all agricultural efforts, especially in third world countries and among populations with modest incomes since land ownership is not a necessary requirement to keep bees.

The pollination dividend

Through the act of pollination, honey bees increase crop quality and

yields, an attribute that often causes landowners to seek out beekeepers willing to place bees on their land. Instead of being accused of stealing from neighboring farms, beekeepers receive praise for the pollination services they provide. The pollination action of bees also helps ensure the presence of wild and native species of plants and trees, which indirectly benefits wildlife as well.

A model of sustainability

Beekeeping is not only proving to be somewhat more resilient in the face of climate destabilization, but it can be part of the climate solution. Depending on how it is carried out, the perennial nature of beekeeping provides the potential to have one of the smallest environmental footprints in all of agriculture (Mujica et al., 2016; Moreira et al., 2019; Pignagnoli et al., 2021). The bees do most of the work. The biggest energy demands of beekeeping are in traveling to and from apiaries or migratory pollination sites. Significant energy is also required for extracting, bottling and processing of honey and beeswax. By keeping beeyards close to the honey house or farm that need pollination services, using renewable energy sources for processing, and non-plastic packaging, many of the negative climate and environmental effects of apiculture can be reduced, if not eliminated.

Since every beekeeping operation is different it can be difficult to pinpoint the exact ecological footprint of beekeeping in general. Much depends of the variety of practices such as feeding regimens, treatment practices, honey yields and shipping and transportation distances used by the beekeeping operation. Migratory beekeeping operations for example have been shown to have greater disease problems and results in bees more likely to have compromised immune systems, all of which increases the

Despite enormous environment challenges facing the honey bee and beekeepers, there are a number of reasons to believe that the beekeeping industry is better able to withstand the uncertain future than other agricultural industries.





Climate destabilization is making things harder for farmers, especially in arid regions like Africa.

need for treatments and expensive inputs (Brosi et al., 2017; Simone-Finstrom et al., 2016; Gordon et al., 2014; Jara et al., 2021). Generally speaking, the ecological footprint of backyard beekeepers is more than three times as small as your standard commercial beekeeping operation (Kendal et al., 2011).

Unlike most agricultural activities, the very nature of the beekeeping business model provides the potential to be more sustainable. Vegetable, grain and fruit farmers typically need to buy new seed, fertilizer and agrochemicals annually, while providing tilling, irrigation and weed control. Beekeeping is a perennial activity. Beekeepers can use the same hives season after season, and as long as they are able to keep their bees alive, the need to purchase expensive inputs on a yearly basis is minimized.

It is easy to focus on all the challenges and fall into a “Woe is me” attitude considering the constant flow of bad news facing our industry. While I am not saying that things are going to be easy, there are plenty of reasons to believe that the future of beekeeping is more secure than other agricultural industries, many of which are profitable only because they are being propped up by government subsidies and taxpayer dollars. Beekeeping has the potential to provide one of the most stable and sustainable agricultural business models during the uncertain climate future that threatens to destabilize much of agriculture as it is practiced today. While beekeepings’ ecological footprint is already better than most other forms of agriculture, we can improve the current carbon footprint of the industry by finding ways to re-

duce emissions by minimizing transportation and shipping distances of bees, increasing the adoption of stationary beekeeping practices and by localizing, or at least regionalizing our business models.

Many beekeepers initially get involved in this ancient craft out of a concern and desire to benefit the natural world, a world that is rapidly changing and not always for the better. Thankfully, beekeeping appears to be better situated than most of agriculture to weather the unstable and uncertain future that is envisioned. Despite the numerous very real and serious threats to honey bees, there is good reason to think that beekeeping, and therefore honey bees themselves, will continue for as long as the planet’s ecosystem can support it and us. **BC**

Ross Conrad is author of *Natural Beekeeping: Revised and Expanded*, 2nd edition, and *The Land of Milk and Honey: A history of beekeeping in Vermont*.

References:

Brosi, B.J., Deleplane, K.S., Boots, M., De Roode, J.C. (2017) Ecological and evolutionary approaches to managing honey bee disease, *Nature Ecology & Evolution*, (1)1250-1262

Climate impacts are predicted to be most severely felt throughout South, Central and much of North America. As well as Africa, Australia and parts of Asia.

Gordon, R., Schott-Bresolin, N., East, I.J. (2014) Nomadic beekeeper movements create the potential for widespread disease in the honey bee industry, *Australian Veterinary Journal*, 92:283-290

IPCC Sixth Assessment Report: Food, Fiber and Other Ecosystem Products

Jara, L., Ruiz, C., Martin-Hernandez, R., Munoz, I., Higes, M., Serrano, J., De la Rua, P., (2021) The effect of migratory beekeeping on the infestation rate of parasites in honey bee (*Apis mellifera*) colonies and on their genetic variability, *Microorganisms*, 9(22)

Kendall, A., Yuan, J., Brodt, S.B., Kramer, K.J. (2011) Carbon Footprint of U.S. Honey Production and Packaging – Report to the National Honey Board, University of California, Davis, pp 1-23

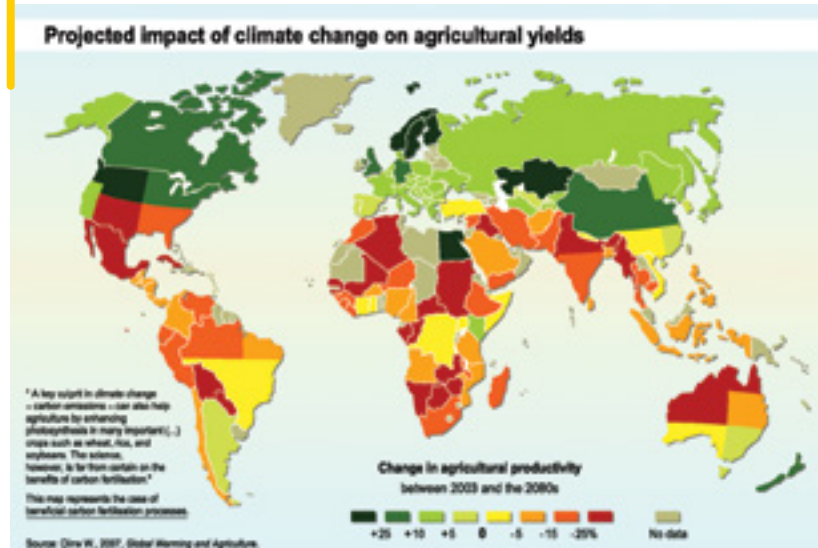
Mambondiyani, Andrew (2023) Why farmers in Zimbabwe are shifting to bees, *Yes!*

Moreira, M.T., Cortes, A., Lijo, L., Noya, I., Pineiro, O., Lopez-Carracelas, L., Omil, B., Barral, M.T., Merino, A., Feijoo, G. (2019) Environmental Implications of honey production in the national parks of northwest Spain,

Mujica, M., Blanco, G., Santalla, E. (2016) Carbon footprint of honey produced in Argentina, *Journal of Cleaner Production*, 116(10): 50-60

Pignagnoli A, Pignedoli S, Carpana E, Costa C, Dal Prà A. (2021) Carbon Footprint of Honey in Different Beekeeping Systems. *Sustainability*. 13(19):11063. <https://doi.org/10.3390/su131911063>

Simone-Finstrom, M., Li-Byarlay, H., Huang, M.H., Strand, M.K., Rueppel, O., Tarpy, D.R. (2016) Migratory management and environmental conditions affect lifespan and oxidative stress in honey bees, *Scientific Reports*, 6(1):32023



Northern California Quality Queens

530-520-8558

-Cordovan
-Carniolan
-Italian

Produced in Orland, California
The Queen Bee Capital of North America



510 Patterson Rd Baxley, GA 31513

912-367-9352

2023 ITALIAN HYBRID MATED QUEENS

Now Accepting Orders

Call for Pricing and Availability

Queen cells available by pick up only.

Marking and clipping of queen offered for additional charge.

Shipping available within the Continental U.S.

Website: www.gardnerapiaries.com

Online ordering not available



May God Bless Your Endeavors This Year

Over 100 Years of Experience • All Bees Are State Inspected

Off the Wahl Beekeeping RAISING QUEENS

Richard Wahl

An admirable goal for the new beekeeper is to become self-sustaining. Learning the intricacies of one's micro-environment and how to get a hive to survive through our variable northern Winters can be a challenging task. Once the hive survives the Winter, there are a new set of conditions to consider. One of those considerations is how to minimize the probability of swarming. In last month's article, I covered the causes of swarming which led to the conclusion that one of the best ways that has been found to minimize the natural instinct to swarm is to create an artificial swarm by doing a split. Once the split has been completed, as described in a previous month's article (just prior to the one on swarms), it is time to introduce a queen to the queenless split off starter hive or nucleus hive (nuc). If the beekeeper does not wish to wait for the time it takes the split to make a new queen on their own, where does the beekeeper get an additional new queen? The logical choice would seem to be to purchase another queen from a commercial source. But if that queen is from out of state or from a considerably distant location it is almost like starting over again. The purchased queen from a far off place will be laying eggs that become brood that need to once again acclimate to your own micro-climate. Producing a queen that comes from your own stock is often a much better option. She will be the product of a hive and its workers that have previously acclimated to your own environment and climate conditions. She will have a better chance at producing future workers whose genetics have also adjusted, allowing for a potentially greater degree of success to survive the coming variable Winter.



A lovely queen on a nuc frame.

Hives develop new queens for three basic reasons. One is if there is an emergency where the previous queen was damaged or removed by the beekeeper. A second is when the hive senses the queen is ailing or running low on sperm to fertilize eggs – called a superscedure. A third

is the impulse to swarm where the existing queen often leaves with around 50% of the bees in the hive to establish a new colony, leaving the remaining bees to produce a new queen. The beekeeper can use this third instinct to their advantage by creating an artificial swarm with a split and adding a queen from one's own stock. I have found that raising a few queens from my own bees is not that hard

of a task if a few basic techniques are followed. There are two methods of raising queens as explained as follows.

Preparing a Starter Nuc

Several years ago I decided that if at all possible, I would not be buying any more packages of bees. Although I have bought several packages over my first ten year span of beekeeping, they were mostly to expand my stock or try a new race of bees, and of course, to replace some overwintered deadouts as I was learning better wintering techniques. The commonly accepted theory in our area for starting a new hive, be it package, nuc or swarm, is to get it off to a good start by the Fourth of July. I have successfully gotten August swarms or nucs through the following Winter, but it is a bit more iffy.

The first step in queen grafting is the preparation of the queen starter nuc. I built a super sided with screen to place under the five frame closed starter nuc for air circulation in the warmer June weather and placed a wet sponge in a shallow water dish at the bottom for a water supply. I suspect this could be done earlier in the year with a closed sided empty nuc super in cooler weather set below the five frame nuc. Either way, the bees in this nuc are closed off and given no exit overnight and discover they have no queen. The next day, when queen cups with larva are inserted they will be ready to make queen cells. How to get queen cups containing larva will be explained later. The queen starter nuc has a frame with honey, at least two frames of capped brood from a donor hive, a frame that is mostly empty or drawn comb that has some pollen (if not on the brood frames) and of course, the empty queen cup frame.

Queen cells are peanut shaped on a queen frame. Empty cups have larva that did not take.



Place the pollen side of a frame next to the brood frame as the nurse bees need the pollen to feed and raise new queen larva. The two frames with capped brood include the bees from the parent hive, as well as two additional frames of bees shook into the starter nuc that were near the donated brood frames. Brood frame bees have not been out of the parent hive yet, so most all of them will stay in the nuc when opened after queen cup insertion. The excess of nurse bees on the brood frames will be eager to make new queen cells in order to get a new queen. If reusing plastic queen cups, it is advised to rinse them thoroughly in hot water (boiling will melt the plastic) to rid the queen cup of previous queen pheromone for better acceptance. If a drop of honey is placed in each queen cup the bees are more likely to better polish the cup overnight in preparation for the larva that is to be inserted the next day.

Grafting Larvae into Queen Cups

Harvesting the smallest larvae to place into queen cups is not difficult. The smallest larvae are just newly hatched eggs, usually right next to comb cells with unhatched eggs. Eggs standing in a vertical position are about one day old. Those that are lying on their side are two to three days old. Choose the smallest larvae in cells next to the eggs lying prone. The smallest larvae will be smaller than an egg in the cell next to it and using a magnifier with a head lamp may make it easier to see. I fumbled my first few larvae collection tries years ago, but still managed to get ten queens out of a twenty cup attempt on my first try without magnifier use.



A photo of myself using a grafting tool to collect larva.

Older larvae may have had a day or so being fed bee bread, which is a mixture of pollen and honey secreted by nurse bees. Queen cells will receive or be returned to being only fed royal jelly.

It took all of fifteen minutes to move twenty larvae to queen cups after the initial starter nuc set up. Carefully slip the tip of the tool which flexes under a larva, and gently lift it out. It is important not to roll the larvae as

their breathing orifice is only on one side at this stage and if rolled in the royal jelly, they could suffocate. Place the tip of the grafting tool with the larva in the bottom middle of the queen cup and push the plunger which deposits the larva with a bit of royal jelly into the queen cup. I work with a warm damp towel to cover the queen cup holder while placing the remaining larva into queen cups. It is important not to let the queen cups dry out, if working in hot weather and not to let them get too cold, if working in cooler weather. If there is no separate warmed room nearby, working in the warmed cab of a pickup truck works equally as well.

It takes sixteen days for a queen to emerge from a laid egg, so it is important to keep a close eye on the calendar. Using this method, the age of the harvested larva should be around the four days old stage (after the egg was laid) but it is best to err on the low side of the progression from egg to larva to pupa (capped cell). I take a quick look at the queen cup frame on day four or five after grafting to see how many queen cups are started with the assumption that the bees chose viable larva to raise new queens. It is important not to disturb the queen cells between days seven through ten after cup insertion (eleven to thirteen days after the egg is laid) as these are critical days in queen development. Since larva next to eggs could be anywhere from three to six days old, I check for mature capped queen cells on day thirteen. At this time, any nucs or receiving hives need to be ready to receive a queen cell removed from the starter nuc. Queen cups with cells can be carefully taken from the frame and inserted into new nucs or queenless hives. I like to cage the queen cells if going into a queenless hive to see that when she emerges she will be accepted. I have also caged several queens in a single hive and they will be taken care of by nurse bees, provided they do not come in contact with each other. If multiple queens are freed in the nuc or hive, the first out will normally kill the others. Common practice is to put two queen cells in a hive/nuc and the first out wins.

It can take up to two weeks (weather dependent) for the virgin queen to go out on mating flights before one finds any eggs from the new queen. Once the queen is laying eggs the nuc or hive can be expanded with additional frames and/or deeps and the new hive should continue to increase in size. An early Summer start may even yield some extra honey for the beekeeper in the Fall. Later Summer starts may need to overwinter before honey can be taken the following Summer. If nucs were begun during the past Summer and overwintered, they are great assets the beekeeper can sell or use to increase the hive count the following year.

It is up to the beekeeper to decide from which hive to select larva for production of queens. Some selection criteria to consider may include the ability of the parent hive to overwinter and how disease free that parent hive has been. Temperament of the hive or amount of honey production may be points for consideration. To some degree, mite counts and extra sugar feeding consumption may play into the best hive to choose larva for queen development. The beekeeper should choose the hive from which they take brood and larva for queen development that best suits the beekeeper's desired traits for the new nuc/hive. This assumes the donating hive is strong enough to support being split. The best success with grafting the best queens is when there is a nectar flow



Nucs come in wood or cardboard containers and the bearding was due to a need for better top ventilation which was solved by moving the bees to a ten frame deep with an inner cover.

occurring. An artificial flow can be made by feeding the starter nuc one to one sugar syrup and adding a pollen patty to help produce the best queens possible.

Queens for Walk Away Splits

If time and/or quantity of queens is not a factor then getting a few more queens by doing a walk-away split may be a better and even easier method in queen production. After equally splitting the brood, nectar/honey and pollen frames from the single or double supers, let the separated new hives develop. It does not matter which hive is queenless, as long as eggs are present in both hives, since the queenless hive should produce a new queen. The beekeeper can assist the process by scratching the bottom quarter of several smallest larvae cells away along with the three or four cells below it to give the bees room to make a new queen cell. If by chance the bees make queen cells on more than one frame, the second queen cell frame can be moved to a second starter nuc and brood, honey and pollen frames added to it from another strong hive. This can result in a three way split from one strong hive.

A split can consist of as little as three frames; one brood frame along with a frame with pollen and another with nectar/honey for a food source. A year ago, I successfully got six of seven hives through the Winter months and felt they were all strong enough to be split. For three of them, I found the overwintered queen, marked her and moved the queen along with brood frames to a five frame nuc. These three nucs were ready for sale at the beginning of May. The parent hives each developed a new queen and even produced a honey super or two for my taking later in early Fall. The other three hives that were split provided brood and eggs for the nuc with the queens left in the parent hive. I waited until the nucs produced new queens, mated and began laying eggs before considering them ready to sell. I did have to add a new frame or two of brood from the parent hive as brood frames in the queen developing nucs had mostly emerged. I could have waited until the nuc with the new queen was fully laying and workers capping brood, but that would have delayed their potential sale for several more weeks. A purchaser of a five frame nuc would normally expect to get three frames mostly covered in capped brood with the laying queen along with a frame largely covered with pollen and the fifth frame with nectar and/or honey stores as a food source. The best queen production will occur during a nectar flow which the beekeeper can create artificially by feeding. The year in which I split all six hives in one fashion or another is the first year in which I did not capture a swarm near my beeyard. It has now been five years since I purchased a package or nuc of bees having relied on my own queen rearing and reproduction techniques. I am happy with my own stock and my hive's honey production has surpassed that of the packages or nucs that I have purchased in the past. If you have not tried raising queens from your own stock, give it a try as it presents a whole new aspect of the beekeeping experience. Your results may vary based on your environmental conditions, experience or the state of your hives. **BC**

OHB
2023
PACKAGE BEES
preorder

ORDER FROM OUR CERTIFIED DISTRIBUTORS

FOR OUR DISTRIBUTOR LIST VISIT:
WWW.OHBEEES.COM

6398 CO ROAD 20 ORLAND, CA 95963 WWW.OHBEEES.COM @OHBEEESHQ

Quality & Service Since 1907

Queens
Italians & Carniolans



C.F. Koehnen
& Sons, Inc.

Packages
All sized orders for pickup

Queen Shipping Supplies

C.F. Koehnen & Sons, Inc.

ph (530) 891-5216
www.koehnen.com

*3131 Highway 45
Glenn, CA 95943*

fax (530) 934-2613
bees@koehnen.com

Harvest The Best...

with SUNDANCE™ POLLEN TRAPS and COMPLETE ROSS ROUND SUPERS.





SUNDANCE POLLEN TRAPS
Imagine the cleanest pollen available with no heavy lifting, chalkbrood mummies or risk of foulbrood scales. There is no substitute for the **Sundance Trap** quality and cleanliness. Leading experts from the USDA and universities as well as commercial beekeepers and hobbyists agree that **Sundance Traps** are the best pollen traps available. *It's NOT a pollen trap, unless it's a Sundance Trap!*

COMPLETE ROSS ROUND SUPER
Produce comb honey with no dripping from cut edges and no liquid honey in the consumer package with **Ross Rounds** equipment. Easily shipped or delivered, stocked on shelves, purchased and taken home without danger of leaking. Enjoy providing locally grown, unprocessed, all-natural honey with a complete **Ross Rounds Super**.

*For more information visit www.RossRounds.com.
For dealers near you please email sales@rossrounds.com.*




ROSS ROUNDS & SUNDANCE ARE REGISTERED TRADEMARKS AND ARE A DIVISION OF FINGER LAKES BEE COMPANY LLC. ALL RIGHTS RESERVED.



**SOUTHEAST
BEE SUPPLY**

www.southeastbee.com
Dealers Needed

CIVAN Extractors & Tanks

Not Just a Pretty Face!

Bottling Tanks, Wax Melters, Uncapping Tanks, Smokers



****Roberts Bee Company****

Over 100 Years of Commercial Package Shipping and Queen Raising Experience.

All packages come from Hives stored in the Jesup, Ga area year-round.

Young, Fresh, Healthy Honeybees and Queens.

****No old bees off pollination from California****



Call for Pricing and Availability

HandRapiaries.com
RobertsBeeCompany.com

2700 S. Macon St. Jesup, Ga 31545 Ph. (912) 427-7311



This small apiary is nice and flat, easy to drive to and has the advantages of foliage and fencing for privacy. It has a water source. The weights are on the hives in case of wind. The tallest hives are secured with straps because there is always the possibility of earthquakes in this county. These are factors beekeepers need to be aware of and prepare for.

