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The Magazine Of American Beekeeping



A Swarm In
October
City Bees

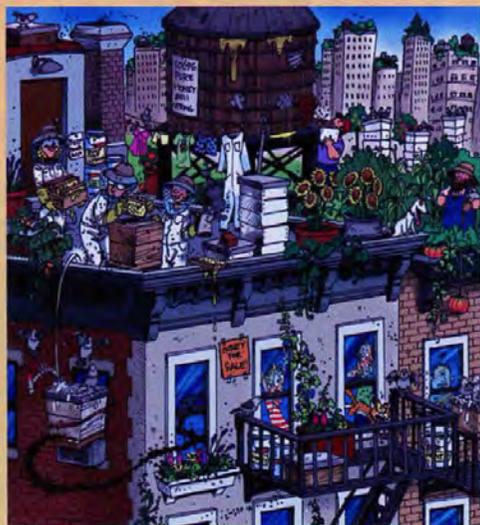
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Check out Inner Cover on page 14 for more about urban beekeeping. Our amazing cover done by Lela Dowling.

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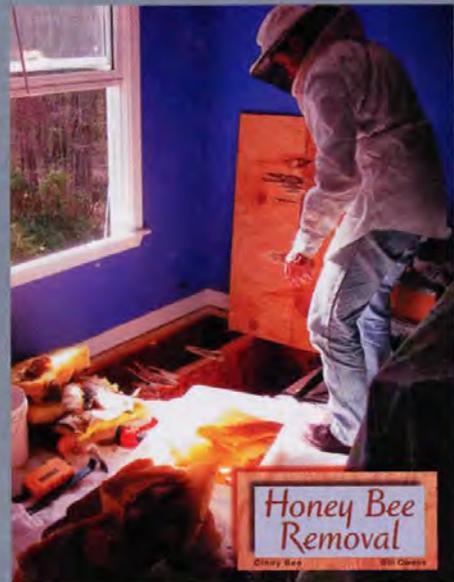
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Pesticides and GMOs

On reading a recent *Catch the Buzz*, www.home.ezezone.com, I'm a little confused over how good it is that GMO farmers can be sued by organic farmers for GMO contamination. After all, how long will it be before someone sues the BEEKEEPER for failing to keep his bees inside the field they were hired to pollinate and, thus, caused pollen-pollution in a farmer's field. Likewise, how many beekeepers will consider suing each other for diluting their "perfect" locally adapted breed with non-selected foreign drones left behind when they moved their hives into and back out of an area?

Please, let us not encourage the vile practice of using "legal precedence" as though it were law. The last time I read the constitution, in the US, only the legislative branch is allowed to create, expand, reduce or otherwise alter written law. The judiciary can only interpret law; and only on a case-by-case basis.

Charles

Roadway Plants

In the August issue of this great magazine Ray Norton wrote an article about Roadway Plants. I would like to say as a beekeeper, subscriber, and employee of Macoupin County Highway I know for fact all highway maintenance crews are not spraying insecticides, in fact none of the local crews have ever sprayed insecticides. I personally doubt there are many that could forgo the cost to start with. I know the town I grew up in sprayed during the Summer months to control mosquito's, brown recluse, etc. I would like to add I have noticed as did Mr. Norton there seems to be less insects in a lot of areas, in fact over the years I see less and less of the insects, plants, birds and wildlife I was used to seeing and more and more of seeming new pests and a whole array of invasive plants, could this be from years of spraying glyphosate products, or what about all the insecticides now being sprayed in agriculture areas re: roadside, to control things like Japanese Beetle. One thing you can see a lot more of in my little area of Illinois is far more airplanes

commonly called crop dust-ers. Perhaps Mr. Norton and I could get together along with some of you other great folks and start a crusade against all of these nasty chemicals that are slowly but surely destroying everything as we know it.

Mark Quarton

White House Bees

I was very impressed by the cover of the July edition of *BC*. On reflection, I wonder if such a stack is good for Foreign Relations. I can almost imagine a foreign visitor thinking – "Bloody Yanks – bragging again!"

Is the Health and Safety officer at the White House on holiday? Or has he been given a sweetener? I would not relish lifting a full super from such a stack even with a cherry picker. Imagine if that lot swarmed.

Envious
UK

Address Requests!

Kudos to John Yoder, Freeport, Ohio (August *Bee Culture*).

It's great to know that there are at least two of us who can't complicate our busy lives with computers (at home). I think sales departments are missing a lot of potential customers by not including a mailing address.

Great magazine!

Bruce Sabuda
Pinckney, MI

Physics Of Bee Wings

Bees have inadequate wing surface to fly according to the physics of fixed wing aircraft. Helicopters also fail this criterion. Helicopters wing (rotor) moves in a horizontal plane. The pitch (angle of attack) is adjusted to provide the proper lift. The center of gravity is under the axis of the rotor for hovering. The axis direction is changed compared to the center of gravity to move horizontally.

For a bee to fly these two conditions must be met: (1) The wings must move in a horizontal direction with pitch. (2) The lift must be over the center of gravity. The center of gravity of a bee is in the front of the abdomen. The wing axis is in the

Bee Culture Information



thorax. In order for the lift to be over the center of gravity, the wing motion (strobe) cannot exceed 90°. Bees fly with head higher than the abdomen. Page 20 of *ABC & XYZ of Bee Culture*, 41st edition has drawings based on photographs by Stellwaag, 1910. These photographs suffer from inadequate depth of focus to analyze flight. The angle of view is downward. Legs and abdomen are not shown. There exists two head on pictures of a bee in flight, Stephen Dalton "Caught in Motion" page 80 and 81. Since the wings motion is in a horizontal plane the only way to analyze is from directly above. I have only one photograph with this point of view.

1903 – Wright Brothers First Airplane

1930s – Harold Edgerton Electronic Flash

1939 – Igor Sikorsky First Successful Helicopter.

I suggest the reference of Goodman be deleted from *ABC* and representation of flight from above be inserted. Snodgrass is what it is. It should remain in and unchanged. Page 255 "Although they cannot hover." Please delete.

Ray Hicks
San Jose, CA

Honey Plants

I am not sure if I have the correct e-mail address to reach you regarding the "Undesirable Honey Plants" article in the July issue.

Under Mountain Laurel, the author mentioned beekeepers feeding "some of the honey to a dog to see if it made the animal sick."

What a cruel, irresponsible thing to do. It surprises me that the author made no comment about

Continued on Page 9

this, and by making no mention of it, I am concerned that *Bee Culture* will be seen as condoning this act. Will you PLEASE provide clarification in an upcoming issue? Not one of us should condone feeding possibly poisonous honey to ANY innocent creature.

Sondra Brooks
Spicewood, TX

Uneasy Lies The Head

Peter Sieling – that was a very funny essay (July, 2011), and so true to life.

I became a beekeeper last year and enlisted two new ones this. From experience over many years, I find keeping bees far more satisfying than being chairman of anything, especially having to deal with blissful ignorance.

Have you ever thought – “what would the bee population be like if they were as improvident as politicians?”

Louis Lyell
Jackson, MS

Jim Tew Retires . . .

Jim is a fountain of solid reliable information on bees and beekeeping. He is also one of the best spokespersons for bees and beekeeping with the non-beekeeping public. All who know him well cherish his wit and wonderful sense of humor, a gift that he has honed for decades into a fine art. As a friend and colleague, I cherish his friendship, seek his advice, and envy his writing and speaking skills. He has earned the admiration and respect of his colleagues and clientele by excelling as a beekeeper, a scientist and human being.

Marion Ellis
Nebraska

Dr. Jim Tew from Ohio State University is retiring. I was one of his students and wanted to thank Jim in print for his influence.

I started as a typical backyard beekeeper and at heart I still am. After graduating from college and trying my hand at teaching at the High School level and then reconsidering that career path I moved on. I worked in the private sector in various capacities and met a guy

who I worked with who had honey bees with his brother in Wisconsin. Well that was very cool. I had always heard, knew about honey bees as everybody has. But, to talk to someone who actually kept honey bees and had looked in a hive and he sold his Honey was amazing. Nobody I knew could really do this and yet I found someone who actually did!

I did what all new beekeepers do (or should do) and read everything could get my hands on about honey bees. Then I subscribed to *Gleanings in Bee Culture*, just *Bee Culture* now and the *American Bee Journal* and bought *ABC & XYZ and Hive and the Honey Bee* and sent for all of the catalogs and many other books. This was exciting. Could I really do this? I bought the appropriate hardware and assembled it on my kitchen floor taking in all of the smells of the pine and beeswax which to this day still remind me of beekeeping. I bought a package of bees, actually two, and started with two hives in my backyard.

Over the ensuing next couple of years our first son was born and I was still reading about honey bees, extracting my first crop and pondering if a young new husband and father could actually make a living with some form of beekeeping.

I have a very patient wonderful wife and I started exploring more “formal” education about honey bees. I found that there were programs at Fairview College in Canada and at Ohio State Univ/Agricultural Technical Institute (ATI) in Wooster, Ohio.

Where we were living it was actually closer to Fairview but I could get into ATI faster. Long story short a young couple with a two year old and an International Scout and a small U-Haul truck drove to Wooster.

Wow, was I excited. Being in a formal structured but flexible Beekeeping Program under young Dr. Jim Tew was incredible. He was an excellent Teacher, Mentor and became a fast friend. I learned how to work bees, raise queens, ID the few pests, predators and diseases there were at the time, treat them, move bees to Alabama for a commercial migratory experience, work with and know several contingents of people from Myanmar, known



then as Burma, learning how to raise honey bees and not Poppies and equipment assembly and extracting and trucks and how to tie stuff down and rubbing shoulders with lots of good people learning the same things.

Jim Tew was always relaxed even at 2 o'clock in the morning in a watermelon field in Alabama in a thunderstorm with wet students and four Myanmar students walking off into the dark as they had just had enough. All you could see in the flashes of lightning was them getting smaller into the darkness.

He was always patient with lots of question from me and others. He was organized and expected certain things from us students with built in rigor that made me better. I wish some days I was still there.

What I do now is not nearly as bone shaking exciting as it was then when everyday was new. But time moves on. My memories are fresh though. And every time of think of those days I am grateful because this life has been pretty good with honey bees and beekeepers.

And it is all because Jim Tew had a program and invited me to give it a shot. I will always be thankful.

G.W. Hayes, Jr.
Gainesville, FL

The news that Jim Tew has retired will come as a big surprise and disappointment to many beekeepers in South Carolina. Jim participated in several of our South Carolina Beekeepers Association summer meetings and was always in demand to come back. Our beekeepers just could not get enough of his both witty and informative presentations. Jim had a way of connecting with all beekeepers mainly because I think he had a good understand-



ing of their challenges and could personalize these issues with true life stories. His command of an audience was always amazing to me and I think this was a result of the fact that beekeepers just did not know what Jim was going to come out with next in his presentations. Jim could take the most mundane presentation topic and make it very interesting and informative in his own special way.

As one South Carolina beekeeper, David MacFawn, noted, "Jim will certainly be missed. He has always had a practical aspect to his writing in the bee magazines. Jim has been able to explain advanced bee topics in such a way that a beginner is able to ascertain value from his writings. I hope Jim continues to keep bees and write in the journals." Our hats are off to Jim and we wish him well in retirement. We certainly appreciate all the support that he has given our South Carolina beekeepers.

Mike Hood
Extension/Research Apiculturist,
Clemson University, Clemson, SC

Several years ago Dr. Tew and I were invited to speak at the National Honey Show in London. I was thrilled, of course, not only for the opportunity to visit England for the first time, but also to share a stage with Dr. Tew. However, after the first day of speaking I was ready to cry, and here's why.

When we finally arrived at the meeting location outside of London, which is a story unto itself, I leafed through the program booklet to see when we spoke. Great!!! I immediately followed Dr. Tew every single time I lectured. That's like a brand new comedian right out of the gates having to follow Jerry Seinfeld. You never recover.

So the next day, in his usual fashion, Dr. Tew rocked the crowd

during his presentation. They were not only laughing and swaying back and forth, but they were hanging on his every word. As he left the stage they actually began chanting his name . . . Jim!!! Jim!!! Jim!!! I know what you're thinking, a room full of stuffy English folks actually raising their hands in the air??? Guess you needed to be there. After the crowd finally settled down and I was being introduced, I heard a gentleman say, "I wish we could just listen to Dr. Tew all day and not this girl from Georgia". Perfect! Not something you want to hear before giving a 45-minute talk.

Once on stage, I looked out over the audience and there was not a smile, a sound, movement, nothing. Dead silence had settled over the crowd. Hundreds of people staring at me, just daring me to be half as good as Dr. Tew. I really believed he had laughed them all out. After about 10 seconds into my presentation I wanted to run out of the room, slip out the backdoor, flag down one of those really cool English black cabs and disappear into the city. But instead I stopped and said, "I got to have one of you all smile or something, I'm dying here." After a few seconds passed, this sweet little man in the front row smiled and said in that brilliant English accent, "you're doing fine missy, just tell us what you know about bees."

Dr. Tew is a great asset to the beekeeping community but he really missed his calling. He should have been a comedian. He surely would have rivaled Steve Martin and the like. Every time I get the chance, I make sure to sit in on his lectures. Not only does he communicate brilliant information but he also makes it fun and enjoyable at the same time. Keep up the good work Jim but next time I get to go first!

Jennifer Berry
University of GA

Rattlesnakes, Almonds

This year, 2011, a rattlesnake was found in an almond orchard in the California Central Valley. No rattlesnakes had been reported in the area for over 60 years. There are an infinite number of ways that the rattlesnake could have arrived there.

One possibility for the reader to consider is inside, or under, a beehive. Bee alert! It is a rare occurrence, but it does happen.

Alan Budkley
Portola Valley, CA

The Big Picture

To Ann Harman, your article in *Bee Culture* August 2011 was a fine article and stuck to the facts. The tulip poplar, American holly and black locust trees have not produced nectar in my area for around 20 years. It is not that just the bees do not visit the flowers on these trees but there are no other insects visit these flowers either. I have been ever watchful for around 15 years observing the weather, time of day, moisture in the soil, sun, rain and wind that would hinder the bees flying. It has taken those 15 years to rule out all of them. I live in a rural area where not much has changed.

I have taken the blossoms of these trees and squeezed them: no nectar. These are exactly the very same trees that many years ago had so many insects (and bees) that the humming was incessant and vociferous. It was from these very same holly trees that I made vinegar from many years ago and brought to a beekeeper's meeting in Southern Maryland (Association of Southern Maryland Beekeepers). It was you who declared, and rightly so, that it was made from holly honey and you did not care for it.