This apiary has pros and cons. The pros are that it is behind a fence with a field between it and homes. The entrance is facing inward so the bees' flight path would not bother people on the other side of the fence. The main bad thing is that field of very dry grass is a fire hazard here in our very dry Summers. It should be mowed down! Note: this bee colony belonged to a 4-H beekeeper being mentored by Marcus Sugihara, my co-leader at the time.



Selecting Land for Your Bee Colonies

Ettamarie Peterson

Recently, I went to a farm conference and heard a talk on Farmland Assessment that gave some very good advice on how to decide what land is best for leasing. As I listened to the talk, my thoughts were on how much of this applies to beekeepers looking for places to keep any number of colonies. I realized a lot was good information, but even more considerations should be added.

Make yourself a list of what you must have and what you would like to have before you even go to the property. Some things such as access to water would be on your vital to your operation list.

Other things I would also consider would be roads to the exact location your bees would be set down on. Some roads might be unusable in wet weather. That would be a deal breaker if your colonies are going to the California almonds in early February. It might not be a problem if you are not intending to move the colonies once they were in place and don't mind hiking and transporting your hives and other equipment from a parking area to them.

Consider how safe the colonies are from thieves, animals, floods and fire. I recall being called to a friend's farm property to rescue bee colonies after the cows had knocked them over. The owner of the bees lived about fifty miles away and couldn't quickly get back to help. I hate to say it but, I had pointed out that problem and told my friend that owned the land there needed to be fences between her cattle and his bees. A few years ago, a friend lost sixty colonies to one of our California wildfires because he wasn't allowed into the area to truck them out before the fire destroyed them. I know two different beekeepers that lost several colonies to unexpected flooding. When selecting land, you must think of the worst-case possibilities.

When looking at land you are considering leasing or even short-term renting, bring your check list and make notes so you can compare properties later. Take pictures to help you remember what you saw. After looking at more than one site, it is easy to forget those mental notes you took. Trust your instincts and ask lots of questions. If that bothers the owners, maybe they are not people you want to be dealing with. It would help if you could do a background check on the land owner just as he would be expected to do one on you.

Overall, when looking for property, learn all the zoning restrictions. Generally, bees are welcomed onto rural land, but some areas might restrict number of colonies or distances between apiaries. Know how much land you will need. Some beekeepers might want to have a mobile home or travel trailer near the proposed apiary. Find out



This apiary is actually in Ireland. It has the advantage of being hidden away but had easy road access. Some places in the USA that have Summer rains could be like this. Unfortunately, we would not have this option in California! The beekeeper chose this spot because he knows there are no drones nearby to harm his breeding of the Irish Black Bee. Beekeepers should keep in mind what kind of bees are in the vicinity if they are doing any serious genetic breeding.



Before bringing in several colonies to this apiary, the beekeeper needs to spend time cleaning up the property. Those boards in the background are a hazard and make it difficult to do weed abatement. The building could be a real plus for storing equipment safely. Another plus is there is a cattle watering trough nearby where bees can safely access water by the float that keeps the water running.



This apiary was selected by a committee from the Sonoma County Beekeepers Association. They were allowed to use private land and built heavy duty hive stands. They selected it for privacy, access to water and not too difficult to move the equipment onto it plus there was an organic vegetable farm just on the other side of the hedge row. The equipment plus the hive stands were a large investment of funds.

what is allowed. It might be possible to have temporary housing. If housing is on your needs list, find out what the potable water and sewage disposal sources are.

As they say in the real estate business “Location, Location, Location” is important. How far away are lands that are being sprayed with chemicals that could harm your bees? In California, there is a BeeWhere program that by law makes beekeepers register their colonies and tell their location. They must notify the county when they are moved. This law protects the beekeepers because commercial agriculture operations must notify in a timely manner when spraying will occur. I remember listening to a bee speaker that said the quickest way to kill your hives is have them near a cornfield. If possible, I would

also want to keep my colonies close to my home for many reasons such as saving fuel costs and time.

Determine how compatible the landholder and the neighbors are to having an apiary on the property. In my county, many hobby beekeepers are adamantly against having commercial beekeepers nearby. They accuse them of causing robbing and carrying diseases. Recently there was an article in the newspaper talking about how wonderful it was that 120 colonies were going to be placed on county-owned land leased to a professional operation. The uproar from several hobby beekeepers started. The professional beekeeper told me that he and two other beekeepers I know have been leasing land around the county for the last twenty years without problems. He will try to have a reasonable discussion with the objectors. Hopefully it will work out for everyone.




Having secure storage near your colonies could be on your list. Find out if there is a safe place to use. If you have to build a storage unit or buy a prefab one, decide if the cost will “pencil out” as they say in accounting. If your expenses make a negative cash flow, that is not a good business model. Another cost could be fencing. If it is already there, make sure you have access to the colonies whenever you want to be there. It is easy enough to have chains with multiple combination locks. Explain how sometimes you might want to be there after dark to lock up the colonies for one reason or another.


Water is an important factor to consider. You need to know how reliable it is. The creek on our property is

Tech Transfer Team Services for Commercial Beekeepers!



OFFERED SERVICES:

-  Yard and Colony Health and Disease Monitoring
-  Hygienic Testing
-  Sampling and Analysis

-  Consulting Services
-  Field Trials

Visit beeinformed.org/services to learn more about **membership**.

beeinformed.org

Be included. Be involved. Bee informed.

LIBERTY
TABLETOP
AMERICA'S FLATWARE COMPANY
100% MADE IN THE USA

**HONEY BEE FLATWARE
100% MADE IN THE USA!**

**SAVE 10% ON
HONEY BEE FLATWARE
WITH CODE:
BEECULTURE10**

SHOP ONLINE AT LIBERTYTABLETOP.COM



Okay, here are your choices now that I have reviewed various options. Where in this picture would you want to put your bee colonies? I can see an ideal spot!

a dry creek once the rainy season stops. Our dry season can last for as much as six months, so my colonies have to depend on my well water. I remember visiting a beekeeper on the Greek Island of Milos. He had to bring large containers of water where he kept his bees because there was no close water. He also had to put large rocks on the hives to keep the wind from blowing them over!

The terrain is important. Flat land is much preferred for obvious reasons. If the only flat land is on the top of an incline, it will be more difficult to move your colonies to the level ground.

Besides considering how level an area is, think about how much sun, shade and wind to expect. Maybe you have found some land that has everything but some feature you value. Decide if you can change that, such as providing shade or a wind break. Remember to think about the cost.

Another important factor to investigate is insurance. Check with the owner about what is insured and what



This apiary is actually in a park in a community outside of Dublin, Ireland! I thought it might inspire some beekeepers to “think outside the box.” The rustic looking fencing is serving the purpose of changing the flight paths of the bees so no visitors will fear looking at the hives. Maybe some enterprising beekeeper could do something similar in his or her community and work out a deal to share the honey in return for use of the space. I think I would also design some educational posters to attach to the poles to promote organic gardening and knowledge of bees.

you would need to insure on your own. Typically, you will have to have owner’s insurance on your personal equipment much as you would have to have when renting a dwelling for yourself.

Get everything in writing and sign an agreement as to price, expectations of your responsibilities, promises made by the landowner and length of time the agreement is good for.

All these considerations and cautions might sound scary but remember you have an investment whether it is one colony or hundreds of colonies. **BC**

The Everything Bee Vacuum

Bring the fun back into doing removals

- Rechargeable L-Ion Battery, 6+ hour run time
- Remote speed control including whisper mode
- 40,000+ bee capacity with near-zero deaths
- 10 lbs total weight and back-pack carry
- Escape-proof design (built for Africanized bees)
- Designed for professionals, priced for hobbyists



Save Time,
Effort
and Bees



(512) 995-0058 | sales@AllMyBees.com | www.AllMyBees.com



The U.S. distributor for

LYSON

MADE IN
POLAND



FRIENDLY, HELPFUL CUSTOMER SUPPORT

QUALITY STAINLESS BEEKEEPING EQUIPMENT

POLLEN PROCESSING EQUIPMENT

SMALL AND LARGE POLLEN DRIERS AND CLEANERS

BEEKEEPING SUITS, JACKETS & VEILS

CALL US: **800-632-3379** | SHOP ONLINE: betterbee.com

**LYSON DEALER
INQUIRIES WELCOME!**

**Rossman
Apiaries
LLC**

For over 30 years,
we have produced
and provided fine
cypress beekeeping
equipment and now
offer a full line
of beekeeping
supplies.

www.gabees.com

1-800-333-7677

Containers



Queens



Cypress & Pine Equipment



Honey Extractor



Visit us: www.beelinewoodenware.com

Quality Hive Woodenware

Precision Manufacturing from USA Pine

Beekeeping Supplies


- Protective Clothing
- Frame Foundation
- Tools, Smokers & Feeders
- Harvesting & Storage
- Health Products

Bulk Orders
and
Dealerships
Welcome!

Beeline


Serving beekeepers since 2003

Mendon, Michigan: (269) 496-7001 | beeline@abcmailbox.net
Pueblo, Colorado: (719) 250-4005 | sales@beelineofcolorado.com
Rochester, Washington: (360) 280-5274 | beelineofwa@norcell.us




Save Money


Pumps and Spinners



2" Gear



3" Progressive Cavity



Cappings Spinner

Buy Cowen

www.cowenmfg.com 800-257-2894



STILL FAMILY OWNED AND OPERATED SINCE 1976
MANUFACTURER OF QUALITY WOODENWARE

Buzz on in to Miller Bee

We have everything you need!



VISIT US AT OUR NEW WEBSITE AND ENJOY FREE SHIPPING ON MOST ORDERS OVER \$150!

496 YELLOW BANKS RD
N. WILKESBORO, NC 28659
OPEN 8AM-4:30PM, MONDAY THRU FRIDAY

888-848-5184
WWW.MILLERBEESUPPLY.COM

Bees and Women

Susan E. Williams

Nina Bagley

In 1905, the first annual Harrisburg, Pennsylvania beekeeping convention was held on December 6th and 7th. Among the people who attended was a woman named Susan E. Williams of Moorestown, New Jersey. Miss Williams was a reasonably new beekeeper. She was a good listener and highly enthusiastic, making the speakers feel more at ease with her presence. E. R. Root found Miss Williams to be a part of a different class of women beekeepers. He complimented her on how she has enriched the beekeepers from all around and how these women occasionally give the beekeeping world some practical suggestions and scientific facts.

E.R. Root wrote "Scientific Amateurs" under the department of General Correspondence (The Modest Small Beekeepers), "Miss Williams has kept bees for a comparatively short time. She represents a type of "scientific amateur," if I may use the phrase. She has a neat apiary in her backyard where she gets much pleasure and profit." (*Gleanings*, 1908, Jan. 15, pg. 88). E. R. Root classified her as a "type" of a class of beekeeper who was not solely in it for the almighty dollar. He respected the fact she was a nature lover and that Miss Williams was performing an invaluable service.

Miss Susannah Williams was born in Burlington, New Jersey, in 1873, the youngest of six. Her father

was superintendent of West Town Boarding School in Chester County, PA. The family were orthodox Quakers. Miss Williams was interested in bees because a friend asked if she would teach a class to some children on natural history subjects. Miss Williams pleaded ignorance to get out of it. Now her friend insisted and said, indeed, you can read enough to be able to give a simple, childish talk. So, she gave in to her friend just like most of us would have done.

She started to read about bees, spiders and birds. Now, we can guess the results. We have all been there. Miss Williams became so interested in the bee world that she didn't even get around to the spiders and birds. Miss Williams wrote, "Spiders I abhorred, but I learned to tolerate them and greatly admire their skill and wisdom. But the bees I was fascinated with. Such industry! Such sagacity! Such cleanliness! Such perseverance! Truly, it borders on the miraculous." (*Beekeeping for Women*, A. I. Root, 1906.)

She read Maurice Maeterlinck's poetical book with much delight. She also read one of my favorites, Mrs. Comstock's *How to Keep Bees*, which was another treat. Mrs. Comstock was a regular writer in the mid-1800s for *Gleanings in Bee Culture*. She was a Quaker who wrote about her experiences in plants and beekeeping. A. I. Root called her a particular type of



woman. Miss Williams also studied the *ABC and XYZ of Bee Culture* by A. I. Root. Her interest grew, and she planned to have bees in the Spring of 1905.

She had an older sister Rachael, a doctor, and she had three hives of the standard black bees and said she could take care of them for a share of the honey, which she agreed. Having read so much, she still did not know what a bee looked like or the inside of a hive. So in May of 1905, Miss Williams commenced her beekeeping adventure at thirty-two. She wrote this: "No veteran can imagine the awe with which I first beheld the interior of those hives, and how I should ever learn to handle the frames was a frightful unsolved problem. My friend ascertained that one colony was queenless (a fact I never should have discovered alone), and he deemed it wise to unite the bees to other col-

Mrs. Williams Spencer



Agnes Spencer (Daughter)



onies. This he did and removed the hive. Thus my stock was reduced to two colonies.”

When Spring came around, she sought help from two beekeepers, Mr. Selser and Mr. Horner. The two men kindly invited her to see their work with the bees occasionally, learning more from them than she could ever gather from books.

Miss Williams purchased an Italian hive from A. I. Root, and she thought they were beauties and never



Miss Williams and Mr. Selser



Dr. Rachel Williams (sister)



tired of looking at them. She would eventually replace all of her black queens with Italians, and she thought it was short of a miracle to see the bees turn yellow. Now she needed to figure out the financial part of it, but she hoped to make it pay one day. A beekeeper of long-standing said to her, “Remember, you are now getting experience, and experience costs money.”

She started with two hives in 1905. The following year, she increased her hives to six. She took over a hundred and twenty pounds of honey off her bees and increased her hives in 1907 to twenty-five using the Alexander method of taking off a thousand pounds of honey. In addition to that, she caught two swarms that year. Miss Williams was accustomed to getting stung. She compared it to a mosquito bite.

In conclusion, she wrote: “I have nothing to say to those who must make money at beekeeping, for I have not tried it long enough to know of which I speak, but for those who wish a pleasant, healthful, varied and interesting occupation. I would say keep bees by all means, and you will be repaid in honey and health, at least.” (*Beekeeping for Women*, A. I. Root, 1906.)

Miss Williams would continue beekeeping. She would marry a Mr. Rueben Hall-Spencer, born in 1879 in Sheffield, Yorkshire, England. They were married in Morristown, New Jersey, on April 17th, 1915. Rueben was a bookkeeper for a coal company. Now Mrs. Susan Williams Spencer, would give birth to a daughter, Agnes W. Spencer, in 1918.

Short-term birth sequelae of the 1918-1920 Influenza pandemic in the United States, caused a high rate of maternal deaths. Mrs. Spencer was forty-six years old, so there were risks for a woman having children at her

age. She was blessed with a healthy daughter, Agnes, named after Rueben’s mother.

She was seventy-two when her husband, Rueben, passed away on April 11th, 1945. He was sixty-one.

Her daughter Agnes graduated from college. She worked as a secretary and married John Newman Sumner at forty-one. He was married before to Mrs. Margaret Southhall Hayman of Moorestown. They had three daughters when she passed away in 1958. The following year, John N. Sumner married Agnes W. Spencer at her cousin’s home in Moorestown, New Jersey. It was her first marriage. She was only married for twelve years before she passed away at age fifty-one on February 8th, 1970. Mrs. Susanna Williams Spencer passed away the following year, on November 3rd, 1971. She was ninety-eight.

I would agree in her case that keeping bees rewarded her with honey and good health. I know Mrs. Williams Spencer knew little about the bees when she began. But I believe she figured out over the years how to make the bees pay for themselves and still enjoy the honey. Beekeeping is hard work. All that hard work extracting the honey gave her an appreciation for the bees and brought happiness and honey, and if the bees made a little money, that was her reward. Mrs. Spencer enjoyed her honey on waffles during the Winter. She said they were so wholesome and delicious! “One of nature’s finest gifts.”

“He is not worthy of the honeycomb, that shuns the hives because the bees have stings.”

~ William Shakespeare **BC**

Nina Bagley
Ohio Queen Bee
Columbus, Ohio



QUEEN BEES
NEXT DAY AIR QUEEN DELIVERY

RUSSIAN • ITALIAN • CARNIOLAN

LOCAL PACKAGES & NUCS



VARROA SENSITIVE HYGIENIC & DISEASE RESISTANT
45+ YEARS EXPERIENCE

CONTACT US TO ORDER:
(707) 449-0440
ORDERS@HONEYBEEGENETICS.COM
WWW.HONEYBEEGENETICS.COM

"Honeybees are the backbone of agriculture"

**STRACHAN
APIARIES INC.**



New World Carniolan
Bees & Queens


We select for hygienic behavior, honey production,
mite resistance, and gentleness.



2522 Tierra Buena Rd
Yuba City, CA
95993-9654
www.strachanbees.com


Phone: (530) 674-3881
Fax: (530) 674-5802
orders@strachanbees.com

**ONLINE YEAR-ROUND
Beekeeping
COURSES**




"Our Beekeeping program will give you the strongest possible foundation and the best chance at keeping healthy, prosperous hives."

- DR. JERRY BROMENSHENK



UMT.EDU/BEE



OxaVap.com

Your Best Source for Oxalic Acid Vaporizers

**Don't let mites kill your bees!
Vaporize them with an OxaVap Vaporizer!**




Featuring the Award Winning All Steel / Stainless Steel Water "Dunkable" Varroax and the 20 Second, 110 Volt ProVap Vaporizers! Most Cost Effective Varroa Treatment Available and the Only One Where You Don't Need to Open the Hive to Treat!

The only good mite is a "vaporized" one!

WE'RE BUYING HONEY ACROSS THE U.S.A.



<p>ERIC WENGER EWenger@barkmanhoney.com 620-877-0035</p>		<p>CANDACE MOSS CMoss@barkmanhoney.com 620-877-0161</p>		<p>Barkman Honey barkmanhoney.com</p>
---	---	--	---	--

Check your mailing labels! Next to your renew code are your remaining issues left. We suggest renewing if you have 3 or fewer!

www.BeeCulture.com



Wicwas Press, LLC ESSENTIALS

1620 Miller Road, Kalamazoo MI 49001
ljconnor@aol.com www.wicwas.com

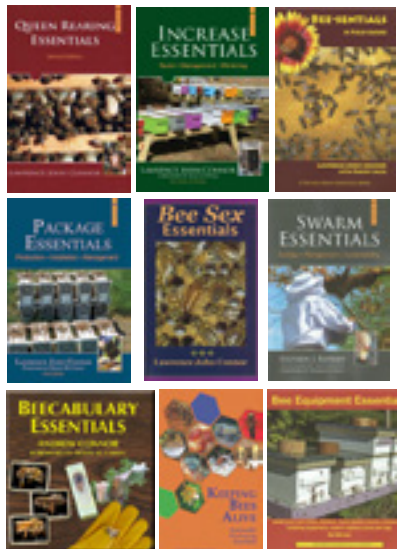
ESSENTIALS SERIES

Lawrence John Connor

QUALITY BEE BOOKS:

- Queen Rearing Essentials \$25
- Increase Essentials \$25
- Bee-Sententials: A Field Guide \$28
- Package Essentials \$28
- Bee Sex Essentials \$25
- Swarm Essentials (S. Repasky) \$25
- BeeCabulary (A. Connor) \$34
- Keeping Bees Alive \$28
- Equipment Essentials (E. Simon) \$20

Easy to read. Fully illustrated.
Full color. Postpaid in USA.



A beautifully illustrated introduction to the incredible variety of bees from around the world



A portable, full-color photographic guide to the most commonly seen bees in the western United States and Canada

 PRINCETON
UNIVERSITY
PRESS

Bee's Strategy for Sticky Resin Handling

Dvykaliuk Roman

Propolis is a sticky resinous substance collected from buds, leaves and stems of wild plants and processed by bees. It has bactericidal properties which they use for sealing cracks in the hive, polishing walls of wax cells and embalming corpses of enemies (mice, reptiles, etc.) (DSTU 4662:2006, 2006). Propolis is divided into types depending on the botanical source from which the plant resin originates. Today, the following main types of propolis are known: Brazilian Red Propolis, Brazilian Green Propolis, Aspen Type Propolis, Mediterranean Propolis, Poplar Type Propolis, Pacific Propolis Type and Mangifera Propolis Type (Popova et al., 2022). Many plants in the world generate sticky substances. Langenheim (2003) points out that it is a mistake to generalize all plant secretions (juice, escudates) as resin. The secretions previously confused with resin can be distinguished from pure resin by their chemical composition and biosynthetic pathways by which they are produced. Honey bees select resins that are moderately sticky so that they can manipulate them and soft enough to cut them off a plant surface with mandibles (Salatino and Salatino, 2017). At the same time, Isidorov et al. (2016) assumes that the selective behavior of bees during the search and accumulation of resin is due to its antimicrobial properties, since the main function of propolis in the bee family is protection against pathogens. Presumably, other resins contain substances that, on the contrary, repel bees. Plants generate secretions, including resins, as protection against pests and herbivores. Accordingly, the assumption that some substances repel, in particular, honey bees can be quite reasonable. When collecting plant resin, bees use their mandibles to cut it and their rear legs to carry this resin to the nest. Kekeçoğlu et al. (2019) studied the interdependence of morphological features of bee races (*Apis mellifera caucasica*, *Apis mellifera carnica* and *Apis mellifera syriaca*) and productivity of propolis harvesting by bee families. A wing size, a proboscis length, a leg size and a mandible size were taken into account in the study. The results show that the size of the bee body parts involved in harvesting, transportation and making propolis, affect the propolis productivity. These results confirm the need for beekeepers to renew honeycombs in the bee nest and make a variety of food available for breeding full-fledged bees and, accordingly, the proper population.

Saccardi et al. (2021) conducted a thorough study of the adhesive properties of propolis. The material for the study was propolis obtained from a nest of honey bees. Propolis was studied under different conditions, such as changes in temperature, compression force and on different substrates (glass, steel, plastic, etc.). Researchers note: propolis sticks to a wide range of substrates, even when the substrate is placed under water or in oil. Storing propolis for seven hours at room temperature (24°C) showed that the samples lost ~0.9% of their weight during this period. Therefore, the question is how honey bees cope with such an adhesive substance (mixture of substances) as propolis. Saccardi et al. (2022) investigated the interaction between propolis and honey bee mandibles and studied in detail the surface structure of the inner part of the honey bee mandible. This surface is in contact with propolis, so authors focused on possible effects of structure to the surface adhesion of propolis. Microphotographs of the bee mandible surface showed that they are covered with anisotropic micro-patterns similar to scales. During the study, they tested the adhesion of propolis to selected mandibles, some of which were washed with various chemicals. The researchers found that bee mandibles are covered with mandibular gland enzyme. The low contact angle (<30°) of the enzyme suggests that the mandibular surface may be oleophilic. The propolis adhesion reduced by four times in the presence of a layer of natural enzyme on the upper part of the mandibular epicuticle, while the scale-like micro-pattern on the mandible may promote the spread of fluid.

In 2019, we developed collectors to explore new ways of collecting propolis from honey bees in conditions of the temperate microclimate of Ukraine. Collectors are shaped like a hive frame measuring 435×300 mm. Three types of collectors were used in the experiment, as shown in Figure 1. The first type

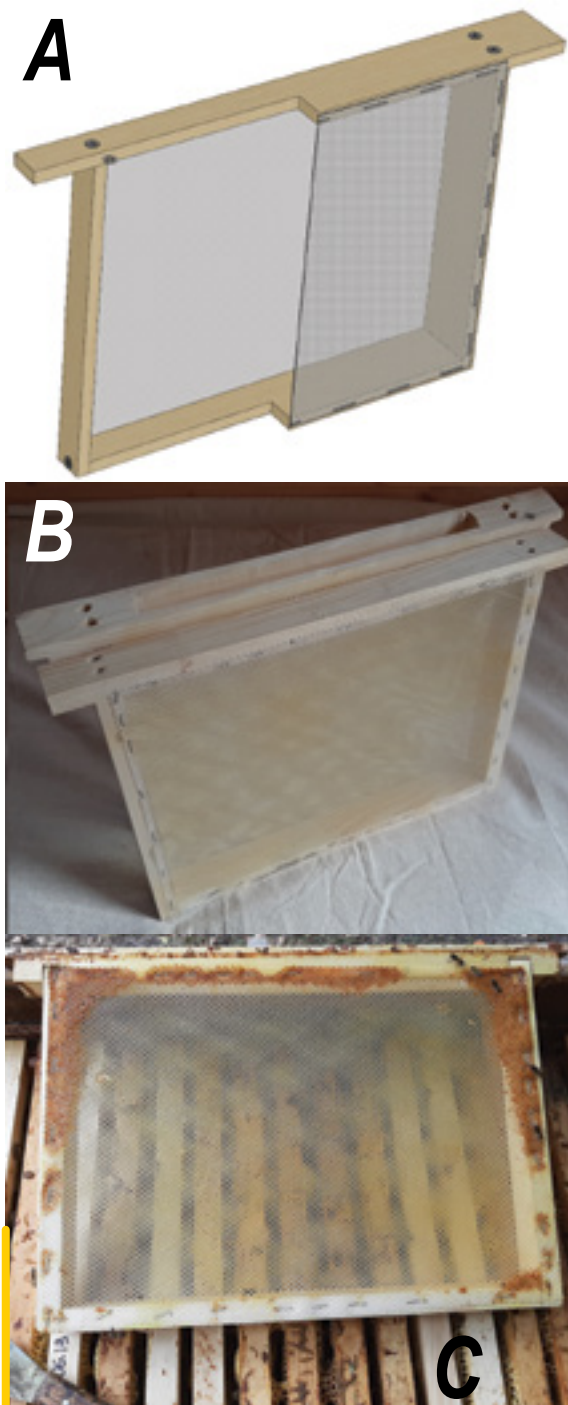


Figure 1. Collectors for collecting propolis: A – 3D-collector model in the form of a hive frame in sections; B – manufactured collectors of different types that were used in the study; C – a collector during the inspection of the experimental bee family with partial deposition of propolis

was made of a solid frame, the second type had a cut hole in the upper bar (Figure 1A), and the third type had a wick for wetting with essential oil and stimulating bees with foreign odors to lay propolis. An elastic mesh of



A

Figure 2. Propolis formations on wooden collector strips: A – general photo of the lower collector strip with was crumbs and propolis drops; B – a drop of propolis on a wooden collector strip with measurement of its diameter

Stanz Pres ethyl vinyl acetate is attached to both sides of the collector with metal brackets.

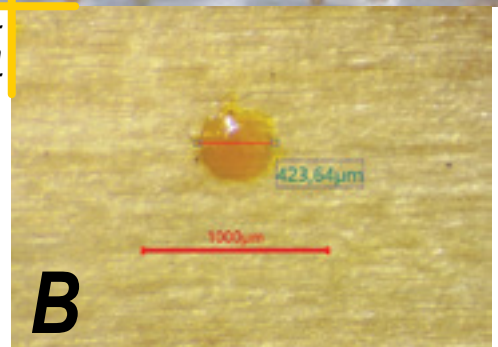
The study was conducted at an apiary located in the Kyiv region of Ukraine. According to its results, it should be noted that this method of collecting propolis has low-productivity in terms of output. At the same time, according to organoleptic indicators, propolis was clean and did not contain wax. Collectors in the nest of honey bees were organized to prevent bees from getting inside the collector at any time. During a detailed inspection of collectors, formation of sitting drops was found inside on the lower bar of the collector (Figure 2). By consistency and color, they corresponded to propolis contained in the nets.

We performed a microscopic analysis of the formations diameter in each collector type and proved for the first time that honey bees, manipulating propolis in the nest and devices for its collection, can lose propolis due to its liquefaction to a liquid state (Dvykaliuk et al., 2022). Until now, it was known that bees lose wax crumbs when rebuilding honeycombs. Since propolis is liquefied to a liquid state, there is a need to investigate how the liquid phase of propolis interacts with various artificial materials. Nets inspection results suggest that bees first cover the perimeter of a mesh opening with propolis, and only then – the center. Wettability of the artificial material with liquid propolis at the place of its deposition by a bee would contribute to self-covering due to spreading around the perimeter of a mesh opening. This, in turn, can contribute to an increase in the propolis intake by reducing the time taken by bees to cover a mesh opening perimeter. Today, the manufacture of nets and meshes for propolis collection is mainly focused on the opening size, durability of the material, its acceptability for contact with food and suitability for cleaning from propolis deposited by bees. We are not aware of any studies aimed at finding materials that are wetted with liquid propolis, as well as finding optimal reliefs that would facilitate such wetting.

In 2022, as part of our research on propolis in Ukraine, we installed 70 propolis collection screens at 10 apiaries managed by members of the Foundation of Women Beekeepers. It was discovered that propolis drops were also present on the screens (Figure 3), which further confirms our earlier findings using collectors (Figure 1.)

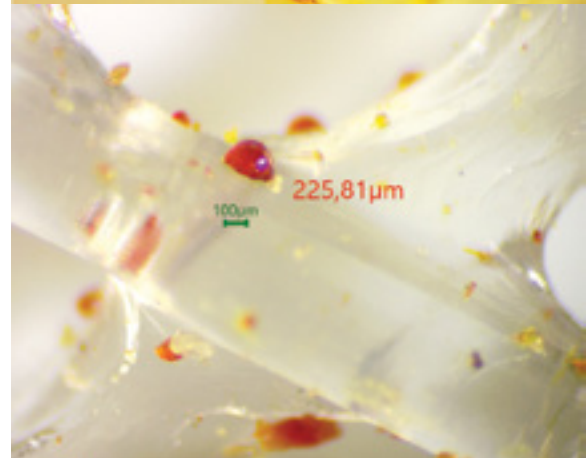
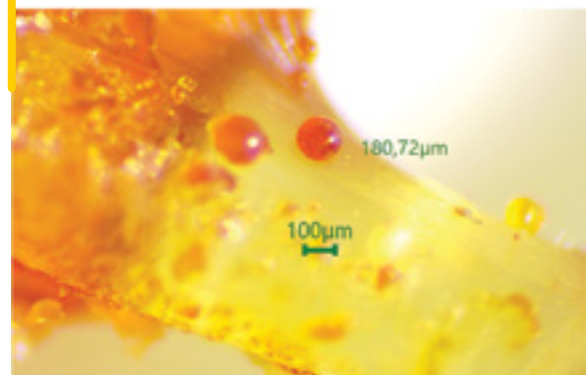
Surface wettability is important in many fields of science and technology – from the mining industry to the creation of modern functional materials and biomedical products (Beketov and Shynkarenko, 2022).

Measuring the contact angle allows understanding how a surface interacts with a three-phase system (solid/liquid/air). One of the most common methods of analyzing the contact angle is through direct measurement of the



B

Figure 3. Images of propolis collections screens and propolis drops applied by bees in Ukraine in 2022.



tangent angle at the point of distribution of the three-phase equilibrium using the sessile drop method. For flat surfaces, the wetting property was determined by directly measuring the contact angle through drop profile observation (Figure 4). A contact angle value of $0 > 90$ degrees indicates surface non-wettability, which is referred to as hydrophobic. When the contact angle value is $0 < 90$ degrees, the surface is referred to as hydrophilic (Hebbar et al., 2017).

Summing up, it is worth noting that this is the first study in this direction. It is not known whether honey bees liquify other types of propolis to such a liquid state, especially when it comes to propolis from tropical countries, namely Brazilian Red Propolis and Brazilian Green Propolis. In the future, it is necessary to study artificial materials for their wettability with propolis liquefied by honey bees. Given study results of the bee ethology during the accumulation of propolis in collectors, it is possible to revise approaches to production of meshes and grids for its collection. In addition, we have gained new knowledge on bee behavior and propolis management in a moderate climate zone. Today, the production of materials from various raw materials creates a significant range of products on the market. Additionally, these materials are processed to alter the structure properties using surface coatings, spraying, polishing or changing the roughness and using lasers. All these achievements should also be considered in beekeeping in order to increase the amount of valuable raw materials such as propolis. **BC**

Dvykaliuk Roman, Chairman of the Board of *BeesAgro* Controlled Pollination Association; PhD candidate of the National University of Life and Environmental Sciences of Ukraine; Kyiv, Ukraine. **E-mail:** Roman.Dvykaliuk@delta-sport.kiev.ua

References

1. DSTU 4662:2006 (2007). Propolis. Tekhnichni umovy [Propolis. Technical specifications]. DSTU 4662:2006 from 1st July 2007. Kyiv: Derzhspozhyvstandart Ukrainy [in Ukrainian].
2. Popova, M., Trusheva, B., & Bankova, V. (2022). Chemistry and Applications of Propolis. In Murthy, H. N. (eds.), Gums, Resins and Latexes of Plant Origin. Reference Series in Phytochemistry. Springer, Cham. https://doi.org/10.1007/978-3-030-91378-6_38.
3. Langenheim, Jean H. (2003). Plant resins: chemistry, evolution, ecology, and ethnobotany / Jean H. Langenheim. p. cm. Includes bibliographical references (p. 586). ISBN 0-88192-574-8.
4. Salatino, A., & Salatino, M. L. F. (2017). Why do honeybees exploit so few plant species as propolis sources? *MOJ Food Processing & Technology*, 4(5), 158–160. <https://doi.org/10.15406/mojfpt.2017.04.00107>.
5. Isidorov, V. A., Bakier, S., Piroznikow, E., Zambrzycka, M., & Swiecicka, I. (2016). Selective behaviour of honey bees in acquiring European propolis plant precursors. *Journal of Chemical Ecology*, 42(6), 475–485. <https://doi.org/10.1007/s10886-016-0708-9>.
6. Kekeçođlu, M., Erođlu, N., Kambur, M., & Mũnir, U. Ç. A. K. (2020). The relationships between propolis collecting capability and morphometric features of some honey bee races and ecotypes in anatolia. *Journal of Agricultural Sciences*, 26(1), 71–77. <https://doi.org/10.15832/ankutbd.447319>.
7. Saccardi, L., Schiebl, J., Weber, K., Schwarz, O., Gorb, S., & Kovalev, A. (2021). Adhesive behavior of propolis on different substrates. *Frontiers in Mechanical Engineering*, 7, 660517. <https://doi.org/10.3389/fmech.2021.660517>.
8. Saccardi, L., Brũmmer, F., Schiebl, J., Schwarz, O., Kovalev, A., & Gorb, S. (2022). Interaction between honey bee mandibles and propolis. *Beilstein Journal of Nanotechnology*, 13, 958–974. <https://doi.org/10.3762/bjnano.13.84>.
9. Dvykaliuk, R., Adamchuk, L., & Pylypko, K. (2022) Propolis Drops as Evidence for Dilution of Propolis by Honey Bees?, *Bee World*, 99:4, 110–116, <https://doi.org/10.1080/0005772X.2022.2094139>.
10. Beketov, G., Shynkarenko, O. (2022). Surface wetting and contactangle: basics and characterisation. *Himia, Fizika ta Tehnologija Poverhni*. 13(1). 3–35. <https://doi.org/10.15407/hftp13.01.003>.
11. Hebbar, R. S., Isloor, A. M., & Ismail, A. F. (2017). Contact angle measurements. In *Membrane characterization*. Elsevier. 219–255. <https://doi.org/10.1016/B978-0-444-63776-5.00012-7>.

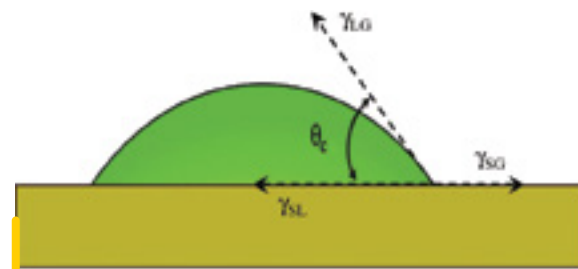


Figure 4. Contact angle formed by a liquid spreading on a surface (Hebbar et al., 2017)


 The Bee & Butterfly
Habitat Fund
A Unique Conservation Solution.

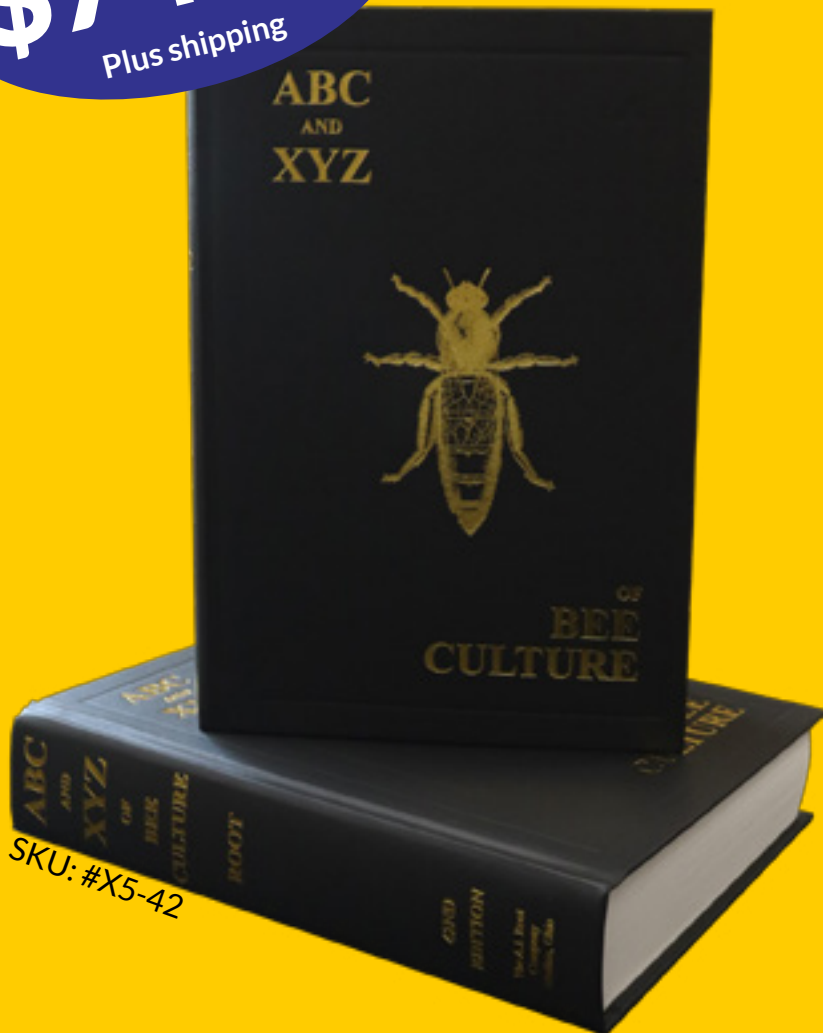
GIVE THE GIFT OF HABITAT

Your support of just \$100 will plant 1 acre of high-quality habitat for honey bees, monarch butterflies and other wildlife. Donate today at beecandbutterflyfund.org/donate.

Our newest edition!

The 42nd Edition of the *ABC and XYZ of Bee Culture*

\$74.99
Plus shipping



The ABC and XYZ of Bee Culture has been keeping beekeepers around the world successful since 1877!

- Over 800 pages packed with information
- Hundreds of color photos and illustrations throughout
- More than 50 contributors discuss everything honey bee
- This book is a mix of reference, the how and why things are done and a history of how beekeeping got where it is today
- A must for every beekeeper large and small

Get your copy today at
www.Store.BeeCulture.com/Books/

Quality Inspired by Nature

Promotes productivity of honeybees

Helps maintain healthy colonies

Treats honeybees the natural way

nozevit^{Plus}

The Original Solution

Your partner in helping maintain the intended well-being and integrity of your honeybee colonies

Available at the following retailers or see your local beekeeping supply store.

info@beekeeping.com • Pierco • Dadant & Sons • Global Patties

17c per jar

Brought to you by: **Complete Bee** www.completebee.com

Makers of Results Driven Products:

WHERE BEEKEEPERS GET

BEES

& BEEKEEPING SUPPLIES

Order Now For Spring 2023

- Weaver Buckfast & Italian Queens
- 3# Package Bees
- 4-Frame Nucs
- Established Colonies
- Beekeeping Supplies
- Beekeeping Classes

SHOP RWEAVER.COM OR CALL (936) 825-2333

SUNSHINE HONEY BEES

LAYING QUEENS

SUNSHINE HONEY BEES
PO BOX 1192
LECOMPTE LA 71346

318-542-5192
318-528-9413

OFFICE@SUNSHINEHONEYBEES.COM

simple harmony farms

HIVE TOOL

LIKE A THIRD HAND!

simpleharmonyfarms.com

Subscribe to keep your Hives Alive!