Maybe what is happening here with these trees is like what is happening with the maple syrup industry? It keeps moving north. Maybe these trees are saying we don't like it here anymore. Maybe we need to pay more attention to global warming/climate change.

Bill Bartlett
Maryland

Ann's Response: *Thank you very much for your letter. I am glad you have been so observant about your bee forage plants and for being a Weather Watcher. Keeping track of both plants and weather really does help our beekeeping. Certainly our beekeeping is changing but we may all be following the same timetable as 20 years ago.*

Even with good weather observations, it is difficult for us to realize slow changes in the environment. Dr. Wayne Esaias, who lives in Maryland also, noticed changes in his bee forage plants, especially in the tulip poplar trees. He started a national network of beekeepers who have one of their hives on a scale.

The scale provides an excellent way of keeping track of nectar flows during bee season. Just one season will not give a picture of climate change. For that it is necessary to follow the nectar flows over time.

To find out about the information being collected on scale hives in your region as well as across the nation I encourage you to go to two websites: www.HoneyBeeNet and www.usanpn.org. Here you will find out about how you and your beehives can participate in studying the changes taking place in our nectar plants.

I encourage you to visit these two sites. I find them fascinating and informative. And I also encourage you, as well as all beekeepers, to become a participant in the network of beekeepers with a scale hive.

I wish you and your bees good luck! – Ann Harman

Try Russians

I just saw an article in The Carolina Gardener about Russian bees. The article spoke of their resistance to mites and the fact that expensive chemicals were not needed to keep them alive and healthy. From the article:

“Russian bees are similar to the Italian honey bee, except the Russians carry an important characteristic that the Italians don’t have. Russian bees contain a built-in resistance to the exotic mites that began devastating the country’s bee population in the 1980s.”

It was a well written article and is, I believe still available on line.

There is some discussion or tolerance or resistance to mites, too.

All research on Russian bees has clearly shown that they inhibit the population growth of the *Varroa* mite.

Colonies headed by Russian queens during a recent study showed comparable mite levels without treatment to colonies of Italian bees that were treated for



Carl Webb in one of his Russian beeyards in Georgia.

Varroa twice each year.

But, repeated experiments with Russian bees have shown that this trait is rapidly lost when Russian queens are mated with non Russian drones. Also hygienic behavior is lost if hygienic queens are not mated with drones from other hygienic queens.

Diversity is a good thing, even essential. What is important in my opinion, is the right kind of diversity. If poor stock is used to create diversity it will only bring in traits that interfere with a breeding program. That is why the Russian program has the built-in “diversity generator” of using selected drone sources from other breeders. Diversity is maintained but all the breeding material is under selection.

Mongrelizing will cause the

reduction of selected traits and the result may well be undesirable as an economically useful stock

Additional studies have shown that the Russian bees without chemical treatment when compared with Italian bees with twice annual mite treatment exhibited:

1. Higher honey production
2. Comparable mite levels
3. Fewer colony deaths
4. Fewer queen supercedures

My greatest challenge as a breeder of Russian bees is to maintain an isolated mating area where only diverse lines of Russian drones are available to mate with my Russian bees.

Carl Webb
Clarksville, Ga

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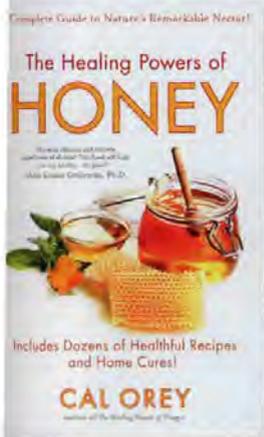
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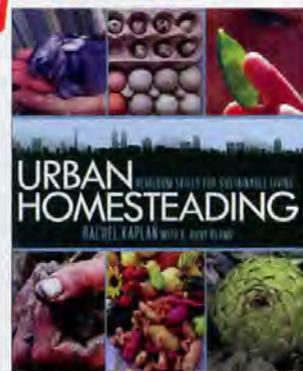
The Healing Powers Of Honey, by Cal Orey. 6" x 9", 302 pages. Published by Kensington Press. Black and white. Soft cover. ISBN 978-0-7582-6159-5. Available from most book stores or www.calorey.com. \$14.00.

Cal Orey has written several Healing Powers books . . . chocolate, vinegar and olive oil. I had an advance look at this book several months ago, and was asked to write a blurb for it . . . so I'm familiar with some of her work. This is NOT a book beekeepers can use to become familiar with beekeeping, and it's not a cookbook, although there are many recipes in it. It does cover a bit of beekeeping history, and mentions some well known authors in our field. But, it does cover a lot of topics – it covers a very broad range of topics, none of them in enough depth to become boring, or dull. It is a good starting place for someone very interested in knowing more about honey, sources, flavors, colors and what's good to

eat with each kind – but most folks don't want to know very much – just a little, and to have a good reason to use more.

Ron Fessenden, MD, and author of *The Honey Revolution*, wrote the Foreword, so you can be assured of some sound medical backgrounding, and the healing chapters cover honey and cinnamon, teas, home remedies, creams and lotions from beeswax, beauty aids, and lists and charts and graphs and more lists and more lists of things to use with honey, things to use honey for, things honey can cure, and more.

Each chapter leads off with a bit of her history as she roamed the U.S. and Canada in her youth, looking for adventure, and good food . . . actually, any food sometimes, and she always has a dog with her . . . and she does write about pets, also. There's a good resource list at the end, and a bibliography of her sources of information, which you may find useful when you want more information. This is a good book to give someone who doesn't want to know all about bees and beekeeping – but just about honey. *Kim Flottum*



Urban Homesteading: Heirloom Skills for Renewing Our Cities, by Rachel Kaplan with K. Ruby Blume. Skyhorse Publishing. Soft cover, color throughout. 8" x 10", 292 pages. ISBN 978-1-61608-054-9. \$16.95.

If you buy only one book this year that isn't a bee book (and there's even bees in this book), this is the book to buy. Paul Hawken, founder of Smith & Hawken said, "This book is ridiculously good, a stunner. It is a manifesto, a guide, a book of prayers, a much-needed tutorial. A masterpiece". I could not agree more.

Both authors live in northern California. Rachel is an artist, author, teacher, psychologist, mother, ↗



Honey. Nature's Golden Healer, by Gloria Havenhand. Published by Firefly Publishers. ISBN 978-1-55407-915-5. 7.5" x 9.25". 160 pages. Color throughout. Soft cover with flaps. \$19.95.

If the title of this book seems familiar, see the *Healing Powers Of Honey* book review on these pages. The popularity of honey bee "stuff" continues to grow, but, to be honest, this book takes it way, way too far. It is, essentially, a \$20, 160 page catalog for a honey bee "stuff" store and web page based in the UK, called Medibee. It is deceptively attractive for a purpose. They sell, are you ready – Bioactive honey, an Antibacterial Honey, Brother Adam's Pure Botanical Honey, pollen sprinkles, all manner of propolis products, and then there are the 'natural' enhancers – Get up and Go, Instant Energy, Bee-Active capsules, Bee-Male capsules, plus royal jelly, soaps, creams, lotions and of course, this book.

The photos in this book are stunning, really – but they offer

nothing instructional or advance the information the book purports to provide. The information on honey bee biology is, at best, marginal, and often blatantly wrong and though it says it will prepare you to be a beekeeper, you would be in trouble if you followed the information presented here.

If you want a \$20 catalog for a company that sells products from the hive, like Pure Botanical Honey . . . from, maybe, their hives and maybe not . . . certainly I would question how much royal jelly they harvest in a season – go ahead and buy this book. Otherwise leave it on the shelf. Better, send me the 20 bucks and I'll send you a whole pound of pure botanical honey. It's the only kind I have. *Kim Flottum*

and urban homesteader. K. Ruby Blume, you may recall, had an article here recently on Top Bar Hive construction and management. But she, too, is an artist, teacher – she founded the Institute Of Urban Homesteading in Oakland – and has background in everything from permaculture to pollination ecology, cooking, canning, fermentation techniques to setting tile, doing electrical wiring and tending a beehive. Combined, these two people bring to these pages an extraordinary amount of information. So then, the basis of the book is going the extra mile and interviewing successful urban homesteaders who have strengths in some, but maybe not all the areas covered. Combined . . . they have it covered.

There are only five chapters. Start Where You Are – and you must take the Bioregional Quiz – 28 questions on Where Are You – for instance – where does your water come from?, Name five resident birds in your area, what is the name of the creek that defines your watershed?. Lots of things most of should know, but don't. There's just enough on this that you get a feel for why it's

important to know where you are, and the things that are important about where you are – remember – this is primarily for city folk – but we all can learn here.

Gardening and Growing. Community gardens, tools, spaces and places, containers and dirt, water and compost and what to grow where. Creatures of course . . . bees for certain, both native and honey, chickens and ducks and goats and rabbits . . . how to grow them, and how to harvest them. Gotta eat, you know. And recipes for all manner of grow it yourself foods . . . yogurt, cheese, butter . . . ummmmm.

Natural medicines (see above for some of those, too) are included – growing, harvesting, using.

And then building – adobe everything, getting off all the grids, harvesting rainwater, waste management, and finally, just taking care of yourself – enough good food, sleep, recreation and work . . .

A list of references, and a list of resources if you want even more is included. Lots and lots of photos, drawings and sidebars only enhance the work.

I said it was a masterpiece. It is.



Reviewed by A. Gary Shilling – In my former dog run next to my garage that was converted to a solar-heated greenhouse, there is a sign:

Successful gardening is:
Doing what has to be done
When it should be done
The way it ought to be done
Whether you feel like it or not.

Similarly, Kim Flottum writes that the inspiration and basis of his new book, *Better Bee Keeping*, was the Rules of Rights of Dr. Hachiro Shimanuki, earlier the research leader of the USDA Honey Bee Research Laboratory in Beltsville, Md. “If you produce the right number of bees that are the right age and in the right condition, and are in the right place at the right time, you will be successful.”

Spread throughout this book are many other pieces of sound general advice. Time is money; there is a trade-off between the two. When you spend more time at beekeeping, you should get more income, and spending more money can save you time. Pre-assembled frames cost more, but what's the value of the time you spend assembling them? Flottum also believes it's better to raise revenues than cut expenses.

He emphasizes the reality that too few of us pursue: Do what you're good at and success will follow, not the reverse. If you love selling honey and candles but hate getting stung, the bee store, not the beeyard, is the place for you. Similarly, my friend and fellow investment strategist, Dennis Gartman, says, “Do more of what's working in your investments and less of what isn't.”

Many of us act before planning, but Flottum stresses the importance



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More New Products on Page 15

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INNER COVER

There's a couple of articles dealing with Winter in this issue. I encourage you to read them both and take the good information they offer to heart. Your bees will be better if you do.

But there's a more important message here. One that says we have forsaken our duty to our bees over the years. When first tracheal, then *Varroa* came along we lost sight of the things that were, and concentrated on the things that were new. Our attention went to

chemicals, to . . . well, to control these newest, hardest, most awful beings, and we forgot the Winters that still were and still are. That is a mistake.

Winter, where Winter is cold, where Winter is where food on a routine basis is rare or not at all, where cold, wet and deadly inside rain are everyday events if not directed up, away and outside, where days are short and cold and nights are long and colder – where winter is what Winter should be, still kills bees if we don't do what's right as beekeepers, not beekeepers.

Honey bees are tropical – meant to enjoy the gentle parts of the planet. Even those supposed to survive the harshest coldest places with cold nights, short days, snowy covers, icy storms and cloudy, sunless times need to stay warm to survive. Sixty-some degrees on average, over 90 when they have a queen on duty, making brood, growing the colony. But you know all of this already, right?

You can, if you choose, let nature decide. Let those that got lucky survive and those that didn't, now weak and uncared for decline and perish. That's a choice you make. But your bees didn't choose to live where you put them. There was no vote, no discussion, no debate. Nor was there a complaint when food wasn't found because no food grew where you put them. No cry went up when pests weren't controlled, when water was scarce, when walls were broken, when covers blew off, when disease ran rampant. Nope, none at all. Not a peep, right? Well, some did. Some just up and left. Not died. Just left. Not sick. Just gone. Not CCD. Just empty boxes. That's the Grandest "Up Yours" there ever was, by the way.

No, bees wouldn't choose snow or cold or wind or desert or too much rain or awful food or pesticides of any kind if they could choose, I'll bet. They would have fine places in the sun with more than enough good food all the time everywhere, if you let them, if they could.

Winter is hard. Really hard if there's cold and wind and snow and ice and more cold. You don't leave your pooch outside in wintertime without a warm and safe place to hide away. Not cats or rabbits, horses or cattle, ferrets or hamsters or goldfish, either, do you? If you did, heads would roll, authorities would be called, television would show the crime. Certainly we don't treat small children that way – nor do old people get left on icebergs anymore, though that's been considered in some places again. So why bees? Why is the "If they can't take care of themselves no matter what then I don't want them" an acceptable attitude? In fact, why isn't that attitude a crime? It is for dogs, for cattle, for children and old people. Truly, it is an offence against life itself.

Why not give your bees what where you put them doesn't? Why not protection from the wind, coverings galore to keep all the warm in and all the cold out, food enough and good, room to grow and flowing air so wet and cold moves freely, joyously up and away. Why not the extra mile anymore? Why let them die? Why?

think that seeing honey bees favorably splashed on the front page of your hometown newspaper, spread on the cover of a regional or national magazine, or maybe playing it up for the lead personal interest story on the evening news is common . . . but please, rethink that thought. That bees are even mentioned on the news, in the paper or in some magazine – without the killer label, or as a swarm imprisoning a sweet, frail old couple in a hot, closed-in-car in a Wal-Mart parking lot, or as billions found living in the steeple of a church, needing industrial scale equipment, fire department know-how and 10 police for security to remove them . . . is, on a daily basis, a very good thing for those of us who have seen all of the above and more and worse for years and years. It's Summer time, and the livin' is easy for bees and beekeepers – for a change. I love the attention, the good feelings, the 'we need to help the bees' goodwill going on. It is as good as it gets, for now.

Continued on Page 29

Winter Time. City Bees.

If you've only been in the bee game for a few years or less, you might

of a detailed and realistic plan if you contemplate an expansion in beekeeping, and includes a splendid list of 22 questions to ask yourself in evaluating the direction you should follow. Sample: "Do you work alone and like it like that?" A psychiatrist and investment client of mine, who also traded commodity futures on his own, told me, "I used to believe there are two problems to contend with, the markets and yourself. Now I believe it's only yourself."

Another Flottum sage observation applies to almost any business: Much of what you do is aimed at next year. As he notes, "Take care of the bees that take care of the bees that go into Winter" to insure successful hives next Spring. Also, he writes, it's the grandparents and earlier generations as well as the parents of your queens that matter.

Better Bee Keeping is heavy on specific advice as well. Contracts for pollinating crops are detailed and enforceable, handshakes aren't. You need about a continuously blooming acre to support a hive for the season. If you lease bee forage land rather than take what's available free, you'll get what you want, and it doesn't need to be in a neat square piece. Overwintered frames of crystallized honey are useless to bees. "Every year have a test yard [for new queens]. Test. Measure. Evaluate. Discard."

Flottum discusses at length buying mated queens, virgin queens or queen cells, and concludes that raising your own queens is best since you have much more control. He notes that many purchased queens are poorly mated and don't last. I agree. After a disastrous winter, I replaced 87 of my 88 colonies with packages from Georgia, and about 25% suffered supercedure or had to be requeened. A queen producer should hold them 21 to 35 days to be sure they're laying and their offspring are acceptable, he writes. Flottum discusses the starter/finisher and Cloake board queen-rearing techniques in detail. Interestingly, he says to give your carefully-raised queens to neighboring beekeepers free to insure the quality of their drones with which your own queens will mate.

He notes that a marked queen insures the one in the box is the one you want there - assuming you're

better than I am at spotting other unwanted royalty. He provides nifty techniques for calculating queen laying rates and how much room an expanding brood needs in the Spring. Flottum gives lots of useful information on swarm prevention in the Spring and for wintering your bees. It was certainly useful to me, but full disclosure: Kim Flottum is my good friend of many years standing, and I continually rely on him for beekeeping advice.

I also was interested to learn that moving is so stressful that most commercial beekeepers replace 80% to 100% of their queens each season. And Flottum confirmed my suspicion that with bees foraging over a radius of at least a mile, pure organic honey is a very rare commodity.

Better Bee Keeping is written for those who know the fundamentals, and want to expand their beekeeping operations and incomes - substantially, to the point that it will be economical to raise dozens if not



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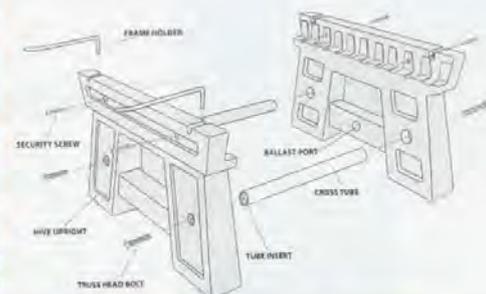
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hundreds of queens. So you'll need to look elsewhere for step-by-step details. Flottum discusses the value of using candy boards, but not enough detail for someone like me who's never used them. He covers making Spring and Summer nucs, but when does Spring end and Summer start? The determination of degree days is interesting, but what do you do with it? His fascinating calculation shows why the bee population needs to accelerate about two months ahead of the blooms, but what do you do if it

Continued on Page 29

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OCTOBER - REGIONAL HONEY PRICE REPORT



The season so far...and Winter

Region 1

A cold, wet, Spring and about average Summer for both rain and temps produced an average crop overall. Wintering looks only OK and the Summer/Fall crops seem light. But that seems iffy most places. Winter could be tough.

Region 2

Spring was cold, wet and produced a below average to no crop. Summer was mostly hot and dry, and another below average crop, while Fall has been much better... average, for an average to good Fall crop. That turnaround makes for good wintering.

Region 3

Spring was just about right most places, and if there's a crop to be made, it was pretty good this Spring. Summer tended toward hot and a bit dry and the crop was about where it should be, and Fall crops here are mostly non-existent. Bees look good going into Winter.

Region 4

Spring mostly OK, with some spots too wet, and some too cool... sound familiar? But the Spring crop was mostly average to less so. Summer was too hot and too dry most everywhere for a mostly below average crop. Fall was hot and mostly dry too, but there's mostly no Fall crop. Bees look OK, but there's work to be done yet.

Region 5

Spring was cool and dry, but some crops did great, others not so great. Summer was too warm and too dry for good crops and the Summer crop showed it with only average to less so. Fall... depending... hot and wet, for an only average crop. Spotty all over the state though. Work to do for wintering.

Region 6

Cool but not too cool, and dry, but not too dry marked Spring for the region overall, with mostly average to good Spring crops. Summer was hot and dry, with mostly below average crops, and Fall hot and dry too. Winter looks to be OK.

Region 7

A cool to cold and way too wet Spring in almost the entire region produced an overall below average, to no crop this year. Summer, mostly hot and dry, but spotty with cool and damp produce an average to less so crop. Fall was warm to OK, with an average crop... biggest unknown is goldenrod... good, or not? Too early to tell.

Region 8

Of course the southern areas were hot, hot, dry, dry and that's the end of the story. Bees in trouble mostly there. Up north, not quite so bad, with Summer and Fall crops average to good. Soy late so it's hard to tell right now. Bees looking good to needing help.

Region 9

Hot, dry, hot, dry, fire, hot, dry, hot, dry. Hurricane. A tough year for bees and beekeepers mostly everywhere in Region 9. Most can use some help. Many can use some prayers.

Region 10

A cool to cold, wet to too wet spring produced a much below average Spring crop, but a Summer of peace and love gave a good crop mostly, while Fall was a let down as too dry and a below average crop. Bees looking just OK, so far.

Region 11

Hot in the south, but mostly cold the rest, plus mostly too dry gave either no Spring crop, or if it did, a below average crop. Summer was better, warm to too dry but mostly acceptable gave a good to average crop. A good to dry Fall might help with an average to good crop. Bees OK to needing help.

Region 12

Too cold, too wet...one calls it a crop failure for the season, certainly the spring. Summer a tiny bit better, but still below average. Fall...too dry, no matter the location, or the temp. Bees...well, they'll need some Winter feed help, for sure.

REPORTING REGIONS												SUMMARY		History		
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.74	1.95	1.74	1.51	1.70	1.63	1.70	1.74	1.74	1.65	1.83	1.75	1.51-1.95	1.72	1.74	1.62
55 Gal. Drum, Ambr	1.67	1.75	1.67	1.48	1.65	1.53	1.69	1.67	1.67	1.67	1.62	1.55	1.48-1.75	1.63	1.60	1.58
60# Light (retail)	145.00	161.00	149.00	139.00	140.00	152.57	143.00	165.00	152.57	139.80	144.50	182.50	139.00-182.50	151.16	141.51	138.39
60# Amber (retail)	145.00	151.00	149.00	144.40	140.00	150.00	135.00	165.00	150.06	150.06	144.33	172.50	135.00-172.50	149.70	139.36	131.48
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	63.36	71.48	48.00	62.40	69.15	69.15	51.58	69.15	69.15	48.00	60.00	81.50	48.00-81.50	63.58	62.27	56.66
1# 24/case	95.75	99.23	81.60	78.53	84.00	92.52	84.36	96.00	72.00	109.08	85.92	112.10	72.00-112.10	90.92	89.27	86.00
2# 12/case	84.60	81.85	75.90	68.75	78.00	87.00	76.48	84.00	63.00	81.00	70.50	92.00	63.00-92.00	78.59	77.35	75.53
12.oz. Plas. 24/cs	86.25	88.88	64.20	74.32	67.20	66.00	65.28	94.80	66.00	61.20	80.40	76.95	61.20-94.80	74.29	72.28	67.85
5# 6/case	92.10	98.98	81.25	79.23	96.00	86.89	81.77	102.00	72.00	85.20	71.25	96.00	71.25-102.00	86.89	83.97	80.89
Quarts 12/case	129.75	121.85	142.80	109.20	96.00	96.95	106.80	108.00	129.75	133.92	97.96	123.67	96.00-142.80	116.39	114.83	101.13
Pints 12/case	73.76	88.98	81.60	71.50	84.00	66.60	77.39	87.00	73.76	90.15	69.00	75.00	66.60-90.15	78.23	72.07	65.58
RETAIL SHELF PRICES																
1/2#	3.00	4.21	2.55	3.63	3.64	3.00	3.21	3.64	3.64	3.15	3.19	4.00	2.55-4.21	3.40	3.38	3.13
12 oz. Plastic	3.75	4.91	3.76	4.06	3.99	3.50	3.64	5.00	4.50	3.95	4.31	4.83	3.50-5.00	4.18	4.04	3.94
1# Glass/Plastic	5.75	5.74	5.07	5.32	5.50	5.37	4.66	6.00	5.50	5.41	4.88	7.21	4.66-7.21	5.54	5.37	5.08
2# Glass/Plastic	8.00	8.49	9.51	8.69	9.50	8.50	7.88	10.00	9.00	8.88	7.23	11.33	7.23-11.33	8.92	8.91	8.05
Pint	8.03	7.61	7.75	6.96	6.50	6.62	7.71	8.75	8.03	9.50	7.63	9.87	6.50-9.87	7.91	8.43	7.25
Quart	12.87	13.40	12.35	11.55	12.00	10.55	11.76	14.00	12.87	14.28	11.59	14.00	10.55-14.28	12.60	13.52	12.06
5# Glass/Plastic	17.50	18.99	18.95	19.90	17.98	17.98	17.61	22.00	21.00	16.45	15.81	23.00	15.81-23.00	18.93	19.30	19.65
1# Cream	10.00	6.86	6.40	5.48	13.62	13.62	6.08	13.62	13.62	5.62	5.88	6.75	5.48-13.62	8.96	6.16	7.34
1# Cut Comb	7.50	7.15	7.80	6.88	8.55	5.00	7.77	8.55	8.55	10.00	9.00	9.25	5.00-10.00	8.00	8.15	7.22
Ross Round	5.80	6.95	7.80	5.48	6.99	6.99	8.33	6.99	6.99	6.99	7.50	8.99	5.48-8.99	7.15	7.77	5.96
Wholesale Wax (Lt)	3.00	4.83	2.75	3.73	2.30	3.75	4.63	5.00	4.50	6.00	3.23	4.10	2.30-6.00	3.98	3.91	3.76
Wholesale Wax (Dk)	2.50	4.32	2.75	3.44	2.00	3.65	4.03	4.75	4.71	4.71	2.50	3.90	2.00-4.75	3.60	3.42	3.25
Pollination Fee/Col.	90.00	105.00	75.00	55.50	55.00	45.00	57.17	75.00	87.65	87.65	24.00	105.00	24.00-105.00	71.83	76.68	78.66

RESEARCH REVIEWED

The Latest In Honey Bee Research

Steve Sheppard

“Always look on the bright side of life? Not likely . . .”

It never entered my mind that the title of an influential book of the 60s counter culture would ever seem appropriate for one of these *Research Reviewed* columns. However, time has a way of opening possibilities and “*Been down so long it looks like up to me*” (written by the husband of Joan Baez’s sister, for those of you that remember) would not be entirely out of place as a subtitle for this month’s contribution. The topic of animal emotions is quite controversial, as even a cursory look into the literature on the well being of animals under human care, in agricultural settings or being harvested from the wild will indicate. Honey bees are well-recognized as research animals for a number of basic scientific areas including chemical ecology, physiology, sociality, pollination biology and others. A recently published paper now indicates that honey bees may also play an important role in answering the question of whether animals experience “human-like” emotions (Bateson *et al.* 2011).

Bateson and colleagues note that, in humans, “negative feelings are reliably correlated with ...the increased expectation of bad outcomes (negative cognitive biases)”. However, given that animals cannot provide us with a report of how they “feel”, one approach has been to test whether animals with poor welfare (or “negative affective states such as anxiety...”) tend to exhibit “pessimistic-like” decision making. This has been shown to be the case for a number of birds and mammals, although it had not been previously evaluated in invertebrates. Bateson *et al* set up a series of experiments to investigate the response of honey bees to manipulation in a way that induced anxiety. Experimental bees were first trained to respond to a set of odor mixtures, using a protocol that incorporated the proboscis extension reflex (PER). Briefly, PER is

a widely used technique where individual honey bees restrained in small harnesses are trained to extend their mouthparts for some given stimulus (i) and withhold their mouthparts in the presence of others. The training can involve both positive reinforcement (a sugar solution “reward”) and negative reinforcement (quinine or salt solution “punishment”). In these specific experiments, the researchers trained the experimental bees to extend their mouthparts in the presence of a particular two-component odor mixture (CS+) and to withhold it in the presence of another mixture (CS-).

The experimenters then subjected 50% of the trained bees to “shaking” for 60 seconds to simulate a “predatory attack on a concealed colony”. Bateson *et al.* had shown in a separate test that this amount of shaking was sufficient to cause physiological changes in the bees (reduced octopamine, dopamine and serotonin levels). They then subjected both the shaken bees and the unshaken bees to PER screening with five odor stimuli presented in random order, including the CS+ and CS- odor mixtures and three novel mixtures that were various intermediate ratios of CS+ and CS-. Bateson and colleagues observed that shaken bees were more likely to exhibit “pessimistic judgment biases”. That is, shaken honey bees were more likely to refrain from extending their mouthparts for both the CS- and the closest intermediate odor form. Their response to the CS+ odor mixture was unchanged, relative to the unshaken bees, indicating that shaking did not simply depress their tendency to process odor information or respond.

The authors noted that their study provides the first addition of an invertebrate animal to a “growing list of vertebrates, including rats, sheep, dogs, starlings and domestic chicks, that when subjected to various forms

of negative, stressful manipulations exhibit pessimistic judgment biases.” More generally, the authors concluded that their work further supports “. . . the hypothesis that pessimistic judgment biases are likely to be a good measure of negative emotional states across species...”. They caution that while their results do not indicate the existence of “negative subjective feelings” in honey bees, they do “call into question how we identify emotions in any nonhuman animal.” This latter point touches on the significance of this ground breaking work and undoubtedly this research paper will add fuel to the fire of controversy surrounding whether animals exhibit human-like emotions. Bateson and colleagues set the stage for further discussion with a concluding statement that it was “logically inconsistent” to claim that pessimistic biases confirm “that dogs or rats are anxious but to deny the same conclusion in the case of honey bees.”