Monthly Magazine
100+ pages every month

Science & How To
Articles that keep you informed about the latest scientific advancements and hive management techniques

Great Columnists
including:
Peter Borst
Randy Oliver
Rusty Burlew
Wyatt Mangum
Jamie Ellis
Scott McArt

Beekeeping Basics
Covering critical topics for beginners every month

And So Much More...

VOLUME 13 NUMBER 10

AMERICAN BEE JOURNAL

Should We Fear SG? — 1107

DO-IT-YOURSELF BEAR FENCE — 1113

A Pollination Primer — 1125

www.americanbeejournal.com

AMERICAN BEE JOURNAL *Subscribe Now!*

Stay informed every month for the price of a cup of coffee.

All prices good through December 31, 2023

<input type="checkbox"/> New Subscription Allow six weeks	<input type="checkbox"/> Renew Subscription Please include customer number	U.S.
<input type="checkbox"/> Order Back Issues Current year \$5.00 each plus postage For other back issues, write for prices	<input type="checkbox"/> Change of Address Include address/label reference or customer number	<input type="checkbox"/> 1 Year \$32.00
Prices subject to change without notice		<input type="checkbox"/> 2 Years \$58.00
		<input type="checkbox"/> 3 Years \$81.00
		Canada
		<input type="checkbox"/> 1 Year \$53.00
		<input type="checkbox"/> 2 Years \$98.00
		Foreign
		<input type="checkbox"/> 1 Year \$63.00
		<input type="checkbox"/> 2 Years \$113.00
		Digital
		<input type="checkbox"/> 1 Year \$16.00
		<input type="checkbox"/> 2 Years \$32.00

Date _____
Name _____
Address _____
Address _____
City _____ State _____ Zip _____

American Bee Journal
51 S. 2nd St., Hamilton, IL 62341
www.americanbeejournal.com

Ph: 217-847-3324
Fax: 217-847-3660
1-888-922-1293



APPLIED BEEKEEPING IN THE UNITED STATES

Excellent for bee courses and
reference

2021 CIPA EVVYTM Awards Book
Second Place Competition Winner

BEEKEEPING TIPS AND TECHNIQUES

This book is for the beginner
through advanced beekeeper



FOR MORE INFORMATION

Go to Outskirts Press: <https://outskirtspress.com/>

Also available from these sellers: Amazon, Barnes & Noble, BAM, and Dadant (only Applied Beekeeping)



SPLITTING COLONIES

FOR THE SMALL-SCALE BEEKEEPER

David MacFawn

SPLITTING COLONIES

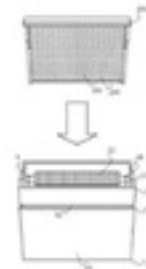
This book is for the
small-scale beekeeper.

FOR MORE INFORMATION

Go to Northern Bee Books:
<https://www.northernbeebooks.co.uk/>

simple harmony farms

UNCAPPER



Patent Pending © 2014/15

IT'S FAST

simpleharmonyfarms.com



“We love your uncapper!
It’s the best!”

Steve Hiatt
Bowman, ND

We sell liquid sucrose and
55% High Fructose Corn Syrup
as feed for your bees.

Dakota Gunness, Inc.

P.O. Box 106, Abercrombie, ND 58001

888.553.8393 or 701.553.8393

dakgunn@rrt.net • www.dakotagunness.com



sailorplastics.com

1-800-380-7429

Visit our website
for all of your
bottling needs!

SULLIVAN'S QUEENS

Mated Queens
5-19 \$29
20-49 \$25
50-99 \$23
100+ \$21

Queen Cells \$5
PICK-UP ONLY

Sullivan's Bees has 30+ years of experience, genetically producing better mated queens. Email Shad Sullivan at bees@outskirtsol.com

ORDER TODAY FROM: sullivanbees.com

Located in
Atwater, CA

Queen Right Colonies

Over 50 Years
& 5 Generations
of Beekeeping
Experience

Beekeeping Supplies
Package Bees
Woodenware
Hive Evaluations
Order Queens Today!

ATTEMPTED
GUINNESS
WORLD
RECORD

queenrightcolonies.com

43655 State Route 162 • Spencer, OH 44275
440-647-2602
info@queenrightcolonies.com

More Honey Less Work

Dick Vermeulen

I am a first year beekeeper addicted to watching my bees work. I think it is called "bee-fever". I am also an avid woodworker. One of the most pleasant surprises of learning the bee craft has been the ability to build my own hive boxes and components. If I see an interesting new piece of bee equipment, I have to build it myself and add a few design modifications that I hope will improve its function for my bees. My wife hopes this frenzy of building bee equipment will subside soon and I can get back to finishing the doors for our kitchen cabinets.

I live in mid-coast Maine, four miles inland from Penobscot Bay. The first half of the Summer was amazing with happy bees and a happy keeper. I added two supers to my two deeps the middle of July and by the first week in August the supers had over ten frames of capped honey. This beekeeping was easy. Experienced beekeepers know that's a lie.

Reality hit when my queen died and the robbers showed up the third week of August. I bought a new queen and robber screen and the colony calmed. The end of August was time for my monthly mite check. Off came the outer and inner covers, then the two honey supers, which the bees defended with warning head bumps to my veil. I tilted the top deep on to a platform and that upset the bees even more. Finally, I got to the nurse bees in the

bottom brood box to get my ½ cup sample of bees and all hell broke loose. I think I had more bees on my veil than in the cup. There has to be a better way to do this. I had seen the Ian Steppler video where he tilts the entire hive off the bottom board and holds it at 45 degree angle while shooting the video and collecting his mite sample off the bottoms of the frames. He makes it look easy but I know if I tried that, all four boxes would be on the ground.

Why do I have to take the entire hive apart and disturb every box of bees to get a frame with brood and nurse bees? When the roof comes off the hive the bees are stressed and stressed bees are not productive bees. How long does it take for the colony to settle and get back to being fully productive? I have read it might be a week or two.

Is there a better way? I believe there is. My goals are simple: more honey, less work for the beekeeper and less stress on the bees (and the keeper) during inspections. I also want all frames fitted with standard Langstroth deep 8½" by 16¾" foundation so I can move resources as needed to any area of the hive. If this new hive design could allow for storage of frames not needed by the colony during the Winter, it would be an added benefit.

Honey bees will make more honey if they are disturbed less, have a strong healthy population, extra storage space is provided when needed and ventilation can be increased during the honey flow. Our bees are disturbed by predators, disease, lack of good nutrition and their keepers. I believe a hybrid AZ hive mounted two feet off the ground and physically attached to the hive stand in a small shed provides maximum protection from four-legged vandals. Also robbing can be reduced if the hive never has to be taken apart during a nectar dearth.

This hive design provides easier access for mite checks which will help beekeepers perform this needed

sampling even when hives are at their worst temper. A large protected top feeder provides carbohydrates and pollen substitutes when natural sources are not available, to encourage brood production and maintain strong populations. Extra space is easily added by moving the crown board up and installing another chamber of frames. Ventilation can be controlled providing good air circulation to help dehydrate the nectar into honey during the Summer. During the Winter, hive air is recirculated in the back chamber through moisture absorbent foam while conserving heat and reducing the amount of honey consumed by the cluster to stay warm.

Back door, vents open | Back solid hinged door





AZ sticky board out

For the beekeeper, this type of hive will be easy to manage. Simply open the back screen door behind the comb you want to inspect and pull out frames like books off a shelf. Propolis is greatly reduced on the cove cut bottom frame bars resting on the $\frac{3}{8}$ " rods providing very little contact area. The frame spacers also provide little contact area and frames no longer have to be cracked apart or pushed against an adjacent frame, crushing bees. You can pull out a brood frame from the bottom chamber and never lift a box of honey or disturb the bees above. Easier on the beekeeper and less stress on the bees. The only physical strength you need to keep bees is to be able to lift a single frame.

As a new beekeeper, being able to see what is going on inside the box will help me learn more than just watching the landing board. The rear screen doors provide observation of the hive activity with minimal disruption. I can monitor colony growth without opening the hive. Kids of all ages can look inside the hive without protective gear. Bring the neighbors over for a glass of mead to watch the bees work. They might get hooked.

I only see one possible negative with this type of hive design – you may have to spend more time extracting honey and bottling. But for me, that's the goal.

The AZ hive was invented by Anton Znidersic (1874-1947) inspired by Adolf Alberti, a German beekeeper. Anton named his new design AZ honoring Alberti. The original AZ frames are $16\frac{1}{8}$ " (410mm) by $10\frac{1}{4}$ " (260mm). A typical two chamber AZ hive is 25" high with a volume



AZ top feeder floating racks

of 90 liters. Anton grew up in Slovenia, which must be the beekeeper's capitol of the world. One out of every 200 Slovenians keeps bees. My queen is a Carniolan honey bee (*Apis mellifera carnica*) which is the only honey bee allowed in Slovenia. I don't think my queen remembers her home land, but building a couple of hybrid AZ hives became my quest.

I am convinced that providing bees a wooden enclosure which resembles a hollow tree makes the best living quarters for bees to be productive and remain healthy. A natural honey bee nest in a hollow tree has several inches of wood providing insulation moderating the effect of outside temperature changes. The hive arrangement should be vertical like the honey bee's natural nest which is easier to heat and cool. Using a movable crown board in a single large box, I can expand or contract the interior hive volume without moving any boxes. My hybrid AZ hive is 45" high by 24" deep by $14\frac{3}{4}$ " wide. The total interior hive volume is 186 liters. Using insulated panel construction, I provided an R-value of six (same as five inches of wood in a feral hive) and kept the weight down to 50 pounds.

I based my interior hive measurements on $\frac{3}{8}$ " bee space with $17\frac{5}{8}$ " by $9\frac{1}{2}$ " frames. AZ frame spacers can be purchased from <https://www.azframespacers.com/> and the $\frac{3}{8}$ " diameter aluminum rods from <https://www.onlinemetals.com/>. I purchased the balance of the materials from my local lumber yard and Home Depot.

I used $\frac{1}{4}$ " birch plywood for the interior panels glued to one inch by one inch pine framing on all edges. The interior side panels are 24" by 45" and routed for the $\frac{3}{8}$ " rods used to support the frames and provide a keeper

to hold the rear screened doors in place. I built a jig for my router to cut the $\frac{3}{8}$ " wide by $3\frac{1}{2}$ " long slots allowing one setup to machine 12 slots per side to hold the rods for each of the four chambers. All four chambers use the same size deep frame which is ideal for brood production and honey storage.

Rigid foam insulation panels are one inch thick polystyrene with foil facing on each side that I glued into each of the framed panels with Loctite PL300 foam board adhesive. I would recommend using foil faced polyurethane foam panels for a slightly higher R-value. On the two sides I covered the insulated panels with $1/16$ " white Polywall plastic panels from Home Depot. On my first box, I used $1/4$ " birch plywood for the exterior front wall, which I painted. The second hive I built used $3/4$ " tongue and groove beaded pine boards laid horizontally for the front wall. I believe the pine boards will hold up better than $1/4$ " plywood, and being attached to outside of the frame, should not affect the dimensional stability of the interior $1/4$ " panel.

I allowed a $1\frac{1}{2}$ " space under the bottom three support rods in the first chamber for a screened bottom board and sticky board tray. Sampling the sticky board will give me a good window into the bee's current activity and eliminate some mites my bees may have removed. This is another opportunity to learn more about the colony without disturbing the bees. Removing the bottom board tray with the sticky board provides good access under bottom frames to clear debris not captured by the sticky board.

AZ top feeder with screen



Govee temp and humidity sensor

The screened access doors to each chamber are $14\frac{3}{4}$ " wide by 10" high using $1\frac{3}{4}$ " wide rails and stiles. The center is covered with #8 hardware cloth flush inside to maintain bee space. Two AZ frame spacers are attached to this same surface to maintain proper bee space.

I built the large back door $17\frac{3}{8}$ " x 46" using $2\frac{1}{4}$ " wide rails and stiles and a $1/4$ " birch plywood panel center panel. The top ventilation shutter is $2\frac{3}{4}$ " high and bottom vent is $3\frac{1}{2}$ " high. When the shutters are closed, the bees still get fresh air through the front main entrance that flows out the back screen doors into the back chamber.

For the moveable crown board I used a piece of the one inch insulation board $14\frac{5}{8}$ " by $18\frac{3}{4}$ ". I cut a $1\frac{1}{2}$ " square by $\frac{5}{8}$ " deep section out of foam to mount a Govee

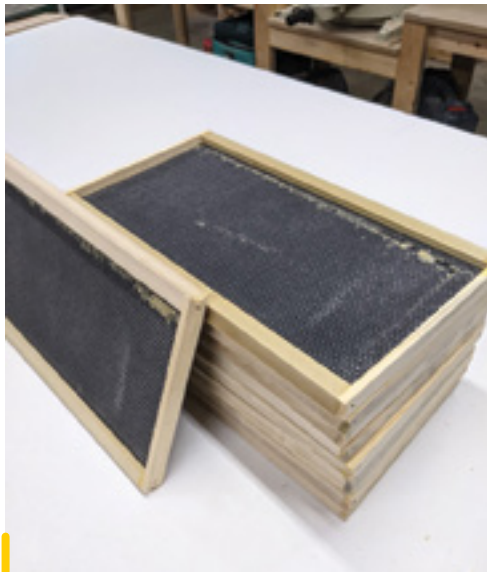
AZ hive insulated panels



Bluetooth thermometer and humidity sensor. This provides more good information to avoid swarming and make sure the Winter cluster is staying warm and able to reach their stored honey.

This type of hive design could be used to perform splits, hiving both nucs in the same box using follower boards in two chambers and allowing the two new nucs to share heat. This benefits both new colonies conserving energy, allowing heat to be exchanged in the vertical stack. Queen rearing is perfect in this hive arrangement being able to load all four chambers with thousands of nurse bees to feed the queen cells.

I have read bees speak to us – we just don't understand – unless we watch and listen to what they are working on each day. I believe this type of hybrid AZ hive gives us the best opportunity to learn and understand what is best for our bees. Be good to your bees and build them a great home – they just might thank you by producing more honey. **BC**



Completed AZ frames



AZ insulated crown board

AZ hive painted front with landing boards | AZ inside hive with spacers



Heroes to Hives

Developing Accessible Apiaries

Adam Ingrao, Heroes to Hives &
Ned Stoller, Michigan AgrAbility

If the goal in life is to live without risks, beekeeping should not enter a person's career or hobby aspirations. Venomous insects, remotely located and difficult to access apiaries that are far from medical attention and days that require the lift-twist-bend repetition make the work of a beekeeper both daunting and dangerous. A person with a physical disability may not even imagine the potential to start an apiary or continue the work if faced with a physical limitation.

For the last decade, Heroes to Hives and Michigan AgrAbility have been working together to develop accessible technologies and recommendations for beekeepers with physical limitations. One outcome of the collaboration is the development of a Standard Operating Procedure (SOP) for Developing Accessible Apiaries. Not only does the SOP apply to physically limited beekeepers, it can also be a guide for anyone to reflect on the risks of apiary management and address operational weaknesses before an emergency or injury happens. The goal of this article is to provide a guide for building an accessible apiary, and help all beekeepers incorporate tools that will help them work smarter, not harder.

Planning

- One of the most important aspects of ensuring an apiary is accessible and can accommodate a variety of participant needs is planning. For educators, we recommend having participants register in advance for scheduled events and during the registration process you should ask those registering if they need any special accommodations. This allows you to prepare in advance if special equipment is needed and allows you to reach out to the individual to ensure you fully understand their needs. Examples of a question that can be included in an event registration are:
 - Are there any special accommodations we can provide at this event to ensure this beekeeping experience meets your personal needs?
 - Please let us know if you need accommodations to participate in this event. If so, we will reach out to you to discuss your personal needs.
- For individual beekeepers with physical limitations, planning is also an important part of a day in the apiary. Ensuring someone is aware of where you are going and how long you plan on being there can be an important safety measure that can support you if something happens. Additionally, ensuring you have a cell phone, two-way radio (when within range) or another communication device on you when in the apiary can be helpful to contact emergency support if an injury experienced in the apiary limits your mobility.

Support Team

- When hosting individuals with accessibility needs at beekeeping events, it is important to ensure you have a proper support structure in place in case a par-



Figure 1. Photo credit: Adam Ingrao

ticipant requires attention, whether it be medical or personal support (Figure 1). Identifying an individual with emergency medical experience can be a great benefit to any beekeeping event and ensures that if a participant experiences a medical emergency, an individual is ready to jump in and support that individual immediately. Keep in mind, apiaries tend to be in remote locations that are not near medical facilities. Individuals that make great emergency support team members include:

- Firefighters / EMS
- Medical professionals: Doctors, nurses, etc.
- Mental health professionals
- Military Combat medics
- Beekeepers in personal apiaries that have physical limitations should try to work with a friend for support when possible. Support members can help with beekeeping activities but will also be an invaluable resource if the beekeeper experiences an injury or medical emergency.

Parking and Pathways

- Ensure that parking is in close proximity to the apiary, within a couple hundred feet, so that excessive walking is not required to get to the apiary site (Figure 2). Parking and walking paths should be on level, compacted surfaces that can accommodate vehicles and mobility devices, such as wheelchairs and walkers. If parking near the apiary is not possible, it is recommended that vehicle transport for individuals with mobility restrictions is provided to and from the apiary.
- In situations where vehicle access is not possible, or if you are a beekeeper with physical limitations working in a remote apiary, a well-outfitted cart or all-terrain utility vehicle is a great solution for managing off-road beehives and moving equipment to and from a remote apiary.

Apiary

- Selecting a proper apiary site is one of the most important aspects of developing an accessible apiary. Often, apiaries are in remote areas, far from medical attention, which makes them a risky place to be for individuals already facing physical restrictions. If an injury occurs in a remote apiary, medical attention may not be available for some time, which underscores the importance of a support team. By using the following criteria when selecting sites, you can avoid many common pitfalls that make apiaries inaccessible and/or dangerous to many with physical limitations. Following is a list of considerations that should be made for accessible apiaries:
 - Soil types should be considered when selecting an apiary site. Apiaries on heavy clay soils can become unusable for mobility devices if high moisture is present or rutting has occurred. High clay content soil surfaces should be avoided for accessible apiaries. High sand content soils may also be an issue for mobility devices if vegetation is not covering the surface to help stabilize the soil.
 - Apiaries should be on flat, compacted surfaces or well-manicured grass to mitigate tripping hazards and accommodate mobility devices (Figure 3).

Figure 2. Photo credit: Adam Ingrao



Figure 4. Photo credit: Adam Ingrao



Figure 3. Photo credit: Bev Berens

- Materials for compacted surfaces can include concrete, crushed concrete, rubber, milled asphalt, decking, compact gravel and weed exclusion cloth over a solid surface, or other materials that have been designed to support wheelchair and walker mobility in outdoor environments (Figure 4).
 - Grass areas can be utilized for an apiary if they are consistently maintained and cut at a very low height (such as a fairway on a golf course).
 - Note: all grass areas used should be cut with a bag attachment to collect grass debris. No grass debris should be present in an accessible apiary to prevent tripping hazards.
- Tripping hazards are one of the most dangerous aspects of an apiary (Figure 5). While working in an apiary, beekeepers are often carrying heavy equipment while moving about in a veil, which obscures vision. As a result, tripping hazards such as holes, stumps, rocks, tall grass, roots and weeds can cause severe injury. All tripping hazards should be removed or filled to ensure a safe, level surface to walk upon.
- Hive stands should be utilized to meet the needs of apiary users. Depending on the mobility restriction, hive stands can be as simple as cinder blocks that provide an eight inch lift, to custom stands that are

Figure 5. Photo credit: Adam Ingrao





Figure 6. Photo credit: Adam Ingrao

engineered to support a comfortable working height for beekeepers (Figure 6).

- Variable hive styles can be incorporated into an apiary to meet the physical needs of beekeepers using the site. There are numerous manufactured and custom options available to support individuals with accessibility needs. The following is a short list of common hives that can be used in an accessible apiary and the limitations they may accommodate.
 - AZ hives are one of the most useful hive designs for individuals with lifting restrictions or that are using a mobility device, such as a walker or wheelchair. The AZ hive offers the beekeeper the ability to work the hive from the rear, without having to lift hive bodies, and ensures that the most weight the beekeeper will have to work with is a single frame. Additionally, since AZ hives have a set height (no additional hive bodies are added) the hives can be positioned on stands that are designed to be at the best working height for the individual's needs.
 - Top bar or long hives are a style of hive that orients all frames on a horizontal plane so that no hive bodies are lifted. These hives can also be modified to articulate on their stand so that individuals can work the hive from a seated position. These hives work well for individuals with lifting restrictions or that are using a mobility device, such as a walker or wheelchair.
 - Langstroth, and similarly vertically oriented hives, can be suitable for individuals with some mobility restrictions as long as the restrictions do not completely limit their ability to lift equipment. Langstroth hives require each hive body to be removed to inspect frames, which requires a lot of lifting (this can be supported with hive lifts). A couple accommodations to make Langstroth hives more accessible for those with some lifting restrictions are:
 - Use eight frame hive bodies instead of 10 frame. This reduces the weight of each individual hive body by up to 15-20 lbs when full of honey.
 - Use all medium hive bodies instead of deep hive bodies. Utilization of medium hive bodies can

reduce the weight of the hive body by up to 15 lbs. Additionally, medium frames are easier to handle and inspect, especially for those suffering from arthritis or other mobility restrictions of the hands.