So as beekeepers we might consider two possible views related to the application of these findings to honey bees. First, we all have been right all along to ascribe human-like emotions at times to what we see inside a colony! Thus, the notion that colonies appear very “demoralized” when they are “hopelessly queenless” (i.e. having no queen nor brood from which to rear a new one) would be correct . . . because the bees may



indeed "feel" hopeless. There are likely many other examples where it could be philosophically entertaining (although perhaps not very useful) to compare the emotions of a colony to human emotional states. The other viewpoint (and one that points toward the controversy) is that the findings of Bateson *et al* show that the widespread consideration that the existence of "pessimistic judgment biases" supports the occurrence of human-like emotions in other animal species is probably unwarranted. On the other hand, when I return home much later than normal on

"We have been right all along to ascribe human-like emotions at times to what we see inside a colony!"

a given day, especially if it meant a delay in the normal feeding time for "Geechee", my yellow Labrador Retriever, there is no other emotional state descriptor that seems more appropriate than "anxious." **BC**

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A Closer LOOK



DIVISION OF LABOR

Clarence Collison
Audrey Sheridan

Workers build drone comb, raise drone larvae, and regulate the total number of drones produced.

Colony reproduction in honey bees involves complex interactions between sterile workers and reproductive castes. While a great deal is known about worker-queen interactions, less is known about worker-drone interactions and how they contribute to social reproductive decisions. Workers use at least two communication signals, the vibration signal and worker piping, to influence queen behavior during colony reproductive events. The vibration signal, which consists of a worker grasping a recipient with its legs and rapidly vibrating its body dorsoventrally for one to two seconds, is performed on both laying queens and virgin queens. It exerts a nonspecific modulatory influence that may help to prepare laying queens for flight and departure from the natal nest (Allen 1959, Fletcher 1978, Schneider 1991, Pierce et al. 2007), and may influence the development and survival of virgin queens during queen replacement (Schneider et al. 2001, Schneider and DeGrandi-Hoffman 2003, 2008). Worker piping consists of a worker producing a high-pitched, pulsed sound while pressing its body against another bee, which causes the recipient to warm its flight muscles in preparation for flight (Seeley and Tautz 2001). Workers perform piping on laying queens at high rates immediately before the departure of the swarm from the natal nest and inside the swarm cluster before liftoff for the new nest cavity, which may provide the immediate trigger for queen flight (Pierce et al. 2007). In combination, the vibration signal and worker piping help coordinate queen behavior with the different stages of the swarming process, which in turn contributes to the successful completion of swarm production and movement, and the continuation of the parental colony.

Laying queens are vibrated only in the three to four week interval when a colony is preparing to swarm (Schneider and Lewis 2004). During this period, laying queens are vibrated at an increasing rate, and by the final one or two days before swarm departure they may receive hundreds of signals each hour (Allen 1958, 1959, Fletcher 1975, Schneider 1991, Painter-Kurt and Schneider 1998). Fletcher (1975) suggested that vibration signals inhibit queen activity and are used by workers to prevent laying queens from attacking developing queen cells during the swarm-preparation period.

However, laying queens can be vibrated for several days before queen-

cells are present, suggesting that preventing attacks is not the sole function of the signal. Rather, most evidence suggests that a primary role of the vibration signal during swarming preparations is to gradually help prepare laying queens for flight (Allen 1958, 1959, Schneider 1991). Laying queens receive more vibration signals when inactive than active and respond by walking or running (Schneider 1991). Also, during swarm preparation periods, workers decrease the rate at which laying queens are fed (Allen 1960, Schneider 1990). The combination of increased activity and reduced food intake results in a noticeable weight loss that may be necessary for laying

"Any interactions that enable workers to influence the behavior and flight performance of adult drones could convey strong selective advantages."



queens to become airborne (Allen 1958, Schneider 1991).

Vibration signals can be performed on queen cells and virgin queens throughout the rearing and elimination phases of the queen replacement process. Workers often perform the signal on sealed queen cells, sometimes at very high rates (Schneider and Lewis 2004). Queen cells are vibrated repeatedly when virgin queens are attempting to emerge and this may delay or prevent emergence (Fletcher 1978). Virgin queens that are allowed to emerge sooner may have a competitive advantage in eliminating rivals (Schneider et al. 2001, Schneider and DeGrandi-Hoffman 2002). Thus, workers could potentially use the vibration signal to influence the timing of queen emergence and ultimate outcome of the replacement process. However, Grooters (1987) and Schneider and DeGrandi-Hoffman (2002) found no clear association between the signal and virgin queen emergence order, while Schneider et al. (2001) found an effect in some colonies but not others. Queen cells can be vibrated for four to five days before emergence, suggesting that delaying or preventing emergence is not the sole function of the signal. Schneider and DeGrandi-Hoffman (2002) found that queen cells vibrated at higher rates were more likely to develop to emergence, whereas those receiving few or no vibration signals had a greater likelihood of being destroyed by workers before development was completed. The signal may therefore help to promote development, although its specific effect on queen cells is unknown.

Vibration signals are also performed on virgin queens after they emerge. However, there is tremendous variability in the number of signals performed on different queens in the same colony (Schneider and Lewis 2004). Some may be vibrated at rates of 200-300 signals per hour, while others receive few or no signals (Schneider et al. 2001). Virgin queens that are vibrated at higher rates relative to their sister queens survive longer, eliminate more rivals and are more likely to become the new laying queens of their colonies (Schneider et al. 2001, Schneider and DeGrandi-Hoffman 2003). Virgin queens are often vibrated at high rates when near rivals, which elicits

"Tiny proportions of workers belonging to separate, but overlapping age groups provide most of the care received by adult drones, and drone vibrators comprise a subset of signalers within a colony that have an increased tendency to contact and interact with drones."

brief bursts of running that may remove them from potential battles and temporarily prevent fighting.

Workers build drone comb, raise drone larvae, and regulate the total number of drones produced (Seeley and Mikheyev 2003, Boes 2010). After drones emerge as adults, workers interact with them primarily through trophallaxis (mouth-to-mouth feeding) and grooming (Ohtani 1974). Trophallaxis provides the nutrients necessary for sexual maturation, which typically occurs around 12 days of age (Winston 1987). As drones age, they begin to feed directly from honey cells, but still receive some trophallaxis from workers, which may help to maintain drone condition (Free 1957, Ohtani 1974). Grooming may also contribute to drone maintenance (Winston 1987). Drone reproductive success is dependent upon flight ability, because mating occurs on the wing and drones must compete intensely for access to virgin queens while in flight (Koeniger et al. 2005 a,b). Thus, any interactions that enable workers to influence the behavior and flight performance of adult drones could convey strong selective advantages.

Workers may use communication signals to influence drone behavior. Boucher and Schneider (2009) reported that workers will perform vibration signals (but not piping) on drones. Drones of all ages can receive the vibration signal; however, sexually immature drones are vibrated at higher rates than mature drones. Drones respond to the vibration signal with greater activity and interactions with workers, which increases the proportion of time they spend receiving trophallaxis and grooming (Boucher and Schneider 2009). Worker honey bees that receive vibration signals show slight, significant increases in juvenile hormone titers (Schneider et al. 2004), but it is unknown whether drones show a similar hormonal response. It is possible that the vibration signal could also contribute to drone development by affecting endocrine responses that promote sexual maturation.

In contrast to queens, there is no evidence that the vibration signal has a direct effect on drone flight: most signaling activity occurs early in the morning and precedes the onset of drone flight by four to six hours, and there is no association between the rate of signaling and the level of drone flight activity later in the day (Boucher and Schneider 2009). Taken together, these observations suggest that the vibration signal is not used to directly stimulate drone flight, but rather is used by workers to adjust the care drones receive for sexual maturation and maintenance. This, in turn, could ultimately contribute to increased mating performance and greater colony reproductive output (Boucher and Schneider 2009). However, the role of the signal in worker-drone interactions is poorly understood. In particular, nothing is known about the workers that vibrate drones or how these workers may be involved in colony reproductive decisions.

Stout et al. (2011) investigated caste interactions in honey bees by determining the age and behavior of workers that perform vibration signals, trophallaxis, and grooming with drones. Workers of all ages could engage in the different interactions monitored, although workers that performed vibration signals on drones were significantly older than those engaging in trophallaxis and grooming. Only 3-8% of workers engaged in the different behaviors were monitored. Compared with workers that performed vibration signals only on workers ('worker vibrators'), those that performed signals on both workers and drones ('drone vibrators') had greater movement rates inside the nest, higher vibration signaling rates, and were more likely to have an immediate association with foraging. Both worker vibrators and drone vibra-

tors contacted drones of all ages as they moved through the nest. However, drone vibrators contacted drones at higher rates, contacted slightly, but significantly younger drones, and were more likely to engage in trophallaxis and grooming with drones, in addition to vibrating them. Taken together, the results suggest that tiny proportions of workers belonging to separate, but overlapping age groups provide most of the care received by adult drones, and that drone vibrators comprise a subset of signalers within a colony that have an increased tendency to contact and interact with drones.

Drone flight activity occurs during the afternoon hours and consists of orientation flights, which are taken by younger drones and lasts one to six minutes, and mating flights, which are performed by sexually mature drones and last 20-30 minutes (Taber 1964, Ruttner 1966, Witherell 1971).

Mature drones may take two to four separate mating flights per day and fly up to 7 kilometers (4.35 miles) from the hive (Currie 1987). Between flights, they return to the nest for brief periods, during which they feed from cells or receive trophallaxis in preparation for subsequent flights. Drone flight behavior is under strong endogenous control, and the timing of flight activity may be more dependent upon a drone's circadian rhythm than on interactions with workers (Koeniger et al. 1994).

Boucher and Schneider (2009) monitored sexually mature drones that returned to the colonies during mating flight activity. Each drone was observed for five minutes and during this time they crossed 18.6 grid squares/min., engaged in 1.5 interactions with workers, spent 4.5% of their time receiving trophallaxis, 13.3% feeding from cells and 3.1% receiving grooming. Of these returning drones, 88.0% left the hive for another flight. Only four of the 89 drones received vibration signals between consecutive mating flights. Thus, the signal was not associated with drone behavior during mating flight activity. **BC**

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Managed Pollinator CAP Coordinated Agricultural Project

Miticide & Fungicide Interactions



Reed Johnson

Some Of These Are Extremely Toxic

There is no question that honey bees are surrounded by a dizzying variety of chemicals (Mullin et al. 2010). However, just because a chemical is present does not necessarily mean that it poses a threat. We humans often choose to surround ourselves in chemicals, known as drugs, that help us to live longer and healthier lives. Similarly, the most abundant chemicals in bee hives are the ones that are placed there deliberately by beekeepers as therapeutic drugs to control bee diseases and parasites.

Despite therapeutic intentions,

drugs may become harmful if too much of the drug is used – an ‘overdose’ in human terms. Drugs can also become harmful if they interact with other drugs a person is taking. Drug interactions are a major concern for doctors and pharmacists, which is why medical professionals always

ask the question “What drugs are you taking?” As a beekeeper, and your bees’ medical professional, you also need to watch out for drug interactions and need to be asking your bees, “What drugs are you taking?” In most cases you already know the answer to that question, since you, the beekeeper, are the one that administers drugs to control *Varroa*, American Foulbrood or *Nosema*.

But which drug combinations does a beekeeper need to watch

out for? In my first CAPS update (Johnson 2009), I reported on our work at the University of Illinois at Urbana-Champaign where we discovered a potentially deadly interaction between tau-fluvalinate (the active ingredient in Apistan™ and Mavrik™) and coumaphos (the active ingredient in Checkmite+™). Over the last two years Dr. Marion Ellis and I have continued to look for interactions between a wider array of beekeeper-applied drugs at the University of Nebraska-Lincoln.

Miticide-Miticide Interactions

Dr. Ellis and I looked for interactions between six miticides. In addition to tau-fluvalinate and coumaphos, we included amitraz (active

ingredient in Apivar™ and Taktik™), fenpyroximate (Hivastan™ and FujiMite™), oxalic acid and thymol (ApiLive Var™ and ApiGuard™).

To test for interactions between miticides, we topically treated small groups of bees with a uniform low, sublethal dose of the first miticide, then followed up with a range of doses of the second miticide (Figure 1). We included low doses of miticide that killed no bees, medium doses that killed some of the bees and high doses that killed all of the bees. An interaction was determined if an otherwise non-lethal dose of the second miticide suddenly began killing some or all of the bees after those bees had been treated with a sublethal dose of the first miticide. As it is difficult to



Figure 1. Groups of bees used for a lab miticide interaction experiment. In this picture, each cup contained 20 bees that were treated with the recommended dose of fumigillin, followed by different doses of fenpyroximate, or no fenpyroximate as a control. Bees were fed sugar water through a tube placed in the cheesecloth covering each cup. The number of bees surviving were counted 24 and 48 hours after treatment application. This represents a single trial from the 250 trials carried out to produce Figure 2.

kill bees with oxalic acid this miticide was only applied as a sub-lethal first-treatment and could not be used to kill bees previously treated with other miticides

None of the miticides came away clean from the 25-pairwise miticide tests (Figure 2). We validated our previous work demonstrating interactions between tau-fluvalinate and coumaphos and this interaction was potentially the most deadly of any miticide combination tested. Tau-fluvalinate became 20-times more toxic to bees previously treated with coumaphos. Interestingly, tau-fluvalinate became more toxic no matter what other miticide it was paired with, while amitraz never became more toxic (though amitraz could make other miticides more toxic).

Miticide-Antimicrobial Interactions

Miticide interactions with antimicrobial drugs are of particular concern because bees may to be treated for *Varroa* at the same time as they are treated for other diseases. The antimicrobials we tested for interactions with miticides were fumagillin (the active ingredient in Fumagilin B™), which is used for control of *Nosema*; and oxytetracycline (Terramycin™) and tylosin, both of which are used to control American Foulbrood. We fed the antimicrobial drugs to groups of three-day old adult bees in sugar-water at the maximum recommended dose, then treated these bees with a range of miticide doses.

A relatively mild interaction was observed between fumagillin and tau-fluvalinate, but no other adverse interactions were observed between antimicrobial drugs and miticides.

Miticide-Fungicide Interactions

While it is true that beekeepers do not deliberately treat their colonies with fungicides, it is possible for bees to be exposed to large doses of fungicides in the course of foraging. Fungicides are generally not very toxic to bees which means that they may be applied while plants are blooming and therefore when bees are present. Chemical analyses show that one fungicide, chlorothalonil (the active ingredient in Bravo™), is nearly as ubiquitous and abundant in bees and beehives as the miticides that are placed there deliberately (Mullin et al. 2010). Given the high likelihood

While we wait for results from the field experiments there are a few simple things beekeepers can do to avoid the most dangerous drug interactions identified in our laboratory experiments.

that bees might be exposed to high concentrations of a fungicide at the same time they are undergoing miticide treatment, we decided to study the possible interactions between miticides and fungicides.

We treated bees with a large dose of one fungicide followed by one of a range of miticide doses. Fungicides used included: a combination pyraclostrobin and boscalid (the active ingredients in Pristine™), chlorothalonil, and the sterol biosynthesis inhibiting (SBI) fungicide prochloraz.

The toxicity of tau-fluvalinate increased almost 1000-fold in bees previously treated with prochloraz. Coumaphos and fenpyroximate also demonstrated noteworthy interactions with prochloraz, increasing the toxicity of these miticides more than 20-fold. Moderate interactions were also observed between other fungicides and the miticides tau-fluvalinate and thymol.

While Pristine™ and chlorothalonil are often used in flowering crops during bloom, prochloraz is primarily used in greenhouses and it is unlikely that honey bees will ever come into contact with it. Prochloraz was cho-

sen as a representative of the large family of SBI fungicides primarily because there have been previous reports of interactions between this fungicide and other insecticides (Pilling et al. 1995).

After seeing the potent interaction between tau-fluvalinate and prochloraz we were curious to see if this interaction would occur between tau-fluvalinate and other members of the large SBI family of fungicides. We repeated our tau-fluvalinate interaction experiment using doses of one of the following SBI fungicides: fenbuconazole (the active ingredient in Indar™), tebuconazole (Folicur™), metconazole (Quash™), propiconazole (Orbit™) or myclobutanil (Rally™). The results for these fungicides was indistinguishable from the prochloraz results, which suggests that any SBI fungicide has the potential to make tau-fluvalinate much more toxic to bees. We did not test these other SBI fungicides in combination with either fenpyroximate or coumaphos, but it seems likely that any SBI fungicide would interact with these miticides as well.

Figure 2. Elevated miticide toxicity observed in combination with sublethal doses of other miticides, antimicrobials, and fungicides. Blank boxes indicate a combination that was not tested, dots "." indicate no increase in miticide toxicity, tildes "~" indicate an increase in miticide toxicity of less than 20-fold, exclamation marks "!" indicate an increase in miticide toxicity greater than 20-fold and a double exclamation mark "!!" indicates an increase in miticide toxicity of nearly 1000-fold.

	miticides						anti-microbials			fungicides		
	amitraz	coumaphos	fenpyroximate	tau-fluvalinate	oxalic acid	thymol	fumagillin	oxytetracycline	tylosin	chlorothalonil	prochloraz	pyraclo. + bosc.
amitraz	
coumaphos	~		~	~	!	.
fenpyroximate	~	~		.	~	!	.
tau-fluvalinate	~	!	~		~	~	~	.	.	~	!!	~
thymol	.	~	.	~	~		.	.	.	~	~	.



Figure 3. Nucleus colonies at the University of Nebraska-Lincoln that are being treated with tau-fluvalinate, myclobutanil, a combination of the two, or a control treatment to test for potential harmful interactions.

Field Trials

First, it should be noted, all of our interaction tests took place in a lab using three-day old adult bees and a single application of a high dose of miticides and fungicides. It is hard to say if these lab results reflect what happens in real colonies as it is possible that, in the real world, bees never come into contact with enough miticide or fungicide to cause any sort of adverse interaction. On the other hand, real colonies are exposed to miticides and fungicides for weeks at a time, rather than a single dose as in our lab tests, and sublethal pesticide exposure may have more subtle effects on colony fitness through effects on brood survival and development (Wu et al. 2011), and adult behavior, longevity and reproductive success (Desneux 2006).

We are currently following up on the most potent interaction observed – that between tau-fluvalinate and the SBI fungicides – in a large scale field experiment. We are treating 50 two-frame nucleus colonies with Apistan™ (tau-fluvalinate), Rally™ (myclobutanil) and a combination of the two, as well as control treatments (Figure 3). We are tracking the success of these colonies in a number of ways, including intensive tracking of brood survival and development using a new technique involving digital photos and a web-based scoring system. Anyone is welcome to help us score the thousands of brood photos we have generated by simply visiting <http://broodmapper.com> where you can learn how you can volunteer a bit of your time to contribute to this experiment.

Recommendations

While we wait for results from the field experiments there are a few

simple things beekeepers can do to avoid the most dangerous drug interactions identified in our laboratory experiments.

First, never treat with more than one miticide simultaneously. Unfortunately, many of these miticides find their way into beeswax where they take up permanent residence, so avoiding multiple treatment may not be as easy as it sounds. The persistence of “legacy miticides” in the wax creates a situation where bees may still be exposed to low doses of last year’s miticide treatment while this year’s treatment is being applied. At this point it is not known what quantity of miticide can reemerge from contaminated wax and if that amount is enough to cause harmful interactions, though previous research has shown that brood reared in old miticide contaminated combs suffer delayed development (Wu et al. 2011). Since repeated miticide treatment will steadily increase the concentration of miticide in the wax it may be prudent to cull the oldest, most contaminated brood frames in apiaries with a long history of miticide use.

Secondly, avoid using miticides, especially tau-fluvalinate, in hives that will spend a lot of time foraging on attractive blooming crops that are being treated with fungicides. The SBI fungicides are of particular concern as this family of fungicides interacts strongly with several miticides. The SBI fungicides can be identified by the words “Group 3” printed prominently on the label.

Finally, do not use homemade formulations of chemical miticides. The doses that bees receive from barrel gasket or shop towel formulations are unknown and may be high enough that they could cause harm to your bees when combined with

fungicides and legacy miticides in the wax.

The rare nugget of good news is that, in general, miticides do not appear to interact with drugs used against American Foulbrood and *Nosema*. Our lab results indicate that miticides can be applied simultaneously with antimicrobials, at their recommended doses, without worry about drug interactions.

Conclusion

We still do not know about the potential for harmful interactions posed by many of the chemicals found in the hive environment. The list of chemicals detected in bee hives could keep us busy testing different combinations of chemicals for decades. We have attempted to focus our effort on testing interactions between the most abundant chemicals found in beehives. We have been particularly interested in finding interaction between miticides, not only because these drugs are the most abundant chemicals in the hive, but also because they are among the few chemicals in the bees’ environment over which the beekeeper has direct control. To apply or not apply a particular drug is ultimately a decision left to the bee’s medical professional: the beekeeper. Our goal is to provide beekeepers with the best information we can to help them make that decision. **BC**

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The Feral Bee Project

Cindy Hodges

Are feral honey bee populations finally increasing? You can help find out. Here's how.

www.savethehives.com/fbp/Home.html

Between 90% and 95% of the feral population of honey bees was lost when *Varroa destructor* settled in. However, the feral population seems to be slowly growing in numbers again. Some of the DNA analysis of samples from current "feral" colonies can help determine whether the feral populations are increasing or if managed colonies are just swarming into feral cavities. Through the DNA studies of the sampled bees, a better picture of feral bee populations can be determined. Additionally, any levels of Africanization can be logged, as well as, of course, managed colony swarms that have moved into feral domain. The results of this study will help give a bigger picture of the overall health and genetic diversity of our honey bee populations.

Dr. Deborah Delaney, at the University of Delaware, has secured a two-year USDA grant to compare the genetics of feral honey bees to managed honey bees. This is being

accomplished through the time consuming task of collecting samples from colonies "in the wild." Individual beekeepers are aiding in this task by shipping samples of "bees in trees" to the lab in Delaware for further study. Dr. Delaney and her graduate students are also collecting samples as they travel around the southern United States.

This year, Dr. Delaney's student, Katherine Darger, from Goshen New York, came to Atlanta to speak at the monthly Metro Atlanta Beekeepers Association meeting. She also came prepared to collect samples over the five days of her visit. Prior to her arrival, we sent out e-mails to our club members, and Georgia Beekeepers Association members, to determine who knew of "feral" colonies we could sample while Katherine was here. The response was incredible. People contacted us from as far away as Florida and South Carolina, as well as all over the state of Georgia. There

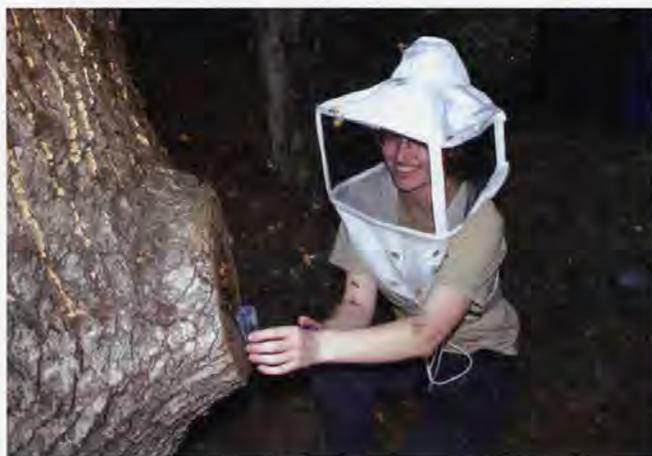
was much more interest in this project than I expected! As time was an issue, I chose to limit the sampling area to roughly an hour's drive in any direction. Even with this restriction, we drove almost 500 miles in our efforts to collect samples that qualified for the study.

Katherine arrived on Saturday night and we headed out on Sunday morning. We started off close to home by going to Jay Parson's apiary. He's a fellow club member who had recovered a colony from a downed tree off the square in Norcross. He had hived it just recently, and it qualified for the study. I say it this way, because I also collected some samples for an Emory University study. In order to qualify for that one, the samples could have not been fed by a beekeeper.

Since I have done varroa sampling in my hives, I assumed that Katherine would collect the bee samples in alcohol, in much the same way. I thought she would just collect them from the entrance since a *Varroa* check was not her goal. She surprised me with her many collecting methods. Sometimes, she would pick them off the brood frames one by one, and often she collected them by picking up bees at the entrance to the colony. Obviously, when they're up in a tree, you can't do that very easily, so she had this fantastic adjustable handled long butterfly type net. It came in her carry on bag, in pieces, and snapped together to allow her to obtain samples from much higher up in trees, or lower as you'll see later. The net itself was fairly large, and she had an artistic flair with her method of using it. Imagine the ribbon dancers at the Olympics swirling their ribbons in the air and keeping them open and rounded. Then, with



A long-handled butterfly net is just what's needed for a job like this.



Collecting from a preserved bee tree.



Picking bees off a brood frame.

a snap of her wrist, the net flipped shut, holding the bees to be reeled in for the collecting jar.

I assumed Katherine would pick up isopropyl alcohol at the drugstore for the collecting. I knew she couldn't carry it on the plane! However, isopropyl alcohol doesn't preserve the DNA well. She told me that she collects her samples in ethanol (also called ethyl alcohol), because ethanol preserves DNA, where isopropyl alcohol preserves the RNA but destroys the DNA. Ethyl alcohol is the correct solution to quickly kill and preserve the samples for their trip back to Delaware. Jennifer Berry at the University of Georgia Bee Lab was kind enough to donate some ethyl alcohol to help Katherine with her collecting.

Our next stop was a tree service in an upscale area of north Atlanta. Linda Tillman met us there at dusk to show us where two "natural" bee gums were located. She worked with this tree service and convinced them to preserve the sections that had colonies living in them. Using a crane, they had brought them back to the business, and they were living successfully "in the wild" at their new location.

We spent one day driving all over northeast Georgia. Some calls were dead ends or false alarms. Even though only beekeepers had received my e-mail about feral colonies, many forwarded them on to non-beekeeping friends who were absolutely positive that they had feral bees on their property. We entered gated and locked compounds in the middle of nowhere to find no bees. We had people cancel on us after we drove 50 miles, because they didn't feel well. We trampled through poison ivy and spider webs in the woods to follow

the given directions to find nothing. We won't even mention the BIG dogs we encountered! There were as many disappointments as there were pleasant surprises. It was all part of the adventure, and for me, a learning experience.

We visited an English woman who wanted us to sample her feral colony living behind the power lines entering her home. However, she didn't seem to understand what sampling was or how it was done. She didn't want us to endanger a single bee. They had lived there for three years, and she wanted them to stay there! That's one of the times I worried for Katherine's safety as she tried to catch her samples with a metal pole around those active wires.

We watched a colony swarm at the UGA bee lab (that didn't qualify), and were driven to another location by Cindy Bee to sample a rather feisty colony that had been recently removed from an old house prior to demolition. In addition to the bees, snakes had been found inside too!

While we were up that way, we visited Bobby Chaison and Scott Young, beekeepers in Jefferson. They had several locations for us to visit, as they had collected swarms and bee removals, hiving them on various properties. They had received a call about a bee removal where the bees had "just moved in." We followed them to the trailer where Katherine caught the samples with her magic net, so we didn't stay for the actual removal. We later heard that the colony was huge and by the size of it, had lived there for years.

We had many more adventures during Katherine's visit, and we had time to get to know each other while driving around. I drove and Kath-

erine navigated the directions with the instructions we'd been given. We only got really lost once. That's another story, but that was also a false alarm.

Fernbank Forest, part of Fernbank Science Center, contacted us about a feral colony in a tree. We confirmed that it was within reach—conveniently at eye level, and we were off on a literal walk in the park. These bees had colonized in a tree that had been struck by lightning. The strike blew a straight up and down line from just above the ground to about six feet up the tree. The bees were easy to collect, but they weren't happy about it. Afterwards, Terry Wierman showed us the observation hive and honey bee display inside the science center. By the hive, a live feed screen showed the outside entrance to the colony, so that children could observe the bees leaving to forage and returning with their goods. The entire display was very well done.

Agnes Scott College was probably my favorite excursion to locate feral bees. I dare say it was Katherine's favorite also, or at least the most invigorating, bordering on frightening. Agnes Scott is a women's college, located in Decatur, and has apparently had bees in the bell tower for at least thirty years. That's as far back as we could confirm their presence from speaking to the most senior facilities manager, Tom Houston, so they have probably been there even longer (the building is over 100 years old). They've seen swarms leave the building over the years, and they told me that they often had dead bees on the steps below, usually after it rained. As beekeepers, we know that the bees will handle their housekeeping duties after the rain stops, so I explained

The Bell Tower.



*On a clear day maybe
you can see forever,
but when it's windy,
hang on.*



this to him. He just knew that he had to clean up the steps after each rain, so he assumed that the rain killed some bees each time by drowning them. He was glad to learn a little bit about bees, but he didn't really want them up there. The good news is that the building has to have a lot of scaffolding for any repairs, and they have no intentions of cutting into the thick old beams on the inside. These bees are pretty safe in this location for the continued long term!