- It is highly recommended that accessible apiaries using Langstroth equipment use all eight frame medium equipment as this is the lightest combination of this style of equipment and is the most accessible arrangement for beekeepers using this hive style (Figure 7).

- Hives should be placed with at least five feet of clearance from other hives, in all cardinal directions, to ensure participants can get near the hives and that mobility devices, such as wheelchairs and walkers, can freely move between and around hives. Hives may be paired next to each other on stands if needed, as long as the area around the paired hives has five feet of clearance in all directions (Figure 8).
- All apiaries should have a first aid kit on site and an emergency action plan in place.
 - First aid kits should include Epipens, band-aids, antiseptic, cooling cloths for heat exhaustion and water.
 - Emergency action plans should identify:
 - The closest emergency medical facility
 - Local phone numbers for police, fire and EMS
 - Where cell coverage is available to make emergency calls (if coverage is spotty or unavailable in the apiary)
 - What support team member will provide care and transportation, if needed
 - Description of the apiary site location for police, fire and EMS
 - Emergency contact info for participants in apiary events

Apiary Facilities

- Accessible apiaries require educational facilities that also accommodate the needs of participants. As such, restrooms and classrooms at any beekeeping event should meet the accessibility needs of all (Figure 9).
 - An ADA accessible restroom should be present on site and in close proximity to the apiary. Restrooms must have at least 60 inches width and 56 inches depth of unobstructed clearance in the restroom with toilet seats 17-19 inches in height and support handles to accommodate movement from a wheelchair to a toilet seat. This can be a seasonal (portable toilet) or permanent facility.
 - If a classroom is used for instruction, it should be ADA accessible with a door width of at least 32 inches. Tabletops should be no less than 28 inches and no more than 34 inches above the floor with 27



Figure 7. Photo credit: Adam Ingrao



Figure 8. Photo credit: Adam Ingrao



Figure 9. Photo credit: Adam Ingrao

inches of knee clearance. Classrooms should be in close proximity to the apiary and restrooms.

- Potable water should be made available near the apiary or participants in apiary events should be notified ahead of time, in writing, that they should bring water to the event.
- Seating is encouraged to assist those who may not be able to stand for long periods of time. It is recommended that educators notify participants ahead of time that they will be standing for long periods and if needed they should bring a chair to sit in, as some individuals may desire to provide their own seating that supports their physical needs.
- Shade should be made available to individuals during field days to ensure sun exposure does not become an issue for those already working through physical limitations. Providing a canopy or a shaded tree line can provide relief when needed.

Liability Coverage (Important for educators)

- Regardless of the audience you are working with, ensuring proper insurance coverage for the activities you are conducting will protect you and your assets. Agritourism policies will oftentimes provide legal coverage

for activities such as beekeeping classes. Consult with your insurance agent to ensure you are covered properly for the activities you are conducting.

- A waiver of liability developed for beekeeping activities should be signed by every individual entering the apiary. This should be a document drawn up by an attorney that clearly indicates the risks associated with beekeeping and the proper language to protect you and your assets from liability if an accident occurs in the apiary.
- Signage should be displayed around the apiary and should clearly state the risks associated with working in an apiary.
- If you plan on taking pictures and using images of individuals participating in apiary activities, it is recommended to have participants sign media waivers to ensure proper permission for use of images. This is especially important when working with individuals with physical limitations.

Keeping bees can be rewarding, satisfying and enjoyable. By creating spaces that incorporate accessibility, beekeepers open doors for more people to join, enjoy and find success within the industry and enjoy the gifts our bees give us! **BC**

My Name is Bill and I am a first year beekeeper from the mid-Ohio region. When I was asked a few months ago to consider writing an article about my journey as a new beekeeper, I was very excited and jumped head first into typing. At the time, I was taking a course through Michigan State University, talking to and learning from the members of our area beekeepers association, and from the speakers that the association brought in to speak at our meetings. I've also read many books about beekeeping and queen rearing. Then, I realized I was no longer right in the middle of my first year of beekeeping and now, it is November, and I have the better part of my first season under my veil to write about and oh boy what a wonderful journey I have started.

I asked Mr. Hayes for some advice on writing this article and he told me basically to write like I was telling my story; how I discovered honey bees, how my interest and passion grew, how I found out about Michigan State University's "Heroes to Hives" program, what I want to know and learn about honey bees and beekeeping. With that advice I hope to inspire passion in new beekeepers and reignite the passion in experienced beekeepers. I realize I have a lot to learn about beekeeping, honey bees and pollinators in general. I also realize that I should always "BEE" learning, no matter how long I am keeping bees. With all that said, I have a lot to say, so let us get into it.

I was raised to have a healthy respect and curiosity for nature, so I was always somewhat aware of the importance of honey bees. It wasn't until I developed a passion for cooking on a smoker and using honey in my recipes, did I even think about keeping bees. I was using 60 pounds of honey a year cooking, so why not keep bees and harvest my own honey? It was my first internet search about beekeeping that ignited an interest, which rapidly became a passion for honey bees. I am cautious about information from the internet, so I reached out to an old golfing buddy of mine whose wife (Pam) is a beekeeper and she gave me the best advice that any aspiring beekeeper should receive. Pam said, "Join the local beekeeping association and take the beginner beekeeping course they offer." The course was around \$60 bucks and included the course, the book *Beekeeping For Dummies 5th Edition*, a veil, a hive tool, information from the Honey Bee Health Coalition and a year's membership to both my local and state associations. Well, I am no dummy so I jumped on it. Now let me tell ya, I didn't expect much out of a *For Dummies* book, but it did not take long for me to realize the wealth of information in that book. I hate



to admit it, but I haven't read very many books cover to cover since I have been out of school. That book however, I read cover to cover in a weekend. That book gave me my first glimpse into how absolutely awesome and amazing honey bees are. I amazed my friends and family with all sorts of information about honey bees. I had to pass on some of the coolest information I have ever heard. I mean the queen can decide whether the egg she is laying is going to be a male or female, isn't that amazing? How about the waggle dance, the caste system the workers go through, the way the queen only mates a few times at the beginning of her reign but can lay eggs for a few years? I mean most of you reading this probably know all this stuff, but you have to admit it is still amazing.

So after the beginner beekeeper course and the *Dummies* book, I craved more information. I subscribed to *Bee Culture*, and started reading what books I found on the subject. A few of the books I read and liked are: *Building*

Bill Lallman

A New Beekeeper's Journey?



Beehives For Dummies, Hive Management: A Seasonal Guide to Beekeeping by Richard E. Bonney and *Splitting Hives & Rearing Queens* by Joseph E Hebert, PhD. In my quest for information, I searched the internet and joined a couple beekeeping social media groups.

Then, one day while playing around on my computer, an ad for “Heroes To Hives”, an educational beekeeping course “free” to Veterans offered by Michigan State University, caught my eye. After doing a little research about the program, I signed up. For a free course I didn’t expect to get much out of it but I was surprised again. The course is a nine module course that is meant to take about nine months to complete. I took the online version of the course which was self paced so I took my time and learned a lot. The Heroes To Hives course provided me with a wide range of information I have been craving. The more I learn about honey bees and what makes them tick, the better beekeeper I can be, right?

Another great source of information came from a few of the guest speakers at our association meetings. The speaker that made the biggest impact on my journey so far is none other than *Bee Culture*’s own, Jerry Hayes. Jerry gave a lecture on the *varroa* mite, yeah those pesky little

things. Jerry’s informative presentation includes a *varroa* mite replica to demonstrate how big a *varroa* mite would be if we were honey bees. Then, Jerry used that mite and his button down shirt to show us how the mite gets to the honey bee’s fat body. I had not heard of the *Varroa destructor* before I started my journey to become a beekeeper and that is probably pretty normal. Mr. Hayes’ presentation really helped me better understand the behavior of the *varroa* mite, which in turn helps me better understand how to help my honey bees.

This first year of my journey has been filled with learning. I can hardly believe how much I have learned already and how much more there is to learn. It took me 50 years to figure out what I want to be when I grow up, and now that I figured it out, I am obsessed. Honey bees are absolutely amazing, as is everything in nature, but with honey bees I get to be a part of their world, up close and personal and I can be an active part in helping our pollinators survive. You’ve heard the term, “There are beekeepers and there are bee-havers,” well, I want to be a beekeeper. To me, being a beekeeper means active hive management and *varroa* control. Mr. Hayes stressed it, and Heroes to Hives emphasized it in almost every lesson; the most important thing you can do for your honey bees is proper *varroa* control. Follow the guides and recommendations of the Honey Bee Health Coalition and always be willing to learn.

The next chapter of my journey is bound to be full of fun, exciting and solemn moments. I am going to be more active with the Richland Area Beekeepers Association because there is a lot of experience to learn

from. No matter how much education from schools, books, lectures and seminars I accumulate, it is the experience that I lack. I am going to try to find some beekeepers that will let me tag along during their inspections so I can watch and pick their brains for whatever honey bee information I can get. I am going to become a “Certified Pollinator Champion”, through another course available at Michigan State University. I would like to continue updating you on my journey. I also would love to try to introduce honey bees to as many people as I can and let them know how important they are to everyone. It is a new year now and I am buzzing on to chapter two of my journey. Bee well, bee kind and bee humble. **BC**





From the moment we start our hive inspection, the thrill of searching for the queen consumes us. It's a grand adventure, a quest for the ages, and the longer we look without success, the more determined we become to find her royal highness. When we come up empty-handed, we can't help but feel a sense of disappointment and concern for the well-being of the colony. Has she vanished? Will they survive without her?

Yet, the moment we finally lay eyes on our queen, a wave of relief

washes over us, and we are reassured that all is right in our little apiary, if not the world at large. The satisfaction of this ultimate discovery is a feeling that never grows old. But let's ask ourselves: is finding the queen really so vital? For a novice beekeeper, locating one bee among 40-60,000 can seem an impossible task.

Most inspections do not require that we see our queen. Instead, evaluating her laying pattern is often all we need to confirm that all is well. Do we see a sufficient number of eggs,

larvae and a good brood pattern of capped over larvae? Once we confirm the brood looks good, there is really no need to spend more time trying to find the queen.

However, there are certain situations when it becomes necessary. For instance, when the queen's offspring display aggression or she's producing a subpar brood pattern, it may be time to replace her. We can't risk introducing a new queen without first finding and removing the old queen. During the Spring season, I typically



David Burns

Hot Hive Inspections



create one or two splits from each colony, and this involves removing and placing the original queen in the new split to mitigate swarming behavior in the original hive.

While filming a recent YouTube video, I found myself needing to create a split by removing frames of brood and resources, while also relocating the original queen. However, there was one major issue: the hive was extremely aggressive. To describe it aptly, this colony was what beekeepers refer to as “hot”. Unlike other hives that I can manage wearing just a hat and veil, working with this particular hive necessitated the use of a complete bee suit and sting-proof gloves.

In colonies like this, you can limit your time searching for the queen by only looking for her on frames of open brood. Rarely will she be spotted on a frame of nectar, honey or pollen. Once you see one-day-old eggs, standing straight up in cells, the queen is likely to be in close proximity.

Need to find the queen in a hot hive? These tips might come in handy.

1. Wear More Than Enough Protective Gear

This is no time to earn bragging rights of how you work your bees in sandals, shorts and a tank top with no hat or veil. Keeping a defensive colony calm is tricky and if you take

one or two stings, the alarm pheromone can attract more stings. The alarm pheromone’s main component is isopentyl acetate, a similar odor found in bananas. Even accidentally smashing a bee can release the alarm pheromone. So, avoid stings by suiting up, and carefully try not to kill any bees.

2. Work Your Defensive Hive Last

If you have several hives that are tolerable, but one is very defensive always work your defensive hive last. If you work it first, these defensive bees will follow you and can attract higher than usual defensive responses from your other colonies. You will want to end your time in the apiary with your defensive colony.

3. Lots of Smoke

Not only do I have my smoker going at 100% capacity, but I have spare burlap smoker fuel in every pocket of my bee suit. Of course, more smoke can keep the queen on the run making her more difficult to find, but there is no choice. These bees respond well to smoke.

4. Work in Slow Motion

Honey bees possess incredible visual capabilities. In fact, a single compound eye of a worker bee contains approximately 6,900 intricate facets or miniature lenses. This remarkable feature allows them to

seamlessly integrate mosaic images and effectively detect swift movements. As beekeepers, we can use this knowledge to our advantage by handling the bees more cautiously and minimizing any sudden actions. This becomes an absolute necessity when dealing with a defensive hive.

5. Carry Parts of The Hive Away

When working a very defensive hive and I must continue inspecting 20-30 frames to find the queen, I find it is best to carry one deep hive body twenty feet away. Once I remove it from the hive location and the other hive box, the bees become calmer to work. Moving the boxes apart also prevents the queen from walking up or down into the other hive body.

Finding the queen in a hot hive can be a challenging task, but once located, it brings a sense of satisfaction, especially when it’s time to replace her with a queen that produces gentler offspring. After approximately 45 days, the aggressive bees will perish naturally, making room for a new generation of bees with a more docile temperament. These tips will not only be helpful when working a defensive colony, but can also help every inspection go much better, even in gentle colonies.

If you’d like to watch my YouTube video of this inspection visit: <https://www.honeybeesonline.com/davids-youtube-channel> **BC**

Swarm Bag

Mike Champlin

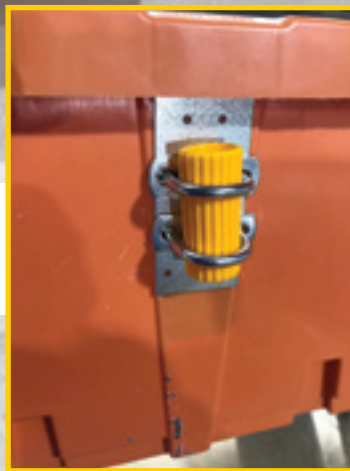
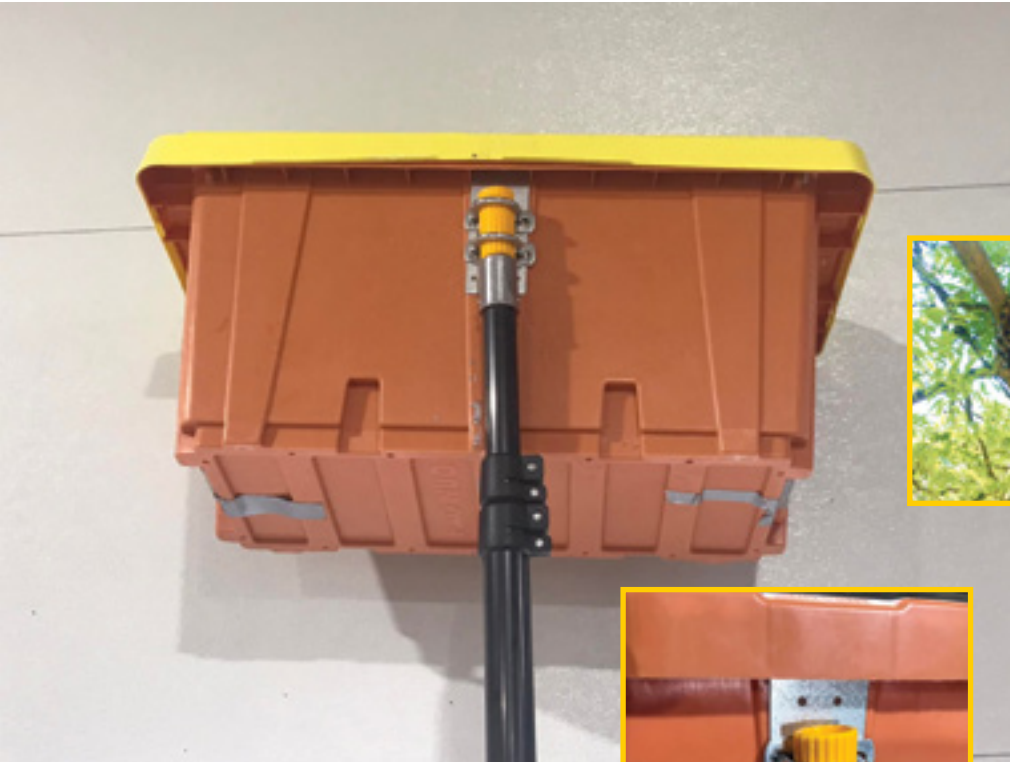
Catching swarms (free bees) is sometimes an unexpected opportunity that happens when I'm not at home. Friends may call me about a swarm and I have to move fast. So for the past few years, I've carried this pop-up mesh laundry bag in my pickup as part of my emergency swarm catcher kit. It's very useful if the swarm can easily be reached from the ground or I can also place a frame of comb out for the bees to collect on then move them into the bag together. The bag folds up and takes no space in my truck, and unzips either on top or from the side for easy access to carefully drop the swarm inside. Being fully vented, it keeps the swarm from overheating during transit. Since it zips shut it also works really well for transporting a package or nuc of bees so they don't make driving too hazardous (backseat driver bees).

If you have any questions or comments about using your own swarm bag, I can be contacted at blindbeehoney@gmail.com. **BC**



Swarm Catcher

Mike Champlin



Swarm traps are bait hives to attract a swarm – but sometimes the swarms end up in trees and I'll want to retrieve them before they take off again in search of their permanent home. Here is a DIY swarm catcher that I built using a Pro Nuc box and an extendable painters pole.

I screwed a 24' long extension pole that I normally use for washing windows into a $\frac{3}{4}$ " paint roller fitting that is attached to the side of a lightweight plastic ProNuc box. I used a couple of u-bolts and metal plates to stabilize and reinforce the plastic sidewall.

Inside of the nuc box, I've attached an old brood comb frame so the swarm is attracted and has a landing spot to collect on once they're inside the box. I'll raise the swarm catcher up underneath the swarm and gently shake them off the limb into the nuc box. After the swarm is inside the vented box, I lower it down and put the lid on for transport back to my apiary. Then, I can easily transfer the swarm to a permanent box by shifting the frame of bees (and queen) over into their new hive. The extension pole allows me to reach 24' and sometimes I'll use it from the bed of my pickup if the swarm is higher.

If you have any questions or comments about building your own swarm catcher, I can be contacted at blindbeehoney@gmail.com. **BC**

Scions

Mike Champlin

I'm getting ready for swarm season by making some Russian Scions (swarm magnets). These scions are different from swarm traps or bait boxes. When bees swarm from their hive box, they usually will go a short distance and collect on a nearby tree to wait for the scout bees to direct them to the new hive location (hopefully one of my traps?). Most of the time they pick a spot 20-50' up in a tree... which is not convenient for

me. I have found that for whatever reason (pheromones?), most swarms coming from my apiaries tend to collect in the same trees, sometimes even on the same branches that other swarms have gone onto before. The scion is placed near the apiary's favorite tree to "lure" the swarm to collect there as a more convenient (for me) temporary waiting spot.

To make these scions, I wrap burlap around a center piece of 2x4 then dip it into melted beeswax & propolis to act as a lure. The center piece is mounted under a bucket lid so the wax dipped burlap stays dry and shaded to help it last longer. The bucket lid is reinforced on

top and bottom with pieces of plywood to better hold the weight of the swarm, and it also adds weight to keep the scion from swinging in the wind. It's all screwed together using an eye bolt from the top into the 2x4. I then attach a rope to the eye bolt and that allows me to pull the scion up into place right at the bees preferred landing spot in a tree. Once a swarm has settled onto the scion, I can easily lower it right into a vented bucket to move them into a new hive box avoiding possibly losing one of my colonies altogether.

If you have any questions or comments about making your own scion station, I can be contacted at blindbeehoney@gmail.com. **BC**



U.S. Honey Industry Report – 2022

USDA Reports with Supplementary by Kim Flottum

Released March 17, 2023, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, United States Department of Agriculture (USDA)

United States Honey Production Down One Percent in 2022

United States honey production in 2022 totaled 125 million pounds, down one percent from 2021. There were 2.67 million colonies producing honey in 2022, down one percent from 2021. Yield per colony averaged 47.0 pounds, unchanged from 2021. Colonies which produced honey in more than one state were counted in each state where the honey was produced. Therefore, the United States level yield per colony may be understated, but total production would not be impacted. Colonies were not included if honey was not harvested. Producer honey stocks were 23.3 million pounds on December 15, 2022, down one percent from a year earlier. Stocks held by producers exclude those held under the commodity loan program, which are entered separately.

Honey Prices Up 12 Percent in 2022

United States honey prices increased 12 percent during 2022 to \$2.96 per pound, compared to \$2.65 per pound in 2021. United States and state level prices reflect the portions of honey sold through cooperatives, private and retail channels. Prices for each color class are derived by weighing the quantities sold for each marketing channel. Prices for the 2021 crop reflect honey sold in 2021 and 2022. Some 2021 crop honey was sold in 2022, which caused some revisions to the 2021 crop prices.

Price Paid for Queens, Packages, Nucs was 22 Dollars in 2022

The average prices paid in 2022 for honey bee queens, packages and nucs were \$22, \$98 and \$129, respectively. Pollination income for 2022 was \$241 million, down 11 percent from 2021. Other income from honey bees in 2022 was \$55.2 million, down 31 percent from 2021.

Released August 1, 2022, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, United States Department of Agriculture (USDA).

January 1, 2021 – Some History Honey Bee Colonies Down One Percent for Operations with Five or More colonies

Honey bee colonies for operations with five or more colonies in the United States on January 1, 2022 totaled 2.88 million colonies, down one percent from January 1, 2021. The number of colonies in the United States on April 1, 2022, was 2.92 million colonies. During 2021, honey bee colonies on January 1, April 1, July 1 and October 1

Colonies, Yield, Production, Stocks, Price, and Value – States and United States: 2022						
State	Honey Producing Colonies ¹	Yield per Colony	Production	Stocks Dec 15 ²	Average Price per Pound ³	Value of Production ⁴
	1,000	Pounds	1,000lbs	1,000lbs	Dollars	1,000 Dollars
AL	10	40	400	84	4.85	1,940
AZ	23	45	1,035	476	2.69	2,784
AR	20	56	1,120	426	2.68	3,002
CA	305	38	11,590	811	2.66	30,829
CO	31	42	1,302	339	3.26	4,245
FL	210	35	7,350	368	3.25	23,888
GA	103	32	3,296	99	3.07	10,119
ID	94	29	2,726	627	2.66	7,251
IL	10	47	470	141	6.19	2,909
IN	9	63	567	261	5.11	2,897
IA	48	51	2,448	710	2.81	6,879
KS	6	62	372	167	3.65	1,358
KY	7	36	252	68	5.70	1,436
LA	42	61	2,562	487	2.47	6,328
ME	10	23	230	64	6.49	1,493
MI	82	41	3,362	706	3.04	10,220
MN	102	51	5,202	728	2.79	14,514
MS	21	95	1,995	60	3.13	6,244
MO	8	41	328	151	5.13	1,683
MT	123	61	7,503	2,176	2.64	19,808
NE	34	44	1,496	598	2.82	4,219
NJ	16	39	624	62	4.00	2,496
NY	54	53	2,862	916	3.61	10,332
NC	13	39	507	198	6.79	3,443
ND	520	60	31,200	4,680	2.63	82,056
OH	19	66	1,254	464	3.48	4,364
OR	92	37	3,404	1,191	3.15	10,723
PA	23	46	1,058	487	5.81	6,147
SC	13	39	507	91	5.78	2,930
SD	185	39	7,215	2,814	2.58	18,615
TN	9	47	423	102	5.73	2,424
TX	157	53	8,321	166	3.29	27,376
UT	26	46	1,196	120	3.00	3,588
VT	6	47	282	121	7.04	1,985
VA	7	38	266	45	7.77	2,067
WA	86	32	2,752	660	3.11	8,559
WV	7	39	273	98	5.25	1,433
WI	53	55	2,915	816	3.04	8,862
WY	30	45	1,350	230	2.64	3,564
Other States ^{5,6}	53	63	3,316	501	3.67	12,170
United States ^{6,7}	2,667	47.0	125,331	23,309	2.96	370,980

¹Honey producing colonies are the maximum number of colonies from which honey was harvested during the year. It is possible to harvest honey from colonies which did not survive the entire year.

²Stocks held by producers.

³Average price per pound based on expanded sales.

⁴Value of production is equal to production multiplied by average price per pound.

⁵Includes data from States not published in this table.

⁶Due to rounding, total colonies multiplied by total yield may not exactly equal production.

⁷United States value of production will not equal summation of States.

were 2.90 million, 2.83 million, 3.17 million and 3.09 million colonies, respectively.

Honey bee colonies lost for operations with five or more colonies from January through March 2022, was 331,780 colonies, or 12 percent. The number of colonies lost during the quarter of April through June 2022, was 282,630 colonies, or 10 percent. During the quarter of January through March 2021, colonies lost totaled 464,640 colonies, or 16 percent, the highest number lost of any quarter surveyed in 2021. The quarter surveyed

Honey Price by Color Class – U.S.: 2018 - 2022
[Producers with five or more colonies that also qualify as a farm]

Color Class	Co-op and Private					
	2018	2019	2020	2021	2022	% Change in 5 Years
	dollars per pound					
Water white, extra white, white	2.98	1.63	1.73	2.33	2.69	-10%
Extra light amber	2.01	1.70	1.81	2.34	2.65	32%
Light amber, amber, dark amber	2.10	1.95	2.00	2.52	2.81	62%
All other honey, area specialties	2.64	3.16	2.39	2.64	3.41	29%
All honey	2.03	1.73	1.84	2.40	2.74	35%

Color Class	Retail					
	2018	2019	2020	2021	2022	% Change in 5 Years
	dollars per pound					
Water white, extra white, white	3.63	4.70	4.18	5.36	5.62	55%
Extra light amber	3.44	3.63	4.67	4.15	5.62	63%
Light amber, amber, dark amber	4.89	5.30	5.51	5.55	6.14	26%
All other honey, area specialties	7.17	6.62	7.23	6.48	7.86	10%
All honey	4.38	4.82	5.23	5.27	6.04	38%

Color Class	All Honey					
	2018	2019	2020	2021	2022	% Change in 5 Years
	dollars per pound					
Water white, extra white, white	2.01	1.70	1.81	2.43	2.81	40%
Extra light amber	2.12	1.90	1.93	2.47	2.75	30%
Light amber, amber, dark amber	2.51	2.57	2.53	2.98	3.15	25%
All other honey, area specialties	3.62	3.99	3.00	3.76	4.02	11%
All honey	2.21	1.99	2.10	2.65	2.96	34%

in 2021 with the lowest number of colonies lost was July through September, with 295,660 colonies lost, or nine percent.

Honey bee colonies added for operations with five or more colonies from January through March 2022 was 367,890 colonies. The number of colonies added during the quarter of April through June 2022 was 589,630. During the quarter of April through June 2021, the number of colonies added were 665,730 colonies, the highest number of honey bee colonies added for any quarter surveyed in 2021. The quarter of October through December 2021 added 93,940 colonies, the least number of honey bee colonies added for any quarter surveyed in 2021.

Honey bee colonies renovated for operations with five or more colonies from January through March 2022 was 187,180 colonies, or seven percent. During the quarter of April through June 2022, the number of colonies renovated were 492,410 colonies, or 17 percent. The quarter surveyed in 2021 with the highest number of colonies renovated was April through June 2021 with 475,750 colonies renovated, or 17 percent. The quarter surveyed in 2021 with the lowest number of colonies renovated was October through December 2021, with 146,520, or five percent. Renovated colonies are those that were re-queened or received new honey bees through a nucleus (nuc) colony or package.

Varroa Mites Top Colony Stressor for Operations with Five or More Colonies

Varroa mites were the number one stressor for operations with five or more colonies during all quarters surveyed in 2021. The period with the highest percentage of colonies reported to be affected by *varroa* mites was April through June 2021 at 50.7 percent. The percent of colonies reported to be affected by *varroa* mites during January through March 2022 and April through June 2022 are 33.7 percent and 45.2 percent, respectively.

Colonies Lost with Colony Collapse Disorder Symptoms Up 12 Percent for Operations with Five or More colonies

Honey bee colonies lost with Colony Collapse Disorder symptoms on operations with five or more colonies was 86,070 colonies from January through March 2022. This represents a 12 percent increase from the same quarter in 2021.

If you want to explore USDA’s survey results further, start here:

Access to NASS Reports are available for your convenience, you may access NASS reports and products the following ways:

- All reports are available electronically, at no cost, on the NASS website: www.nass.usda.gov.
- Both national and state specific reports are available via a free e-mail subscription. To set-up this free subscription, visit www.nass.usda.gov and click on “National” or “State” in upper right corner, above the “search” box to create an account and select the reports you would like to receive.
- Cornell’s Mann Library has launched a new website housing NASS’s and other agency’s archived reports. The new website: <https://usda.library.cornell.edu>. All email subscriptions containing reports will be sent from the new website, <https://usda.library.cornell.edu>. To continue receiving the reports via e-mail, you will have to go to the new website, create a new account and re-subscribe to the reports. If you need instructions to set up an account or unsubscribe, they are located at: <https://usda.library.cornell.edu/help>. You should whitelist notifications@usdaesmis.library.cornell.edu in your email client to avoid the emails going into spam/junk folders.

USDA Honey Prices 2004-2022

Cents/lb.	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
All Honey	108.5	90.4	104.2	103.2	141	144.5	160.3	172.9	195.1	212.6	216.1	209	207.5	215.6	216.6	197	203	265	296
Retail Shelf	188.7	183.3	191.0	196.1	197.6	278.4	305.4	328.4	340.5	373.5	406.6	409.6	462	477.7	421.1	485	522	527	604
% Difference	42%	51%	46%	29%	28%	48%	48%	48%	43%	43%	47%	51%	45%	45%	51%	41%	39%	50%	49%

Income and Expenditures – U.S.: 2021 & 2022

[Represents income and expenditures on the total number of colonies, regardless of whether honey was harvested]

Item	2021 (1,000 dollars)	2022 (1,000 dollars)
Income		
Pollination income	270,690	241,042
Other income ¹	80,174	55,188
Expenditures		
Varroa control and treatment	11,565	13,724
Other colony issues ²	3,066	5,096
Feed ³	42,582	44,517
Foundation	7,064	6,934
Hives/woodenware	9,863	10,835

¹Includes sales of queens, queen cells, beeswax, propolis, etc.

²Includes Nosema, tracheal mites, foulbrood, paralysis, Kashmir, cloudy wing, etc.

³Includes syrup, sugar water, honey, pollen patties, and other feeds.

Queen, Package, and Nuc Prices Paid – U.S.: 2021 & 2022

[Represents prices paid on the total number of colonies, regardless of whether honey was harvested]

Item	2021 (dollars)	2022 (dollars)
Queen	20	22
Package	91	98
Nuc	125	129

Apiary Workers – U.S.: 2021 & 2022

[Represents number of paid and unpaid workers that worked with colonies, regardless of whether honey was harvested]

Item	2021 (workers)	2022 (workers)
Apiary Workers	24,000	25,000

Per Capita Consumption, 2022

We calculate this figure each year using data from USDA ERS, NASS, ERS, FARM SERVICE and the U.S. Census Bureau. From these sources we determine how much honey entered the system, how much honey left the system, how much was used, how much wasn't used and the population on July 1, 2022. These figures include U.S. production, U.S. exports, honey put under and taken out of the loan program and honey remaining in storage, plus how much was imported from off shore. Essentially, it's a measure of honey in minus honey out. The resultant figure, divided by how many people were here on that particular date results in how much honey was consumed by each and every individual in the U.S. last year. And yes, you are correct, not every person eats honey, but by producing this figure on an annual basis, we are able to compare apples to apples each year in honey consumption.

The chart below compares these figures for the previous 13 years. We've included the USDA's price of all honey for comparison too.

Honey Consumption, Population, Prices 2010-2022					
Year	Million lbs Honey in	Million lbs Honey out	Millions Population	lbs/person	Price/lb\$
2010	398	29	307	1.20	\$1.60
2011	470	80	309	1.27	\$1.73
2012	487	53	312	1.26	\$1.95
2013	500	49	314	1.44	\$2.13
2014	547	56	318	1.55	\$2.17
2015	544	58	321	1.51	\$2.09
2016	573	55	323	1.62	\$2.12
2017	600	43	325	1.71	\$2.19
2018	594	46	327	1.70	\$2.17
2019	585	60	328	1.60	\$1.97
2020	617	58	330	1.69	\$2.03
2021	513	36	332	1.4	\$2.41
2022	419	38	333	1.14	\$2.96

Honey Into the U.S., 2022

U.S. beekeepers with more than five colonies in 2022 produced, according to USDA, 125.3 million pounds of honey. The Honey Board calculates that an additional eight million pounds or so are produced by those with fewer than five colonies for a total production of 133.3 million pounds. Additional honey in figures include 23.3 million pounds taken out of warehouses from last year, two million pounds taken out from last year's loan program and a whopping 260.9 million pounds imported for a rough total of 419.5 million pounds of honey in, during 2022. This honey sold, on average, wholesale, retail and specialty honey for \$2.96/pound, according to USDA figures. Commercial beekeepers in the U.S. will tell you to make a living, this price should be about the same price as diesel fuel. Take a look next time you are at the gas station.

Honey Out of U.S. Stock, 2022

For the honey out figure, we exported nearly 12.3 million pounds to other countries, have nearly 23.3 million pounds still sitting in warehouses and put just under two million under loan, for a total of about 38 million pounds of honey produced in 2022 that were moved out of the U.S. figures for 2022.

The July 1, 2022 population was right at 333.3 million people in the U.S. So, to calculate per capita consumption, subtract honey out (put under loan, exported or still in warehouses) from honey in (honey produced this year, left over from last or imported) and divide by 333.3 million, for a total of 382 million pounds consumed in the U.S. last year. Divide this by 333 million people which gives you about 1.2 pounds of honey per person consumed by people in the U.S. during 2022, the lowest since 2012.

Top Ten Producing States Each Year

2016			2017			2018			2019			2020			2021			2022		
State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs
ND	485	37.7	ND	455	33.7	ND	530	38.2	ND	520	33.8	ND	495	38.6	ND	515	28.3	ND	520	31.2
SD	280	19.9	SD	255	14.3	CA	335	13.7	SD	270	19.4	SD	245	14.9	CA	290	9.6	CA	305	11.6
MT	159	12.2	CA	335	13.7	SD	255	12.0	CA	335	16.0	CA	320	13.8	SD	250	12.3	TX	157	8.3
CA	310	11.2	MT	145	10.4	FL	215	10.5	MT	173	14.9	TX	157	9.0	FL	193	8.5	MT	123	7.5
FL	215	10.8	FL	205	8.8	MT	160	14.7	FL	205	9.2	MT	110	8.9	TX	137	7.7	FL	210	7.4
TX	133	9.3	TX	120	7.9	TX	132	7.4	TX	126	7.6	FL	192	8.8	MT	117	6.7	SD	185	7.2
MN	124	7.3	MN	126	7.8	MN	119	7.3	MN	118	7.0	MN	108	5.9	MN	125	7.1	MN	102	5.2
MI	89	5.3	ID	95	4.2	GA	98	3.3	MI	94	4.7	MI	95	4.5	MI	101	5.2	OR	92	3.4
LA	50	4.3	LA	43	3.5	ID	96	2.9	LA	54	3.9	ID	107	3.7	ID	100	3.0	MI	82	3.4
GA	96	3.7	WA	77	3.5	OR	93	3.3	NY	59	3.4	NY	58	3.2	GA	96	3.3	GA	103	3.3
Total	1941	121.8		1850	107.8		2033	110.4		1954	119.9		1887	111.4		1924	91.5		1879	88.4
All Sts.	2775	161.8		2669	147.6		2803	139.9		2812	156.9		2706	147.6		2696	126.5		2667	125.3
% of Tot.	70%	75%		69%	73%		73%	75%		69%	76%		70%	75%		71%	72%		70%	71%

The top 10 producing states produced a total of \$8,844,300 with a total of 1.879 million colonies. This comes to 70.4% of the U.S. colonies, and 70.6% of total dollar value.

The top three producing states had a total of 982,00 colonies, producing a total of \$51,111,000. This comes to 36.8% of all colony production in the U.S. in 2022, producing 57.8% of total production dollars. Moreover, these three states produced 36.8% of all the colonies in the U.S. in 2022.

Top 10 Producing States

The places that yield the most honey every year are pretty much determined by the climate, the soil, agriculture and politics. The crops grown, or not grown in a region certainly play a role in what can be found relative to nectar, pesticides and regulations relative to how many colonies you can put on any given acre, that won't starve after a couple of months. Of course, government conservation programs lend a hand here too.

We've been curious about this for the last eight years or so, just because it's interesting to see what changes, and what doesn't. The Dakotas, California, Montana, Florida, Minnesota, and Texas are almost always in the top eight, with the last two changing occasionally: New York, Louisiana, Georgia, Idaho, Michigan and perhaps a few others round out these performers.

This year provided few surprises in who is on the list, and the totals for the top 10 this year were essentially where they always are relative to the number of colonies counted in these states and the amount of honey produced. Again, these states produced 70% of all of the honey produced in the U.S., and had 70% of all the colonies in the U.S. sitting somewhere within their borders. It's pretty clear that what happens in these few states is going to determine the U.S. crop.

But, just because we can, this year we looked at the contributions of the top three states, for almost every year, the Dakotas and Texas. Combined, they held on to 52.3% of the colonies used last year and produced just over 40% of all the honey U.S. beekeepers made last year. This means, of course, that 52% of the colonies, and 60% of the U.S. honey crop is spread out over the remaining 47 states. You can see this comes to just under 1%/state. That sort of puts us in our place, doesn't it? This extreme unbalanced situation commands notice, then, as to what will happen when climate change erodes, or doesn't, weather patterns in these three states including rainfall, Summer and Winter temperatures, farming practices and conservation practices.

Year	Colonies (million)	Value (million US\$)
2000	2.620	132.8
2001	2.506	133.1
2002	2.574	228.3
2003	2.599	252.1
2004	2.556	199.6
2005	2.413	161.0
2006	2.393	158.4
2007	2.443	159.8
2008	2.342	232.7
2009	2.498	215.1
2010	2.692	285.7
2011	2.491	261.9
2012	2.539	283.5
2013	2.640	320.1
2014	2.740	387.4
2015	2.660	329.7
2016	2.775	343.0
2017	2.683	334.2
2018	2.803	333.5
2019	2.812	309.1
2020	2.706	299.6
2021	2.696	321.2
2022	2.667	371.0

Already, drought in the western third of the U.S. is having an effect, not only on the bees, but their forage and the crops they pollinate as well. Like it or not, we are at the mercy of big weather – call it climate change or whatever – it's dry out there!

**Pollination Costs and Income, 2022
Cost Per Colony to Pollinate Almond Up 13
Percent from 2017**

In Regions 6 & 7, the average cost per colony for almonds increased 13 percent from 171 dollars per colony in 2017 to 194 dollars per colony in 2022. The average price per acre increased from 272 dollars per acre to 336 dollars per acre during that period. The total value of pollination for almonds increased 44 percent. Almonds were the highest valued crop in that region. The total value of all pollination in Regions 6 & 7 for 2022 was 387 million dollars, up 42 percent from 2017.

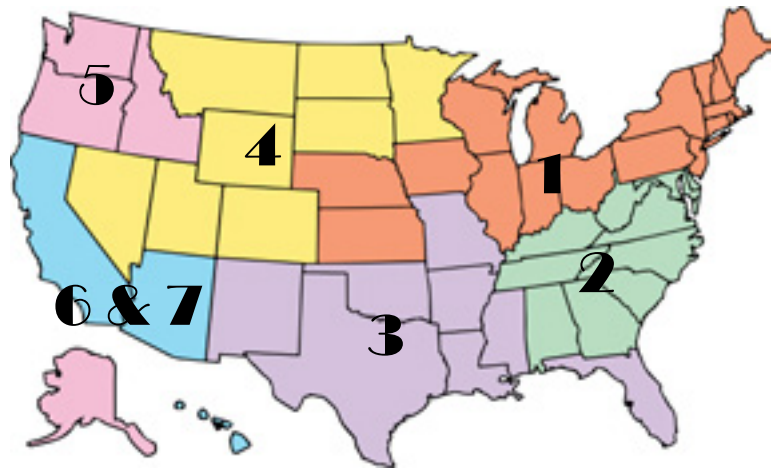
Blueberries had the highest total value of pollination of crops reported in Region 1 in 2022. The price per colony for blueberries increased 27 percent to 98.4 dollars per colony in 2022. The price per acre increased 42 percent to 179 dollars per acre. The total value of pollination for blueberries in Region 1 for 2022 was 8.56 million dollars. The total value for pollination of all crops in Region 1 for 2022 was 21.9 million dollars, up 33 percent from 2017.