Katherine and I were led up an elevator and then through the dorm, while Tom yelled, "Man on the hall!" He then opened a locked door, and we ascended the old dark wooden staircase. All the walls were covered with graffiti so obviously, other people have known how to get in there. Girls are very resourceful! Katherine wanted to "leave her mark" also, but we had work to do. At the top of the stairs, Tom opened another storm cellar type door, and we arrived at the top of the bell tower. All I can say is – breathtaking! We could look over a sea of green trees towards downtown Atlanta, with only the tallest buildings popping up through the tree tops.

We had no choice in the weather that day, and the winds were fierce. Imagine Katherine, who is quite petite trying to lean over the rickety wooden railing as far down as possible to reach the few bees coming

out to forage from under the heavy plank floor below. It was exciting, it was an outstanding view, and it was just too darn cold and windy to get a good bee sample. We were bracing ourselves against the wind, and we had goose bumps just standing there for a few minutes. On the ground, we were comfortable in t-shirts, but up there – definitely sweatshirts weather! We asked if it would be possible to return in a few hours. Maybe it would warm up enough to have flying bees later. He kindly agreed, so we followed more feral leads in the east Atlanta area while we waited for the weather to cooperate.

At the height of the afternoon, we returned and followed the same process to climb the bell tower. I went ahead of Katherine, so that she could "observe" the graffiti on the staircase. It was still blustery up there, but the bees must be used to it, as they were actually performing orientation flights, and the foragers were returning with pollen and nectar. Katherine set up the net, and proceeded to lean as far over the railing as possible to reach out and down to the seam where the bees entered and exited. Did I say that the railing was wobbly and it was still incredibly windy? I actually held on to Katherine's shirt-tail for part of the collecting process. I didn't want her to become the flying nun or fall while we were up there! Samples collected, posterity marks

made, and the feral bee project has several samples to add from the greater Atlanta area.

Katherine will be running the DNA samples back at the lab at the University of Delaware. She must collect almost 100 samples prior to testing them, because she works on plates that hold 96 samples for each test. Therefore, it's more cost efficient to do the work all at once. This process is costly and time consuming.

We southern beekeepers are eagerly awaiting the results of the samples collected for the Feral Bee Project. With the identification of Africanized honey bees down on the coastal plain, beekeepers further up on the plateau in north Georgia wonder if they will be able to move this far north. These studies should help us determine where they are currently, and/or if they are becoming hybridized. Other southern regions and states should also be collecting feral bee samples for this study. This is an excellent opportunity to learn more about our genetic diversity and the future of the honey bee in our region.

Also, please check out the website for more information on the Feral Bee Project. There, you can also map out the locations of feral colonies that you have found. **BC**

Cindy Hodges collects bees, photographs bees, and keeps bees in Atlanta.

But life, the press and the public are a fickle lot. How many swarms downtown will it take before some councilman or woman becomes irked because it is *their* business that is shut down, *their* family that is detoured, *their* life that they feel is threatened. No matter the truth – perception is reality when you're so scared of being stung to death by bees that you wet your pants.

Neighbors, too, after awhile, will finally figuratively storm the fences and take *their* freedom back if next-door bees have kept them captive inside, cowed the dog, scared their children, taken over the pool or kept dad from mowing the lawn except after dark.

But wait . . . there's more. Carefully look at the cover of this issue. It is, we freely admit, an artistic interpretation of rooftop beekeeping, city bees, beekeepers and city life in general. But if you live in that setting you know every one of those people on that page, every setting on that roof, every possibility of something that can go horribly wrong. But, we must admit, there's only a one in a million chance of any of those things ever happening, right? But in a city . . . a big city, one in a million isn't all that long a shot is it? In fact, it's a pretty good bet – given a thousand new beekeepers in a city like New York – what would you bet something, anything, like any of the things on the cover could happen?

Folks, it's a sure thing – it'll happen, if not in New York then Denver, Minneapolis, Cleveland, or Detroit. It'll happen. It happened before the recent enlightenment in cities, towns and small burgs everywhere and it'll happen again. Why do you think so many cities didn't want bees in the first place?

So. Do you have a good PR program in place where your city bees dwell? What do you say when a swarm takes over the Mayor's office? Or moves into a dumpster over on 10th avenue and stings the heck out of those unfortunate waste management guys on the truck. What happens if there's a heck of an incident at the local public swimming pool with bees on the ladder, in the water and on the diving board and in the life guard's chair? Who gets called, who takes the blame, who fixes the problem,

who gets offered up on the alter of 'we screwed up'? And one more thing – who gets that swarm when twitter and facebook friends all show up at the same time – armed with smokers, chainsaws and the police on one side, and the save-the-bees folks on the other? Who's right? Who's wrong? TV cameras love the scene.

I'm pretty sure seasoned beekeepers who have big trucks in their lives quit reading this diatribe a bit ago because they just don't have the opportunity to screw up as bad as a city beekeeper can (until a bee truck carrying a bazillion bees tips over on I-90). But rooftop beekeepers, urban garden beekeepers, backyard beekeepers in cities big enough to worry about fences do . . . and scenes like those on the cover can happen.

If you have bees in the city study the cover, learn good neighbor beekeeping techniques, be a good neighbor, be careful, be very careful – and have a plan B – sorry, have a backup plan for and if when things go wrong. Bees are wild creatures – no matter how much you think otherwise. They do what bees do. You can help, but you can't always control what they do or what people think they are doing. Provide the necessities, the needs and the wants of the bees in your domain. And for Heaven's sake, *keep* your bees. Be inside that hive, know what's going on. Study the biology. Wear the protective gear and get in there and do what needs to be done when it needs to be done. Leaving them alone and not knowing what they are doing is not keeping bees. It borders on criminal neglect.

I like being interviewed on television and radio, and I like having bees and beekeepers being on page one for all the good reasons . . . let's be sure to keep it that way.

Kim Flottum

doesn't? Queen cells can be shipped, he writes, but must they be heated in transit?

At the same time, Flottum implores the beekeeper who is expanding to probably at least several hundred hives to equalize colonies and to move pollen and honey frames around when preparing colonies for the Winter. Where does that beekeeper find the time? How does time vs. money figure in here?

I've known for years that Kim Flottum is opposed to the use of chemicals for bee diseases and pests, and he makes this clear in his book. "The use of any of the chemicals in vogue is a fundamental crime against our product, our livestock, and our way of life," he writes. He does admit that chemicals may be necessary for nosema: "Treat with the only antibiotic available if you think it is necessary," but hopes that non-chemical strategies and, eventually, mite-resistant bees will curtail *Varroa*.

Better Bee Keeping is a highly readable book with a great layout. Numerous sidebars and many beautiful photos with detailed captions reinforce the text and keep it lively. Kim Flottum writes with that rare combination of a philosopher, management consultant, beekeeping expert and in-the-trenches practitioner. I highly recommend this book to beekeepers who are considering expansion, and to those like me who already have too many hives but want to learn more about the science and practice of beekeeping.

A. Gary Shilling



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WINTER SURVIVAL

Jerry Freeman

There are some basics your bees need to survive Winter.

WILL YOUR BEES SURVIVE THE WINTER?

As another beekeeping season comes to an end, our job now is to be sure our colonies are in proper condition for Winter. It's not as simple as lifting the back of the hive to see if it's 'heavy' and hopefully has plenty of honey. Although food stores are probably the most important, good hive management requires much more.

WINTER PREPARATION LIST:

- * Food Stores
 - ✓ Position of those food stores
 - ✓ Pollen stores
- * Brood
 - ✓ Brood rearing activity
 - ✓ Age and condition of the queen
- * Parasites (Bugs!)
 - ✓ Varroa Mites
 - ✓ Small Hive Beetles
- * Disease
- * Colony Population
- * Moisture Control and Wind Protection

FOOD STORES

In my area (Southeast Arkansas), 60 to 75 pounds of honey is enough to get a colony through even a cold, wet Spring next year. How much is 60 pounds of honey? One deep super wall to wall with 10 full frames is 60 pounds (five gallons) of honey. This means two-deep hive bodies are necessary. The bottom box is for the brood with three or four frames of honey on the outside *plus* the full top super. If you're using medium hive bodies, figure on 36 pounds of honey per full super so you need two medium supers full of honey.

Occasionally you will have to re-arrange the frames to get the brood and honey in position for Winter. Since the bees will move up during the Winter, put honey in the top super. Move all brood to the center of the bottom hive body with pollen next to the brood. Finish the bottom hive body with frames of honey or maybe dummy boards on the outside for insulation if you have lots of honey and only a few frames of brood. You can't always get the brood box perfectly arranged, but put the brood in the center and leave some empty space for the bees to cluster when the weather turns cold.

BROOD

There should still be a small amount of brood until around the first frost or a bit later. At some point, the queen will stop laying for a while. If you don't find eggs or young larvae, it's important to find the queen and see that she looks and acts healthy. A queenless hive may survive the Winter only to die next Spring because there are no replacements.

After a few days, inspect again for the queen - she's easy to miss. If you still can't find her, either re-queen the hive or use the bees from this hive to strengthen other hives.

PARASITES

Hive beetles are not likely to kill your hive this late in the year, but remember they spend the Winter *inside* the bee cluster. The more we kill now, the fewer we have to deal with next year. Obviously, I use my own Freeman Beetle Trap. We have a heavy infestation of SHB in our area and no other trap or chemical is effective enough to control the beetles.

Varroa Mites

Previously, I recommended treating for *Varroa* mites in late Summer *before* Fall brood rearing begins. Healthy Fall babies are essential to next year's honey crop!

I've had to change the timing of that recommendation to **mid-Summer** because of the viruses associated with *Varroa* infestation. (See disease section below.)

Randy Oliver suggests using an alcohol wash with 1/2 cup of bees. Finding six or more mites indicates treatment is needed. That's only two mites per 100 adult bees - 2%!

I use powdered sugar dusting to check for *Varroa* mites. Instead of a sticky board, I use a Freeman Beetle Trap with a little oil in it. I shake the sugar from the top, and as it falls, and the bees do some grooming, mites will fall into the oil in the trap below. After 30 minutes or an hour, if I see 10-15 mites in the oil tray, I treat with Apiguard.

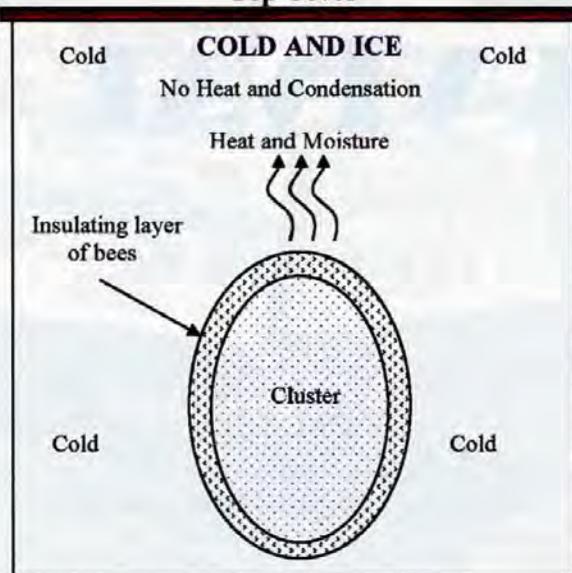
We've discovered that dusting with powdered sugar (to check for *Varroa* mites) usually irritates the bees and causes them to chase the hive beetles more aggressively. To escape the bees, the beetles crawl through the screen into the oil. The sugar dusting method allows you to check the *Varroa* population *and* kill up to 75% of the beetles at the same time.

Since we're talking about Winter survival, what should be done if mites are found in late Fall? Again, I treat with Apiguard (or formic acid - Mite-Away Quick

H	H	H	H	H	H	H	H	H	H
o	o	o	o	o	o	o	o	o	o
n	n	n	n	n	n	n	n	n	n
e	e	e	e	e	e	e	e	e	e
y	y	y	y	y	y	y	y	y	y
H	P	E	B	B	B	B	E	P	H
o	o	m	r	r	r	r	m	o	o
n	n	p	o	o	o	o	p	n	n
e	e	l	t	o	o	o	t	e	e
y	y	t	e	d	d	d	y	e	y
	n						n		

My
Suggestion
For Winter
Set-up

Top Cover



Strips). Treatment when temperatures are low is not as effective as we'd like, but it still kills mites. Check the weather forecast and look for days when the high temperature will be 50°F or more. Since brood rearing is greatly reduced, most of the mites will be on adult bees and susceptible to the treatment. This is not the best option, but it helps.

First, we have to know what healthy brood and healthy adult bees look like. Open brood should be pearly white and moist. If you find open brood cells with dark 'goo', call your bee inspector at once – it may be foulbrood but whatever it is, it isn't good. Find out. Capped brood should have a barely rounded cover. If you find capped brood with sunken caps – or pinholes – use a toothpick to open the cell and see what's inside. Check several.

Open brood, or larvae are grub-like and white. Pupae should be capped. Sometimes we see a few pupae without a cap. This may not be a serious problem, but if there's more than a dozen, call the bee inspector.

Look carefully at *individual* bees. You will quickly learn what healthy, fuzzy little worker bees look like and how they behave. Look for anything unusual. Two or three sick bees may not be a problem – a dozen or more, call for help.

You may see bees that are bald – not 'fuzzy' and may appear shiny. Bees crawling on the ground and having difficulty flying may indicate a problem. Most problems today are the result of viruses. Deformed-Wing virus comes to mind.

The need for proper treatment of Varroa Mites cannot be over-emphasized!

The damage to the brood and adult bees caused by the bite wounds of the mites weakens the immune system of the entire colony. Randy Oliver has a nine part series on 'Sick Bees' on his web-site at: <http://scientificbeekeeping.com/colony-health/>. Despite the name of the site, Randy writes in an understandable style and has a 'Practical Application' paragraph for explanation.

Colony Population

A large population is required for the bees to be able to stay warm during cold weather. The colony population necessary for winter survival depends upon your location and the health of the bees. Honey bees do not hibernate, but instead form a cluster – a tightly packed group of bees on the frames. The group may take the shape of a ball, but mostly there are more at the top than bottom. They generate heat by vibrating their wing muscles (without

moving their wings). The outer layer of bees serves as insulation so the inner portion of the cluster stays warm. As the bees on the outer layer get cold, they may crawl toward the center of the cluster and other bees take their place on the outside, but if there's enough food they may not move all Winter.

Colonies in southern states may survive with three full frames of bees whereas colonies in the middle latitude states will require six or more full frames of bees. Farther north, even more frames of bees are necessary. If the bees are not healthy (maybe from *Varroa* infestation or viruses) their lives will be shorter and the population will dwindle before warm weather arrives. A late freeze with a reduced population could kill the colony. There simply won't be enough bees to keep the cluster warm.