Blueberries had the highest total value of pollination of crops reported in Region 2 in 2022. The price per colony for blueberries increased 40 percent to 78.3 dollars per colony in 2022. The price per acre increased 63 percent to 139 dollars per acre. The total value of pollination for blueberries in Region 2 for 2022 was 3.60 million dollars. The total value of pollination of all crops in Region 2 for 2022 was 6.60 million dollars, up 10 percent from 2017.

Watermelons had the highest total value of pollination of crops reported in Region 3 in 2022. The price per colony for watermelons increased 38 percent to 76.9 dollars per colony in 2022. The price per acre increased 57 percent to 100 dollars per acre. The total value of pollination for watermelons in Region 3 for 2022 was 1.85 million dollars. The total value of pollination of all crops in Region 3 for 2022 was 7.39 million dollars, up eight percent from 2017.

Apples had the highest total value of pollination of crops reported in Region 4 in 2022. The price per colony for apples increased three percent to 51.7 dollars per colony in 2022. The price per acre decreased slightly to 41.0 dollars per acre. The total value of pollination for apples in Region 4 for 2022 was 114 thousand dollars. The total value of pollination of all crops in Region 4 for 2022 was 628 thousand dollars, down 27 percent from 2017.

Apples had the highest total value of pollination of crops reported in Region 5 in 2022. The price per colony for apples increased 12 percent to 58.3 dollars per colony in 2022. The price per acre increased 36 percent to 62.8 dollars per acre. The total value of pollination for apples in Region 5 for 2022 was 6.59 million dollars. The total value of pollination of all crops in Region 5 for 2022 was 17.5 million dollars, up four percent from 2017. **BC**



Region 1				
States: CT, IL, IN, IA, KS, MA, ME, MI, NE, NH, NJ, NY, OH, PA, RI, VT, WI				
Crops: apple, cherry, watermelon, blueberry, cranberry, cucumber, pumpkin, squash, other				
Paid Acres	\$/Acre	Colonies Used	\$/Colony	Total \$ (1,000 dollars)
203,400	91.00	250,100	87.50	21,895
Region 2				
States: AL, DE, GA, KY, MD, NC, SC, TN, VA, WV				
Crops: apple, cantaloupe, watermelon, blueberry, pumpkin, squash, other				
Paid Acres	\$/Acre	Colonies Used	\$/Colony	Total \$ (1,000 dollars)
66,850	84.00	94,100	70.20	6,601
Region 3				
States: AR, FL, LA, MO, MS, NM, OK, TX				
Crops: watermelon, blueberry, other				
Paid Acres	\$/Acre	Colonies Used	\$/Colony	Total \$ (1,000 dollars)
55,100	71.20	129,500	57.00	7,387
Region 4				
States: CO, MN, MT, NV, ND, SD, UT, WY				
Crops: apple, cherry, other				
Paid Acres	\$/Acre	Colonies Used	\$/Colony	Total \$ (1,000 dollars)
4,610	44.20	12,500	50.20	628
Region 5				
States: AK, ID, OR, WA				
Crops: apple, cherry, peach, pear, blueberry, cranberry, raspberry, other				
Paid Acres	\$/Acre	Colonies Used	\$/Colony	Total \$ (1,000 dollars)
220,660	74.70	313,100	55.70	17,453
Region 6 & 7				
States: AZ, CA, HI				
Crops: almond, cherry, other				
Paid Acres	\$/Acre	Colonies Used	\$/Colony	Total \$ (1,000 dollars)
1,155,800	313.80	2,233,000	173.20	386,752
Totals				
1,706,420	678.90	3,032,300	493.80	440,716

Mountain Grey Caucasian
Republic of Georgia

Queens	Packages
1-4 \$60.00	2# \$125.00
5-24 \$55.00	3# \$155.00
25-up \$50.00	

Clip and/or Mark Included
Prices do not include shipping, handling, or insurance
Shipping season starts first week of May

Winters Apiaries
3225 Long Creek Rd.
Parrottsville, TN 37843
(423) 465-8197




<http://www.caucasianbreeder.com>

Big Island Queens Olivarez Honey Bees/Big Island Queens is seeking motivated beekeepers to join our Hawaii team! Experience preferred. Self-motivator and ability to work in a team environment a plus. Positions are full time, salary based on experience. Great Benefits Package. Prior work history and references required. Advancement opportunities available. Submit resume to info@ohbees.com or Olivarez Honey Bees Inc/Big Island Queens, P O Box 847 Orland Ca 95963, Fax: 530-865-5570, Phone 530-865-0298



SIMPSON'S BEE SUPPLY

Formic Pro Strips
2 Dose - \$16 10 Dose - \$62 30 Dose - \$155

Super DFM

Classic Glass & Plastic Jars
4, 8, 16 oz. Muth Jars With Corks
Honey Filled Candy \$88/case

15642 Tiger Valley Road
Danville, OH 43014
740.599.7914
cwsimpson@embarqmail.com
www.simpsonsbeesupply.com




Hardeman Apiaries

Italian Queens		
1-9	10-24	25+
\$23.75	\$22.25	\$22.00

Russian Hybrid		
1-9	10-24	25+
\$26.25	\$24.50	\$24.25

P.O. Box 214, Mount Vernon, GA 30445
912.583.2710

Farming MAGAZINE



One year: \$22.00
Two Years: \$40.00
Canadian and 3 years - \$78
2 years - \$50

Mail payment to:
Farming Magazine
P.O. Box 85
Mt. Hope, OH 44660
or subscribe online:
www.farmingmagazine.com

A quarterly publication for the small family farm

Why not buy good queens?

Northern Zero Treatment Survivor Stock

Selecting For: (315) 815-4301

- Mite Resistance
- Honey Production
- Gentleness



PERFECT FOR OVERWINTERED NUCS AND SUMMER REQUEENING

3171 Perryville Rd Canastota, NY 13032
Wayne Troyer

Call to reserve the **BEST**

Package Bees money can buy!

912-739-4820

Five Generations of Beekeeping!

Wilbanks Apiaries Inc.
Claxton, Georgia

Highest Quality Package Bees for Over 73 years!

We will start taking orders on November 1st for the 2023 package season!!



The IR-4 Project Commemorates 60 Years of Impact

Hannah
Ross



This year, The IR-4 Project commemorates 60 years of operation. Since its establishment by land grant universities and the U.S. Department of Agriculture in 1963, IR-4 has championed specialty crop growers by facilitating the registration of safe, effective pest management solutions to meet their unique needs.

Specialty crops (which include fruits, vegetables, nuts, herbs and horticulture crops) are not typically served by agrochemical companies' registration efforts. Larger acreage, "major crops" (like corn and soybeans) typically yield higher returns on investment. This "minor use problem" spurred the founding of IR-4.

IR-4 upholds specialty crops as essential components of a healthy diet, a thriving landscape and a robust U.S. economy. Since its founding, IR-4 has secured over 23,000 pest management product registrations through the Environmental Protection Agency (EPA) for food crops (and countless others for ornamental crops). IR-4 evaluates a range of tools—including reduced-risk chemical and bio-based pesticides, as well as emerging technologies and integrated solutions.

Notable registrations facilitated by IR-4 include Chlo-rantranilprole (a reduced-risk conventional pesticide) and Spinosad (a bio-based insecticide approved for both conventional and organic growers). As a result of IR-4's submissions, these products are approved by EPA for use on numerous specialty crops. IR-4 also spearheaded the registration of several biopesticides to manage *Varroa* mites in honey bee colonies. These registrations help reduce dietary exposure to pesticides, increase growers' pest management options and secure the vitality of the U.S. food supply.

According to an economic impact

study by Michigan State University in 2022, IR-4 contributes \$8.97 billion annually to the gross domestic product. Additionally, seven jobs today can be attributed to every \$1,000 of public investment in IR-4.

Federally funded through USDA, IR-4 works closely with the USDA National Institute for Food and Agriculture (NIFA), USDA Agricultural Research Service (ARS), EPA and international partners to conduct research, facilitate registrations and harmonize global regulations.

"Not many government-funded organizations survive for 60 years on a year-to-year funding basis," said Dr. Jerry Baron, Executive Director of The IR-4 Project. "We continue to be relevant to our stakeholders in the farming community. Because of our relevance, they continue to support us in many ways, including letting the decision-makers in Washington D.C. know the importance of the organization—why this program should continue to exist, now and into the future."

Headquartered at North Carolina State University since 2021 (formerly at Rutgers University), IR-4 spans the U.S. through four regional offices, each working closely with growers, commodity groups, state liaisons, land grant university researchers, extension and industry leaders. Regional offices are located at: University of Florida, University of Maryland Eastern Shore, Michigan State University and University of California, Davis.

As the future of pest management and its regulation grows increasingly complex, IR-4 has the expertise to guide the specialty crop community forward with innovative, pragmatic solutions. While commemorating 60 years of impact through 2023, IR-4 invites the specialty crop community to follow along, learn more about the project and take part in its evolving, multifaceted work. Visit the [IR-4 website](#) to connect via email, [newsletter](#), or social media. **BC**

This article was originally posted of IR-4's website at this link: <https://www.ir4project.org/news/60yearsannouncement/>

IR-4 helps secure pest management products for specialty crops – including fruits, vegetables, nuts, herbs and flowers. Image courtesy of NC State University.



HONEY BEE CANNIBALISM

And some other quirks of our beloved bees



Listen along here!

I don't know how to start this conversation

A question came to me that found me unprepared and uneducated on the queried subject. This is not an uncommon situation for me. I have an abundance of bee questions for which I have no answer, but my interest in this question lingered far beyond its derived answer.

Becca F., a beekeeper friend from north Florida, phoned to ask me, "Why are some of the bees in one of my colonies eating some of its brood?" The colony in question was from a cut-out¹ from late last season. Other than some destroyed brood, all other biological characteristics of the colony seemed in good order. You should know that, at the time of the phone call, the 2023 Spring season was well underway in Becca's area.

From nearly nine-hundred miles away, I really could not say what was causing this disappointing behavior in her distant colony, but I felt that we could, at least, narrow the possible reasons. *Narrowing the issue is not the same as answering the issue.* If there is a food shortage (probably yellow protein) or if a perceived pathogen is present, I surmised that nurse bees sometimes eat larval brood. I proffered a guess that if all other brood stages seemed healthy, and copious

¹A "cut-out" is a colony that originated when a beekeeper relocated it from a natural nest site, such as a hollow tree or the wall of a house, to standard hive equipment.

food stores were present, and a pollen and nectar flow was still yet to come, this mysterious issue would most likely resolve itself.

Indeed, it did. Apparently, a Small Hive Beetle (SHB) population had grown within the colony to the extent that some of the bee brood was damaged. Selected bees were striving to regain control of the situation and were eliminating damaged or dead brood. Providing some beetle traps and some microfiber cloths seemed to help the bees regain control in the afflicted colony.



Figure 1. Small Hive Beetles, the cause of brood destruction.

From afar, I was able to do nothing that was helpful. The beekeeper and the bees had seemingly won this battle, but the situation lingered in my thoughts. That some of the bees from one of Becca's colonies was actually killing and eating some of its brood was a curiosity that stayed with me. Such cannibalism is documented colony behavior in the beekeeping literature. You and I both know that fact, but exactly how does it work? When and why does it work?

Through the decades

Through the passing decades, many times I have alluded to the fact that bees will, at times, "eat" some of their young. With superficial confidence, I have told audiences that these cannibalistic bees are selecting older larvae first. Why? Older larvae are the colony's major food consumers. Younger larvae seemingly would be on the short list and would be consumed as the older larvae were eliminated. Honey bee eggs will have

not yet become food consumers and developing pupae have already completed the eating stage. They are reasonably safe. However, larval stages would be in serious trouble if food stores were stressed.

For hygienic reasons, bees will also remove diseased brood from the colony. At this point, I have few answers, but many questions. Will nurse bees intentionally consume the larval contents as they dispose of their diseased brood? If so, are

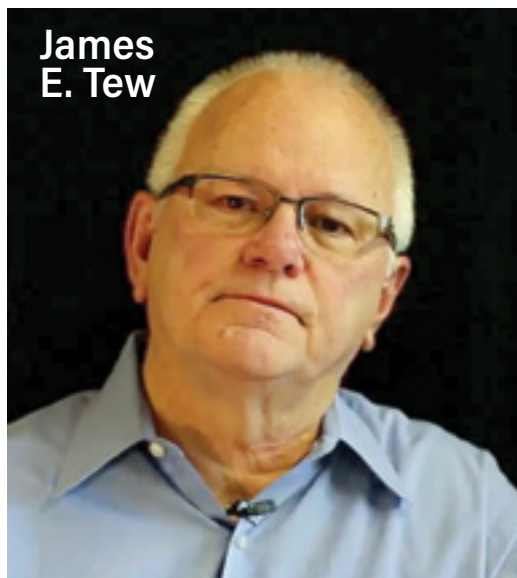
they re-purposing the larvae's fluid contents as food or are they removing the contents to expedite getting the dead brood member to the colony entrance? Or both? I have more comments on this concept later in this piece.

Mature honey bees

Let's just get this out of the way. I cannot recall of an instance where it was documented that an adult bee consumed another adult honey bee. Maybe – and completely hypothetically – I suppose that under specific undocumented situations, if a nectar-laden worker was killed (i.e., crushed, mashed or just died) and the contents of her honey crop was somehow available, that sweetness could be of interest to other living house bees.

Yes, that scenario is a wildcard, but a scenario like that one is the only incident in which I can envision an adult bee having an interest in cannibalistically eating some of the contents of another adult bee. So again, adult honey bees do not see other adult bees as a food supply.

Maybe for another time, and on a different subject, birds, toads, spiders and other insects certainly do view adult honey bees as food sources. Adult honey bees are readily eaten by these animal species.



James E. Tew

Laying workers

When lauding the productivity of a beautiful queen, I have sometimes stated to audiences that, “Nurse bees will police any defective or incorrectly placed brood by eating/removing it.” In effect, this has the effect of making the queen’s output look very good because the workers corrected her mistakes. Well, in a way, she is good at her genetic job, because her offspring had that innate ability. But what about defective queens or even laying workers?

Though I feel a bit shaken, I still support the concept that healthy workers will eat/remove laying worker eggs when they find one. Just exactly how the worker perceives the defective egg is far beyond my knowledge. But I again write that I have lost some of my nerve. Are the workers eating the haploid egg or only removing it? I have been told, and I have re-stated to others, that viable workers truly *eat* the defective egg.

Indeed, I have read, and subsequently repeated to others, that to a greater or lesser extent, laying worker eggs are commonly found even in healthy colonies – especially when the brood and adult population are high and healthy queen pheromone levels are stretched across the large population. During those times, viable adult workers are constantly removing these sly, worker-laid eggs. Then again, I would boldly say to an audience, “They eat them.”

Whereas, I was once confident in this statement, I have recently grown more reticent. In my fifty plus years of beekeeping, I have never seen an egg anywhere but in a cell. Are these undesirable eggs *really* being eaten or did I simply not notice a tiny, white egg laying outside on the landing board as it was being discarded? I don’t know. Maybe I just missed it. I will try to be more observant.

Immature queens and drones

I feel that you and I could agree that immature queens and drones are “eliminated” when they are no longer needed. Queen cells are frequently torn down and contents removed if such cells are unneeded.

As have you, I have seen partially dismembered drones that were being removed from cells. Were they dis-

membered to ease the removal process or were juices and cellular fluids consumed? I don’t know. I offer this thought at this point; I dangerously assume that liquid contents would be eaten – if for no other reason that nest cleanliness.



Figure 2. Dismembered drones at the colony entrance.

Hygienic behavior

Where would honey bees be without this cleanliness behavior? Queen breeders select for this attribute. Scientific careers have been built on this concept. We wish all our queen stocks exhibited this characteristic. But there are instances when the process turns negative for both the bees and their keepers.

For instance, while removing infected brood, nurse bees’ brood food glands may become contaminated with bacterial spores of American foulbrood (AFB). Those nurse bee carriers then feed susceptible young larvae along with pathogenic bacterial spores that perpetuates AFB within the colony’s young brood population. In many presentations, I considered it humorous to tell audiences that nurse bees did not have small stainless-steel buckets and cleaning cloths. Therefore, the only way they could remove the diseased larval debris was to *eat* it. In retrospect, this may not have been as funny as I thought.

There is abundant published literature² that explains how hygienic cleaning spreads deformed wing

²Posada-Florez, F., Lamas, Z.S., Hawthorne, D.J. et al. *Pupal cannibalism by worker honey bees contributes to the spread of deformed wing virus*. *Sci Rep* 11, 8989 (2021). <https://rdcu.be/c8o25>



virus. At this point, I am left with nothing to write. If the colony does not keep itself immaculate, the viral disease spreads. If it cleans itself and keeps colony conditions immaculate, the viral disease spreads. This is a true conundrum.

This spread occurs because bees are in direct contact with virus particles as they clean/eat the diseased brood. I sense that the best solution is to prevent *varroa*-vectored viruses from gaining a hold in the colony; therefore, the alert beekeeper should constantly suppress *varroa* populations. At this point, I am forced to admit that if I don’t manage *varroa* first, I will have much greater problems managing my bees later. This too, is a topic for another time.

Seasonal adjustments

It’s harsh. As humans, we are nearly unable to tolerate the concept, but to bees, brood is potentially food in a form other than bee bread or honey. At this moment, as I write for you, my Spring season is just beginning. Maple is in bloom as are other early season food sources. So, of course, the weather swings between being nice and warm to absolutely wintry.

If my bees have been on time, there is a significant brood population being developed within my colonies. Suddenly, due to cold weather returning, there is no pollen coming in. Not only must the brood be fed, but it be kept warm. What should nurse bees do? It seems that they heartlessly cut their losses. If they perceive that protein is in critically short supply, they stop feeding the oldest larvae, consume them to re-purpose their body fluids to power their nurse bee brood-food glands, and await the restart of the seasonal pollen flow. Such seasonal fluctuations occur everywhere, not just cold climates.

During serious dearths, using brood as food is a brutal but logical thing to do. Could it then be written that bees’ diet is honey, pollen and in trying times, its own bee brood? Yes, this seems harsh to human beekeepers.

Honey bees eating process

Through the years, I have spent significant time trying to understand

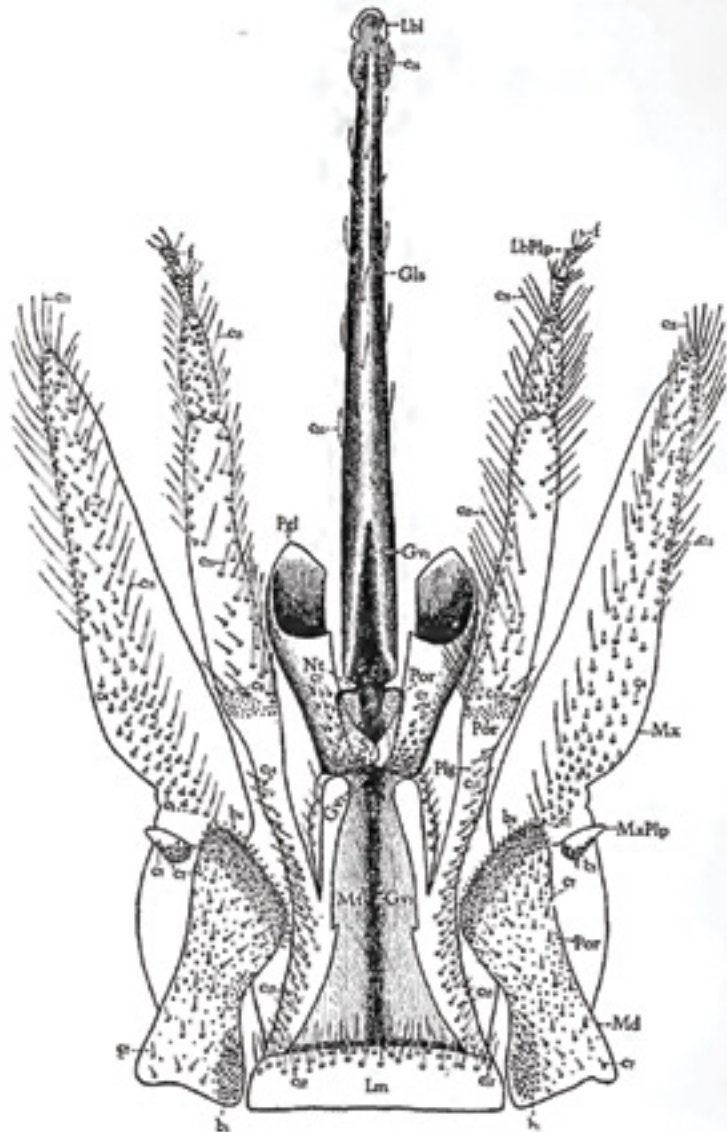
the “chewing-lapping” mouthparts system that bees use to consume their food. While I think I understand the basics, I readily admit that I do not grasp the finer details of this complicated process. Lacking typical chewing jaws and essentially only consuming a liquid diet, how do bees actually *eat* a larva? Indeed, how does a bee eat pollen or anything else solid?