Even here in the South and with healthy bees, I want a large colony population going into Winter. For me, that's 15 frames of bees or more at Thanksgiving. That leaves no question of survival and allows for a strong spring build-up.

Moisture Control and Wind Protection

As with other beekeeping issues, opinions and remedies vary on the question of how to best keep colonies warm and dry in Winter. To be successful, we have to understand how wind and moisture affect the bee cluster.

As mentioned in the Population paragraph, honey bees do not hibernate – they cluster. As the outside temperature falls below 55°F, the bees move close together and generate their own heat. Their respiration and metabolism also generates water vapor just like you do. In freezing weather, the moist air rises in the colony until it reaches the bottom side of the cover or inner cover. If it's extremely cold the moist air condenses immediately and forms a liquid. This will eventually drip, but it may freeze first, then melt later. In either case, water is dripping on your bees, and your bees are getting wet.

Wet bees cannot stay warm! The colony may freeze to death.

To successfully Winter bees in cold climates, the hive must have top ventilation to allow moist of the water vapor to flow out of the hive. Also, the top cover must be insulated so the remaining water vapor will not freeze into ice. How much ventilation and insulation is needed depends upon your location. It usually does not take a lot of ventilation, but it may require quiet a bit of insulation. Talk to successful beekeepers in your area for guidelines.

Finally, wind protection reduces heat loss and makes it easier for the bees to keep the cluster warm. Tightly wrapping a hive with waterproof material is probably more harmful than helpful because of the moisture issue. Some beekeepers use only a wind break. Others cover their hives with some type of box, leaving an air space between the inside of the box and the hives. That provides good wind protection and allows for ventilation. Loosely wrapping a colony with any of the many commercial colony insulating products works, as does roofing paper. Be sure to leave an opening at the top, and bottom to facilitate ventilation.

To get your bees through the winter, pay attention to Food, Brood, Bugs, Disease, Population and keep the colony warm and dry. **BC**

Mr. Freeman Winters his bees in SW Arkansas. Visit his web-site www.freemanbeetletrap.com for information on his product.

Winter Hardy

Hazel Freeman

Winter loss surveys for Canada were almost a mirror image of those in the U.S. Since the Winter of 2006-07, when the Province of Ontario lost 35% of their colonies, Winter losses have continued to take a serious toll.

Each September I head to Ontario for a much needed escape to the "bush." The smell of Fall permeates the crisp fresh air and the sugar maples, aglow in hues of red, orange, and yellow, light up the landscape. But, long before the first snowflake falls, I'm back in Ohio where Winters are plenty long enough. For beekeepers in Ontario and other northern climates, preparing their hives for Winter is crucial to keeping losses down. How long the icy grip of Winter will last each year is anyone's guess. So, for as many beekeepers as there are, there are just as many variations on how they prepare their hives for cold weather. With Winter losses increasing dramatically over the last few seasons, tucking in bees for a long, cold Winter is more important than ever.

Winter loss surveys for Canada were almost a mirror image of those in the U.S. Since the Winter of 2006-2007, when the Province of Ontario lost 35% of their colonies, Winter losses have continued to take a serious toll. According to the Ontario Beekeepers' Association, losses have been ranging between 30-40% with some beekeepers experiencing less, while others have had much greater losses. The mild Winter and early Spring of 2009-2010 gave beekeepers a little break and numbers dropped to around 20%, but unfortunately, the numbers shot back up for the Winter of 2011.

"A number of factors seem to contribute to Winter

losses in Ontario," says Danny Walker of Strathroy Ontario. Walker is a past president of the Ontario Beekeepers' Association and is currently on the Board of Directors. According to Walker, nosema, *Varroa*, and hives stressed from pollination can make them weak and less likely to survive the long, cold Winters. Canada, known for its blueberries, cranberries, fruit and canola production, requires about 100,000 colonies of bees for pollination. Moving bees during hot weather for pollination takes its toll.

Ernesto Guzman, a honey bee researcher and professor in the Department of Environmental Biology at the University of Guelph's Ontario Agricultural College also believes the loss of naturally flower-rich areas is contributing to the decline of honey bees. According to Guzman, wildflower meadows are essential to bee health providing bees with a continuous supply of pollen, from early Spring to late-Fall. With increased urbanization, and monoculture agriculture, natural meadow areas are disappearing in both Canada and the U.S.

Guzman also notes that while insulating and feeding hives for Winter helps, it doesn't solve the problem of the infectious agents wreaking havoc with bee populations. He says feeding sugar-water solutions can help a colony over Winter, but these solutions lack the finely balanced nutritional qualities found in natural pollens that bees get from wildflowers.

Professor Guzman and his colleagues recently



Tin foil with peanut butter is used to bait bears to a solar charged bear fence around a beeyard in Ontario.



Black bears are a problem year-round for many beekeepers in Ontario.

For Winter management in Ontario, it's recommended a colony have seven to eight frames of bees, be fed 70% sugar syrup (also referred to as Winter grade, 2:1 sugar syrup), weigh 70 pounds for singles and 100 pounds for doubles, and be wrapped.

completed a three-year study on Winter mortality and post Winter populations of honey bees in Ontario. According to professor Guzman the study results suggest that *Varroa* mites are most likely the main culprits for the death and reduced populations of over-wintered honey bee colonies in northern climates. He believes the combination of *Varroa*-infested colonies with weak populations and low food reserves significantly reduces Spring and Summer colony populations.

"If your bees aren't healthy and in good shape by August, they may be too weak to make it through the Winter," says Walker. "October is really too late to begin health treatments for colonies here in Ontario. As soon as the honey comes off, we start treating our bees and getting them ready for Winter," he says of their some 600 colonies. "We've found that it's not really worth trying to get a fall crop of goldenrod honey. Maybe once in five years, you'll get a good crop, but usually it's better to leave it for the bees."

Ontario beekeepers have available to them a guide, *Ontario Treatment Recommendations for Honey Bee Disease and Mite Control*, published by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). The guide includes detailed information on the management of pests and disease, recommendations for treatment, monitoring methods and information on the status of pest and diseases in Ontario. The most recent guide notes the arrival of the small hive beetle to Essex County, near the Michigan boarder. That county is now under quarantine.

For Winter management in Ontario, it's recommended a colony have seven to eight frames of bees, be fed 70% sugar syrup (also referred to as Winter grade, 2:1 sugar syrup), weigh 70 pounds for singles and 100 pounds for doubles, and be wrapped. Bees forming the Winter cluster are hatched in late August and early September.



This display hive at Board's Honey Farm in Restoule, Ontario shows how they insulate their hives for Winter.

Hives should be monitored in August to determine the health of the colony and what treatment is necessary. As soon as the honey supers are removed (usually by mid-September) treatment should begin.

For nosema, they recommend feeding bees a mix of Fumagillin-B in sugar syrup. Fall treatment for nosema is important since bees may be unable to make cleansing flights during extreme cold spells. "I've found, and they recommend, that direct-to-colony feeding using a hive-top feeder, pail, or a plastic bag is the best way to get the right dose to each individual colony. That way all the bees in that hive have a chance of getting their share," says Walker. They also recommend replacing three empty brood combs in Spring from the brood box to help reduce the level of nosema spores and the accumulation of chemical build up in the wax.

Wrapping beehives for Winter is a common practice in Ontario. The methods used vary, and also depend upon how far North or South beekeepers are located. Wrapping helps moderate temperature swings not only during the cold Winter months, but also during Spring when brood rearing begins. Wrapping can also benefit packages installed in April or May when northern weather is unpredictable and temperature fluctuations can vary greatly.

A variety of wrapping material is used. Some beekeepers wrap with only a layer of tarpaper, stapling the paper to the hive box while others use heavy black plastic bags, or homemade wraps using insulating layers. There are several prefabricated winter hive wraps on the market as well. It's recommended not to use materials that will absorb moisture in or next to the hive body. Some beekeepers even bury their wrapped hives with snow, or let Mother Nature do it for them, for added protection. Larger operations may Winter their hives inside temperature controlled buildings.

"We'd had almost 100% wintering success for many years, then a few years ago we started having losses of around 15 - 30%," says Stefan Board of Boards Honey Farm, in Restoule, Ontario. The Boards have been growing their bee business since the early 1970s. Tucked in amongst the woods and water of the beautiful Algonquin Park region, Restoule is located in a portion of what's known as Ontario's Near North. Here, it's not unusual for the thermometer to register well into the minus numbers and several feet of snow can accumulate



A prefabricated Bee Cozy is used to slip over a hive for wintering on the 14th floor rooftop beeyard of the Royal York Hotel in Toronto.



Some Ontario researchers believe the lack of natural pollen and nectar from wildflowers can contribute to the nutritional decline of honey bee colonies.

on the ground. "The whole Province had a lot of losses last Winter," says Ann Board. "Many colonies went into the Winter weak and the *Varroa* makes them even weaker."

Once honey supers are off, hives are fed, inspected, and recommended health treatments administered; the Boards wrap the hives for Winter. "We slide two hives together, side-by-side, then place 1" Styrofoam insulation around the outsides and 2" on top. Then we wrap them with tarpaper making sure the lower and upper entrances are open. Two of the most important things in preparing hives for Winter is top ventilation so moisture can escape, and wind protection," says Board. Hives should be tipped slightly forward to allow any condensation that collects under the top cover to run out and not rain down on the bees, a sure fire way to kill a colony of bees in Winter. Replace screened bottom boards with solid bottoms or cover them so wind can't whip up through the hive body.

The Boards say bears are a problem year round. "Wildlife is getting more used to people in our area and we're experiencing more problems," says Ann Board. All of the Board's beeyards have electrified bear fence installed. "We use a solar charged fencing system. The secret for a bear fence is a grounding plate two inches down in good, moist soil. Use four wires and make sure they're really tight. Test the fence every week. (Oh, and don't urinate on it,)" Board says with a laugh. The bears are baited to the fence with strips of tinfoil coated with peanut butter or a piece of bacon. "It usually only takes one good shock and they leave the yards alone."

The Board's bees will stay wrapped until Spring and the nights are no longer freezing. When daytime temperatures go above freezing, they begin feeding 2:1 sugar syrup and then transition to 1:1 syrup as the weather warms up. "Make sure you give them plenty of room before you think they need it," Board recommends for Spring management.

No matter how cold and long the Winters can get in Ontario, many beekeepers hardly blame the weather for the bleak Winter loss numbers. The *Varroa* mite continues to ring the death knell for many colonies over the Winter months. Canada is very proactive in its efforts

to maintain healthy colonies and reduce Winter losses. The Canadian government recently directed almost a quarter of a million dollars to the Ontario Beekeepers' Association (OBA) to fund research projects in honey bee genetics, pest and disease control, nutrition and best management practices.

The research arm of the OBA is the Technology Transfer Program (TTP). Established in the 1990s the TTP conducts research for Ontario's beekeeping industry. It facilitates a honey bee-breeding program in Ontario and to transfer information, skills and methodologies to the beekeepers. One of the main focus areas of research is Integrated Pest Management (IPM) and that includes the breeding program. Testing is also done on treatments for the control of *Varroa* mites. The TTP conducts educational workshops for introductory beekeeping, IPM and queen rearing.

About 13 breeders from across the Province participate in TTP's Mite & Disease Resistant Breeding Program. Breeders make the initial selection of breeding stock based on traits such as: honey production, gentleness, over-wintering ability, and Spring buildup. From this selection, the OBA Tech-Transfer Team evaluates breeding stock for additional characteristics such as hygienic behavior, tracheal mite resistance, queen quality, and an overall colony health survey.

For beekeepers interested in more natural management practices, the OBA's Tech-Transfer Team publishes a brochure on *Organic Beekeeping Practices*. These practices include a combination of soft chemical treatments (formic acid and oxalic acid), cultural management practices (drone brood removal and screen bottom boards), monitoring, and the use of genetic stock (hygienic and tracheal mite resistant bees). No synthetic chemicals or antibiotics are used.

With another Winter quickly approaching it's no surprise beekeepers are nervous about how their hives will make it through the upcoming Winter. Researchers are working hard to find answers, and feasible solutions, to reduce colony losses. The hope is that Winter loss numbers will soon begin to decline and Ontario's hardy beekeepers can go back to enjoying all that snow and cold instead of worrying about their bees! **BC**

SWARM in October

This is a true story, but I am the only person alive who experienced it.

The setting was a dairy farm in rural west-central Wisconsin in late October 1950. It was an unseasonably hot day with a hard freeze forecast for that night. Having finished the evening barn chores, Dad and I were headed for the house and supper.

We came out the door on the west side of the barn. As Dad closed the door behind us, the sun was warm but setting. Much to our surprise, a couple feet from the door was a swarm of bees on the west wall, which was still warm in the afternoon sun. The barn wall was made of porous orange block and the surface probably held heat well. I remember this swarm being approximately 18 inches wide by 24 inches top to bottom. It seemed that it was about one inch thick. We were within three feet of them. I was scared but Dad told me to move slowly. They didn't bother with us.

On the walk to the house, Dad said the bees were going to freeze to death that night if they couldn't get in somewhere. He wanted to save them, but he didn't know who to call. No one in our neighborhood had bees and he couldn't remember any beekeepers. Remember, this was rural Wisconsin in 1950 with its relative isolation; instant information such as the internet was not available. Our telephone exchange consisted of a live human plugging jacks into a wooden switchboard and sleeping on a cot beside it. A phone call required a good reason. Hard to imagine, but true.

Our house was about 200 feet from the barn. It was a big old farmhouse with two chimneys; one for the central wood furnace (I think it was called a 28" Round Oak.) and one for the kitchen. The kitchen originally had a wood cookstove, but it had been replaced by an oil burning space heater for fast localized heat.

By the time we sat down for supper, it was dark and cold outside. We heard a dull roar and Dad said, "Chimney fire!" (He was wrong.) Having homed in on the kitchen chimney as the closest heat source, the bees pushed open the chimney cleanout drawer and started pouring into the kitchen. It is amazing that the bees could overcome the friction to open this drawer; it was always stuck shut.

Perhaps a second later, the bees also lifted the top lid on the oil stove. The lid was cast iron approximately nine inches square and hinged at its rear. The bees lifted the free end about an inch and boiled out. The kitchen was filling with bees! I was dumbfounded at the time, but the sight of the bees pouring out of the cleanout drawer and out from under the stove lid is burnt in my mind.