While searching a plethora of complex literature on honey bee mouthparts, I stumbled across a very old pamphlet from the Smithsonian Miscellaneous Collections by N.E. McIndoo³. This author reported that

³McIndoo, N.E. 1906. *The sense organs on the mouthparts of the Honey Bee*. Smithsonian Miscellaneous Collection, Vol 65, No. 14. https://repository.si.edu/bitstream/handle/10088/23540/SMC_65_McIndoo_1916_14_1-55.pdf?sequence=1&isAllowed=y



Figure 3. The complex honey bee mouthparts (Snodgrass)



bees, using enzymatically reducing saliva, convert some solids to liquid forms thereby allowing the bees to “drink” the heretofore solids. Alternatively, if the solids are small enough, other supporting mouthparts, “*in crane-like fashion*” lift the small particles to the bee’s mouth where they are subsequently swallowed. For the hyper-interested reader, in clearer description, this bit of information was deeply buried in the fifty-five-page document and can be found on pages 39-41.

An aside...

Through the years, I have admonished honey bee enthusiasts to understand and respect all insect and animal life – not just honey bees. All species have some astonishing characteristics and abilities that seemingly make them stand above

their other animal peers. Ergo, honey bees are amazing, but so are many other animal species. But I want to get sappy for a bit. The function and complexity of honey bee mouth parts astound me. Admittedly, I am not a honey bee anatomist, so I struggle to understand this complex system that honey bees whimsically use. I suggest that these hidden mouth parts and their functions are every bit as elegant as the dance language behavior and orienting capabilities of honey bees. In my opinion, bees’ mouthparts deserve more respect than they have gotten.

So, are honey bees vegetarian?

Under dire conditions, some bees will eat some of the colony’s developing brood. Can we agree on that point? If that is true, then can it be stated that honey bees are vegetarians? Maybe not. In fact, things are even more complicated. When bees gather and store pollen, they also collect microbes that live on and in pollen⁴. Those microscopic animals are also eaten by bees. Some researchers feel that this “*meat*” is an important overlooked food nutrient for honey bees. As you would expect, this is causing some consternation within scientific circles, but the concept seems to have a toehold at this time. So, are honey bees truly vegetarian? Maybe not.

Just one more thing – robbing behavior

I am out of space, but just one more thing. If robbing bees are maniacal for any food from anywhere, why do they not murder all the larvae in the colony being robbed and imbibe their body fluids? Do they? Honestly, I have never looked. Those large larvae are certainly a potential food source in the weakened colony.

As you know, a robbing episode is NOT the best time to pull all brood frames out of the robbed colony to have a look at whether larvae have been killed, but maybe I should have a look just one time. Please let me know if you see something in your robbed colonies.

Thank you.

To Becca and her bees, I offer a thank you for spurring me to think. To the readers who struggled through this piece, I thank you for your time and dedication to our bees. **BC**

Dr. James E. Tew
Emeritus Faculty, Entomology
The Ohio State University
tewbee2@gmail.com



Co-Host, Honey Bee
Obscura Podcast
www.honeybeeobscura.com

⁴Embry, Paige. 2019. *Surprise: Bees Need Meat*. Scientific American. August. 2019. <https://www.scientificamerican.com/article/surprise-bees-need-meat/>



Berry Lemonade Bars

Shana Archibald

Ingredients

- ½ cup butter (softened)
- ⅓ cup honey
- 2 eggs
- 1 tablespoon lemon juice
- ¼ teaspoon salt
- Zest from half a lemon
- ¾ cup flour
- ¾ cup raspberries (or mixed berry blend, which is what I used)

Glaze Ingredients

- ¾ to 1 cup powdered sugar
- 1 teaspoon raspberry jam
- 1 tablespoon lemon juice

Directions

Step 1

Preheat oven to 350°F.

Step 2

Prepare an 8x8 square pan by spraying it with non-stick spray (or lining it with parchment paper).

Step 3

In a large bowl, combine butter, eggs, honey, lemon juice, salt and zest. Mix by hand or hand mixer.

Step 4

Add flour and mix until just combined.

Step 5

Add fresh raspberries (or mixed berries) and stir in by hand.

Step 6

Pour into prepared pan and spread into an even layer.

Step 7

Bake for around 25 minutes or until edges are brown and the middle is set. Do not over bake! You want the texture to be like a brownie.

Step 8

Let it cool.

Step 9

While the bars are cooling, combine the glaze ingredients and whisk together.

Step 10

Pour it over the cooled bars and spread out into an even layer on the top. Let the glaze set for at least 20 minutes.

Step 11

Cut into squares and serve.

Store at room temperature or in the refrigerator in an air tight container. Enjoy! **BC**



CALENDAR

◆ILLINOIS◆

Save the Date! The **Mississippi Valley Beekeepers Association** will be hosting the ISBA Summer Conference in Quincy, IL on July 14th and 15th, 2023. It will be held at the Oakley Lindsay Center (300 Civic Center Plaza #237, Quincy, IL 62301).

Speakers include Kamon Reynolds, Randy McCaffrey, Natalie Summers, Jeff Horchoff, Cory Stevens, Elsa Gallagher and more.

There is something for everyone including vendors, breakout sessions and bluegrass music.

Keep an eye out for more details at <https://mvbees.com/>

◆INDIANA◆

2023 Purdue Field Day will be on June 17th and will be held at the Beck Agricultural Center located at 4550 US-52, West Lafayette, IN 47906. There will be an indoor area for eating and if the weather turns bad or really hot, there is air-conditioning.

This is a hands-on event with hives available for sessions from the Purdue Research Lab. You will be in hives so everyone is required to wear a hat and veil at minimum.

Pre-registration will close at midnight, Monday, June 12th. Lunch from Harvest Bread Co will be provided to those that pre-register. Walk-ins are allowed but will need to provide their own lunch.

For directions, see the website: https://indianabeekeeper.com/events/purdue_field_day

Are you a veteran, first responder, family member of, or person with a disability? If so, a stipend is available to cover expenses to this event. Please contact joericker@ateaseorchard.com for more details.

◆IOWA◆

The **Iowa Honey Producers Association** will be holding the 2023 Field Day on June 17, 2023 at the Red Shed in Clarion, Iowa.

Speakers include Tom Montavon and various breakout speakers on topics for all ages.

Additional information can be found on the IHPA Website at: <https://www.iowahoneyproducers.org/>

◆MINNESOTA◆

The **University of Minnesota** will be holding a Queen Rearing short course on July 21-23, 2023.

Topics include queen and drone biology, timing of queen rearing in northern climates, stock selection and breeding for hygienic behavior, setting up mating yards and record keeping.

Everyone will have a chance to try their hand at grafting larvae and raising their own queens.

CLASSIFIEDS

FOR SALE

- For sale: New, heavy duty 4-way pallets. All treated wood with HDO decking. Call Lester **715-644-5588**, Boyd, WI 54726
- Five frame nucs \$160.00 each. Overwintered \$185.00. FREE SHIPPING on prepaid orders of 5+ nucs. **717-548-0330** Double Echo Apiaries, 244 Soapstone Hill Rd., Peach Bottom, PA 17563

TRAVEL

- Slovenian Beekeeping LLC offers Beekeeping Tours to Slovenia, the Beekeepers of Europe! May 10-25 Beekeeping Tour & Oct 6-20 Discover Slovenia. We have been offering these amazing tours since 2014. Contact Suzanne at beeslovenia@gmail.com

Contact Jen Manis to place an ad: Jen@BeeCulture.com

There will be a section on queen rearing equipment designs that will allow everyone to build their own.

The cost for the two and a half day course is \$350. This includes the Successful Queen Rearing Manual, lunch and refreshments.

Enrollment is limited to 32 people with at least two years of beekeeping experience. Make sure to register early! Registration is first come, first served.

For more information or to register, go to z.umn.edu/beeclass

◆TEXAS◆

The **Texas Beekeepers Association** will be hosting their Summer Clinic on June 17th, 2023 in Conroe, TX.

The clinic will include speakers, classes, demos and vendors.

For more information, go to www.texasbeekeepers.org

◆WASHINGTON◆

The **Washington State Beekeepers Association (WASBA)**'s upcoming beekeeping conference is October 7-8, 2023 in Olympia, WA!

The event will include a Saturday evening banquet with the famous "Dessert Auction", a live auction, raffles and much more!

The conference will conclude with the WASBA Annual Board Meeting on Sunday, October 8.

Profits from the conference benefits Washington Honey Bee Research.

You can learn more at <https://wasba.org/>.

JZ's BZ's
jzsbzs@aol.com
866-559-0525
 to order
Cups, Cages
& Cell Bars



If you are having a beekeeping event, we are happy to send back issues to give to your attendees and students. Please email Emma at Emma@BeeCulture.com with the number of magazines needed, a complete mailing address and a contact person.

Follow us on Social Media:
 Facebook:
facebook.com/BeeCultureMagazine
 Instagram:
[@beeculturemag](https://instagram.com/beeculturemag)



Sign up for our daily email blast:

<https://www.bee-culture.com/catch-buzz/subscribe-newsletter/>

Display Advertisers

<i>ABC and XYZ of Bee Culture</i> 65	Gardner Apiaries 46	R Weaver Apiaries 66
Acorn Beekeeping Equipment 3	Global Patties 37	Rayonier Land License 13
All My Bees 55	Hardeman Apiaries 88	Resilience Queens 88
<i>American Bee Journal</i> 66	Hive Tech Solutions 15	Roberts Bee Company..... 51
American Honey Producers 16	Honey Bee Health Coalition..... 11	Root Candles 39
Anthony's Beehive 35	Humble Abodes 21	Ross Rounds..... 50
B & B Honey Farm..... 13	JZs BZs Honey Company 94	Rossman Apiaries 56
Barkman Honey..... 61	Kona Queen..... 21	Sailor Plastics 67
Bee & Butterfly Habitat Fund..... 64	Liberty Tabletop..... 54	Simple Harmony Farms – Hive Tool 66
Bee Smart Designs..... 21	Lohman Apiaries..... 22	Simple Harmony Farms – Uncapper 67
Beekeeping Insurance Services ... 24	MacFawn Books..... 67	Simpson's Bee Supply..... 88
Beeline Apiaries 57	Mann Lake Back Cover	Southeast Bee Supply..... 51
Betterbee – BeeMax 40	Maxant Industries 13	Spell Bee Company 46
Betterbee – Lyson 56	Meyer Bees 15	Strachan Apiaries 60
Bee Informed Partnership 54	Miller Bee Supply..... 57	Sullivan's Queens 67
Blue Sky Bee Supply Inside Back Cover	NOD Inside Front Cover	Sunshine Honey Bees 66
Bucko Gloves..... 15	Olivarez Honey Bees Inc..... 49	Superior Bee..... 14
C. F. Koehnen & Sons..... 50	Olivarez – Help Wanted 88	Swarm Catcher 43
Complete Bee..... 66	OxaVap..... 60	Tauzer Apiaries..... 60
Cowen Manufacturing..... 57	Pendell Apiaries 59	UMT Master Program..... 60
Dadant – Containers 25	Pierco Frames 36	Vita Europe – Apistan 1
Dadant – Medication 2	Princeton University Press 61	Vita Europe – B402/Certan 17
Dakota Gunness 67	Project Apis m..... 35	Wicwas Press 61
Ernst Seeds 15	Propolis etc. 40	Wilbanks Apiaries..... 88
<i>Farming Magazine</i> 88	Queen Right Colonies 67	Winters Apiaries 88
Forest Hill Woodworking 43	Z's Bees 46	

Image Contest – Splitting & Nucs

We've started an image gallery! This month, we want to see any and all pictures you have of **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.

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.

How To Submit:

Email your images to Emma@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)

It's mid-April as I write, and in my semi-retired beekeeper life, seemingly nothing is going according to plan. The news is mostly bad.

For starters, the big one got away. Paul and I were happily catching foot-long trout, using tiny floating flies called dry flies, when an exceptionally large rainbow showed up. Gentle reader, how long is your arm? Because that's how long this trout was. I could see it clearly in the shallow water. Remarkably, it was feeding on tiny midges on the surface. Normally small fish feed on small insects, while the big boys lie in deeper water waiting for more substantial morsels to drift by. Like smaller fish or an unlucky mouse.

There was no way, I thought. Look, I'm a hack fisherman. This was a trout Paul might catch, not me. But when I drifted my imitation midge over my target, it opened its enormous mouth and took it. I promptly jerked the hook right out of its mouth. This is what beginners do – set the hook too soon.

Okay, calm down and slow down, Ed, I told myself. You were too hasty, that's all. Try again. I did, and the fish did. I jerked the fly out of its mouth a second time. There was no third opportunity. Rainbow trout of a lifetime, and I blew it – twice.

My California queen breeder is behind schedule due to weather, so that first shipment I anticipated about now will not arrive until Mother Nature eases up a bit.

Northern California's Oroville Dam is a giant earthen impoundment on the Feather River. It has some structural problems. This year drought-stricken California experienced record rainfall, along with historic snow in the mountains. That snow should be melting right about now and filling Lake Oroville. My queen breeder lives on Oroville Dam Boulevard.

The apricot bloom was two weeks late in Palisade on account of relentless cold and snow. I have a couple of pollination customers down there, and when I tried to deliver bees, my '83 flatbed Ford overheated. I got off I-70 and limped home on back roads that I know about. It took awhile. I ultimately had to haul bees to Palisade in the pickup, which is not so handy. The flatbed has a lift. With the pickup, I have to load and unload with a hand truck and a ramp.

When I dropped off bees in Palisade, one of my growers pointed to some trees at the edge of his property. "There're a couple of bears that hang out over in those pinions. They don't come into the orchard. Is this going to be a problem?"

Oh yes, this would be a problem. And he's telling me now? I remarked that bears have keen noses and are famously hungry when they come out of hibernation. So I had to make a second 120-mile roundtrip and erect a solar electric fence around my little darlings.

Then last Sunday, on Easter morning, we had to put down our Stumpy-Tail Australian cattle dog Pepper. His lymphoma finally caught up with him. We knew this was coming, but that didn't make it any easier. The dear boy kept rallying, right to the end. He might not get out of bed to eat his breakfast, but later he'd jump up and go chase a squirrel or bark at the neighbor dogs. His last night on Earth he penned the geese, one of his assigned tasks. By morning, he was gasping for breath.

There are dogs and then there are *dogs*. That gal Marilyn paid Pepper tribute in a text to her very large Irish-American family: "He was scary smart, certain of his duties, born to dominate, an indispensable hand on the farm, singularly devoted and loyal. He loved few and few loved him. No grief, no joy. No joy, no grief."

Pepper could sometimes understand complete sentences. He loped with the curious three-legged skip characteristic of his breed. Descended from crosses between Australian wild dingoes and European herding dogs, Stumpy-Tails are like no other dog on Earth. Pepper would herd anything that moved, except honey bees. He despised them, and they returned the favor. Out for a ride, he'd try to bite passing cars.

He adored Marilyn, and whenever I'd put my arm around her, he'd give me a little heel nip. He could be a very effective chaperone. Extraordinarily spooky, he'd sometimes vanish when we were out walking. I'd call and call, only to find him standing right behind me. But never again. Now he's four feet under in the front yard.

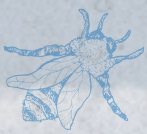
Of my colonies that took a hit from *Varroa* mites in the Fall, a few made it through the Winter. But they're not right. Some that looked prosperous six weeks ago dwindled to two or three frames, so I united them. I didn't experience this March collapse the last few years, when I had my mites better under control in the Fall.

One more piece of unfortunate news: Tina called and asked if I'd be willing to don a bee beard at the Colorado State Beekeepers meeting in June. Dangling 10,000 bees off your chin is something crazy people do, isn't it? Unforgettably, I once had a bee go up my nose. Didn't I learn my lesson? But it was Tina, so I said yes.

I often dream at night about what absorbs me during the day. Sometimes it's honey bees. Lately it's been the big one that got away. But last night it was Pepper. **BC**

Gentle reader, did you find this piece amusing, heartwarming, perhaps even instructive? If you clamor for more of Ed Colby's writing, contact him at Coloradobees1@gmail.com. Ask him to promptly mail you a copy of A Beekeeper's Life, Tales from the Bottom Board, a collection of his Bee Culture columns. Price: \$25. Satisfaction guaranteed or your money back!

Ed Colby *A Run of Bad Luck*



Blue Sky bee supply®

With so much to do this year, visit www.blueskybeesupply.com to shop for the tools you need to get it done!



**SAF NATURA SIDELINER
UNCAPPING BENCH**

reg \$379.95
now \$303.96



**SAF 9 FRAME POWER
RADIAL EXTRACTOR**

reg \$1029.95
now \$823.96



**SAF 4 FRAME
DELUXE EXTRACTOR**

reg \$399.95
now \$319.96

SAF
natura
Stainless steel
Made in Italy

20% OFF Select Honey Harvesting Equipment!

Sale ends 5 pm June 30th!

ALL PRICES IN THIS AD ARE SUBJECT TO CHANGE

Caps



PRINTED METAL CAPS

Available in 2 designs & 2 sizes! 58mm to fit our 12 oz. skep jar or 12 oz. hex embossed cylinder. 43mm to fit our 3 oz. skep jar.



Plastic



a PLASTIC PANEL BEARS

2 oz Panel Bears \$70.21 / 160 Ct. Case
WITH Caps
6 oz Panel Bears \$211.20 / 660 Ct. Case
No Caps
12 oz Panel Bears \$127.95 / 365 Ct. Case
No Caps
16 oz Panel Bears \$91.95 / 200 Ct. Case
No Caps

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 - \$96.95 / 225 Ct. Case
No Caps

d SQUARE PLASTIC

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

Glass



e GLASS 3 OZ. MINI MASON

\$22.95 / 36 Ct. Case
Lids now available in Gold, Black or White

f GLASS 12 OZ. HEX EMBOSSED CYLINDER

\$11.95 / 12 Ct. Case
Gold Metal Lids Included

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

4 oz - \$31.95 / 36 Ct. Case
8 oz - \$14.95 / 12 Ct. Case
16 oz - \$22.95 / 12ct. Case
Includes Corks

i CLASSIC GLASS JARS

8oz - \$19.10 / 24 Ct. Case
16 oz - \$10.60 / 12 Ct. Case
32 oz - \$15.75 / 12 Ct. Case

ALL PRICES IN THIS AD ARE SUBJECT TO CHANGE

Honey Bottling

 **Quality Nutrition**  **Higher Honey Yields**  **Ready to Use**  **Protein Rich**

NEW!

ULTRA BEE
plus

HIGH PROTEIN NATURAL POLLEN SUBSTITUTE



**5%
NATURAL
POLLEN**

CONTAINS NATURAL POLLEN

FOR HEALTHIER, STRONGER BEES

Same great formula as Ultra Bee with the addition of natural USA pollen!

- Pollen increases patty consumption rate, allowing for healthy brood buildup.
- Custom orders with higher protein content available in bulk batches.

**5%
NATURAL
POLLEN**

High protein
content to promote
brood rearing

**15%
CRUDE
PROTEIN**



Contains 5% natural,
USA pollen, irradiated
to prevent the spread
of honeybee diseases



Made with
high-quality
ingredients



THOUSANDS
of products



EXCLUSIVE
online sales



MANNLAKE®
MANNLAKELTD.COM

800-880-7694



SIX RETAIL
locations



CUSTOMER SERVICE
for all your needs