Quickly (and I do mean quickly) Dad hustled the whole family into the living room and closed the door behind us, isolating the kitchen. Supper was left on the table. I don't think anyone was stung unless it was Dad, being the last one out, and he wouldn't have made a fuss. He wouldn't let us turn on any lights; we sat quietly in the dark. I think we were all too stunned to talk. Sixty years later, I can safely say that this type of thing does not happen every day!

The situation had changed since we had left the barn. The issue now was to regain control of our home. Dad decided that the only solution was to let the bees freeze to death. He went out the back door, then around the outside of the house to open the kitchen door to the outside. He shut down the oil stove in the kitchen by closing the valve on the tank outside. He let the furnace fire burn down. It was COLD in the house. My brother and I went upstairs to bed.

When I got up at dawn, there was still no heat in the house; the kitchen door was wide open to the outside; and the kitchen was covered with dead honey bees. There were a few struggling on the floor. Mother was cleaning them up. She was just getting started and had already filled two big pails. I'm guessing that there was probably a total of six pails full; I don't know for sure because I went to join Dad in the barn. There was a sadness in the air, but life went on as usual.

This story is ostensibly about bees, but in a larger sense, it is also a story of how quickly our life situations can change; a father protecting his family; and the mother cleaning up the mess after the struggle.

Today, I think the world is lacking one swarm of bees. Perhaps a beekeeper out there will start an extra colony . . . **BC**

A Hot Freezer

Marcia Neely

Keeping un-crystallized honey on the shelf at our little country store has seemed like an on-going hassle. My husband John and I keep 30-35 hives. Normal yearly production is about a ton of honey. We usually have just enough to last the season at our Honey & Herbs store in rural Benson, Minnesota.

In the past, after extracting and filtering the honey, we stored the year's supply in five-gallon buckets. When we needed more honey for the shelves, I used bucket heaters to bring the honey slowly up to about 117° where I would try to hold it for a couple of hours to ensure that all of the crystals were dissolved. I used two bucket heaters on each bucket and would turn one off as the temperature came close the ideal 117° – warm enough to un-crystallize and not hot enough to destroy the enzymes in the honey. The enzymes, of course, are so important for strengthening the immune system, breaking down fats, enhancing digestion and assisting all the cells of the body to function appropriately.

Especially when the honey was frozen, un-crystallizing would take a couple of days and I'd need to check the temperature periodically, day and night. When un-crystallized, I would pour the warm honey into a bucket with a gate attached and bottle the honey in eight-ounce to four-pound Queenline glass jars. I'd label some of it and store the remainder unlabeled since some of it would need to be un-crystallized again before selling.

If these containers of honey, or some already on the shelf, started to crystallize, I'd use the water-filled reservoir on our wood cook stove to gently heat it until clear of crystals. Occasionally, I'd use a crockpot to un-crystallize just a few jars. It seemed to me I was almost always in some process of trying to keep nicely un-crystallized raw honey on the shelf.

John, who is the beekeeper as well as the mechanically/electrically-adept half of our partnership, came up with an idea.

He visited the local recycling center and was able to get an old upright freezer. It cost nothing. Having the freon

removed cost \$25. Add the cost of a couple of electric outlets, a bit of wiring, sockets and a few incandescent light bulbs and we have a un-crystallizer that un-crystallizes honey with minimal work and requires only occasional checking. It should last the remainder of our beekeeping years with no further expense apart from a few light bulbs and very minimal electrical costs.

John drilled a hole through the lower side of the freezer box. He ran electrical conduit through the hole, then threaded electrical wire through the conduit. He mounted two electrical outlets on the rear inside of the freezer near the bottom. And, finally, he installed two plug-in fixtures in the outlets. Incandescent light bulbs of various sizes are plugged in when needed to heat the inside of the unit.

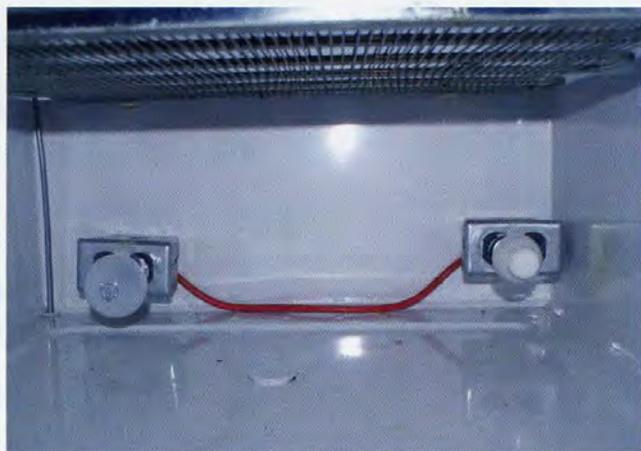
The freezer-un-crystallizer has enough space for a five-gallon pail to be set on the bottom shelf, which is useful for un-crystallizing a bucket of honey as well as for separating the cappings from the honey. After heating the honey-laden cappings, which can take two days and usually requires two 100-watt light bulbs, I allow it to cool. The wax floats to the top while the honey sinks to the bottom. I call that honey "cooking honey" and use it



and sell it for that purpose – at a reduced price from our raw honey.

Now, we usually bottle most of our honey right after extracting and filtering, saving a few buckets so that we can meet our customers' desires for particular sizes as the year draws to a close. We store the filtered honey in the various sized Queenline jars in our "honey house," where, during the Winter, it will freeze. Whenever we need to un-crystallize honey, we fill the freezer with up to 150 pounds of bottled honey.

I normally insert one 100-watt bulb and either a 60 or 75-watt bulb into the sockets and flip the switch to turn on the lights. A thermometer in the freezer, which I check occasionally, tells me when the temperature is about 120°. Then, I may remove the smaller bulb or insert a 40 watt one, depending upon the outside temperature. I leave the honey in the freezer-un-crystallizer a couple of more hours



Two fixtures for light bulbs at bottom of freezer.



Close up of light fixture.

until the honey is free of crystals and the internal temperature in the honey is 117-118°.

Occasionally, during the cold of winter, the uncrystallizer requires two 100-watt bulbs to create enough warmth. During the Summer heat, a 75-watt bulb might be sufficient. A larger quantity of honey will require more watts or a longer time to reach 117° than a smaller amount of honey. The insulating characteristics of a different freezer might require somewhat different wattage to reach the ideal temperature. Usually, the thermometer we put in the freezer registers about 120° and has remained there for an hour or more when the internal



Switch on outside.

temperature of the honey reaches 117°.

Part of the key to this method is the slow rise of the temperature, so the honey very gradually uncrystallizes without getting overheated. After turning the bulbs in the freezer off, the temperature gradually reduces, letting the honey coast in the heat without overheating.

The time and hassle involved in uncrystallizing honey has been significantly reduced with this new method. We also save the expense of periodically replacing worn-out bucket heaters. This simple idea saves time, irritation, worry, and money – and it works. It was win-win-win – less expensive, easier, and it keeps one freezer out of a landfill. **BC**

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ALL THE BUZZ IN...



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Bee B. Queen Challenge

Decorate your hive and send us a picture.

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Nora, 7, NY



Ian Plett, 4, MB Canada



Alena Meier, 6, MN



Tristan Adams, 7



Beehives on a truck near Mota, Slovenia. Photo by Marion Schneider.



Beautiful Beehives

It's fun to decorate cookies or paint a picture. Now let's take art to the hive!

Over 250 years ago, people in Slovenia added paintings to the front of their hives. The first paintings were of religious themes. Later the paintings were about everyday life, history and folktales.

People today still enjoy bright colors and unique decorations on their beehives. Beautifully painted hives can be found in unusual places. Let's take a look at some of these one-of-a-kind beehives.



These colorful hives in Ireland were discovered by Louise Parks.

Ida Gnislak shared this photo from the Apicultural Museum in Radovljica, Slovenia of a very old, decorated front board with a painting called "Adoration of the Magi". More painted hives can be found at <http://web.bf.unilj.si/jbozic/muzej/muzej.html>



C. Herbert took this picture in Exochori, Greece. Exochori is on the edge of the Taygetos mountain range. There are 700 plant species there. To see more photos go to <www.one-foot-on-the-mountain.eu>.

... Bee kid's corner

Bees

Buzzing is *always* heard here
As liquid amber glistens on the honeycomb
Not a drop wasted. *Ever*.

Buzz, Buzz, Buzz, all day.
Hurry, hurry, hurry they say, winter's near.
No play now, winter's coming.

Buzz, buzz bumble busy bees,
Never stopping, never ceasing *work, work, work*.
Making food, building hives, *work*.

Dance, dance, dance, to pollen
Motion the path to our food, *dance*,
So we can survive winter.

Fan, fan, fan, ventilate air
So we can make honey from nectar.
Never stopping, untiring, *fan, fan*.

Fly, fly, fly, for pollen
Fly miles in search for our food.
So we survive winter, *fly*.

Heal, heal, heal, the earth.
Grow back the plants lost to us.
Pollinate so we may survive.

Kyrra Bosland, 13, PA

Bee Budding Artist

Elizabeth Burns lives in Kentucky where she paints her hives to help her bees find their way home. She says, "I think the painted hives look prettier than the white hives". Elizabeth likes to watch the bees to see what pollen they are bringing in. The pollen is light green in the spring and yellow and orange in the summer. Sometimes she sees red pollen, but not very often. Looking for the queen is something else she enjoys. Her favorite thing about keeping bees is sell the honey. Not only does she help with the bottling, but she also designed her own honey labels!

Elizabeth has other interests as well. She is a goalie for her soccer team, plays violin and is a Junior Girl Scout. She also sings in the Children's Choir at her church.

Thank you Elizabeth for sharing your beautiful hives with us!



Produced by Kim Lehman - www.kim.lehman.com
www.beeeculture.com

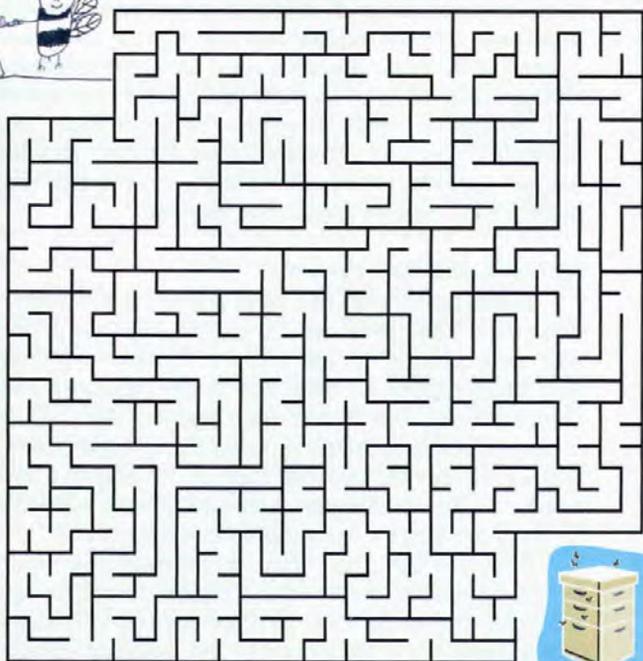
October 2011

What likes flowers
but does not like showers?
Bees!

Jo Plett, 8, MB, Canada

Rainbow Hive

This hive wants to be decorated.
Help the artist find the hive.



Become a Bee Buddy



Send two self addressed stamped envelopes and the following information to: Bee Buddies, PO Box 2743, Austin, TX 78768. We will send you a membership card, a prize and a

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Age: _____ **Birthday:** _____

E-mail (optional) _____

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

QUEEN PRODUCTION SYSTEMS



James E. Tew

These 'systems' have advantages and disadvantages over the other techniques we've looked at so far.

The "Doolittle Drawback"

The requirement to graft tiny, tiny larvae is the primary limiting characteristic when using the Doolittle method of queen production. Numerous queen production books have been written explaining how to graft and what tool to graft with. Plus, there's a need for great dexterity and sharp vision. Most of us don't have those characteristics or if we ever did them, they have begun to fade. So, is it possible to get around the grafting hurdle? To a limited degree – *yes* – it is possible to work around this requirement. Use a "queen production system".

"Queen production systems"

These devices do not have a generalized name that describes what they do. So aspiring queen producers who are exploring the use of these devices must deal with individual names such as: *The Jenter Device* (or the *Karl Jenter device*), the *Nicot Queen System*, the *Cupularvae No-graft Premium Queen Rearing Kit*, the *Ezi Queen System*, or the *Larval Transfer System*. No doubt, I have left some out. For discussion purposes, I have named these types of devices as "queen production systems."

First, one way or another, all these devices require the breeder queen be confined in a compartment (roughly 5" x 5") that encourages her to place eggs on cell bases that can subsequently be moved to cell building colonies. In theory, no grafting is required. Second, all of these devices are made mostly of plastic and third, these devices have a LOT of parts and pieces. These component parts are at risk for becoming scattered or being forgotten in beehives.

Testimonials abound

One catalog reports, "This system of queen raising is completely graft-less! With this kit, the queen lays her eggs in the cell cup, eliminating the painstaking step of grafting! This system allows you to produce up to 110 queens at one time. Another catalog description states, "This is the most popular and successful queen rearing system available in the world. With this kit you will be able to raise your own queens and do it without grafting or ever touching a larva." The description continues with, "Next you confine the queen in the front of the cage and she immediately lays eggs in the 110 available cells. She can be released the next day." Is all or any of this correct?

Well, yes and no

But I suppose the answer is mostly "yes." Confined queens do ultimately submit to the procedure and lay eggs in remarkably unnatural plastic structures. In principal, this is a good way to get queens without grafting. However, to a greater or lesser extent, queens resist laying in the cells so the eggs that are laid may be separated by hours between the earliest egg laid and the last egg laid. To the queen producer, this means that additional care must be taken when removing ripe queen cells. If a queen emerges early, she will kill her still-confined sisters.

The Jenter System

This is the system with which I am most comfortable, but I am not endorsing it over the others that are presently available. Normally, these devices are similar in function but vary in the design details.

The core of the Jenter System is a plastic box with a central grid having openings for 110 plastic cells. The grid is accessible from both the front and back. The front lid is removed to expose the queen compartment and the cell bases where she is expected to place her eggs. The back lid covers the backside of the cell cups. In fact, the plastic cells are installed from the back side. The back lid does not have to be in place, but it keeps the house bees from gumming up the back of the device with wax and propolis.

In use, the cage is placed in the hive in a modified frame. Essentially, the plastic foundation has an area cut out allowing the cage to fit in the frame. Nurse bees can enter the front compartment of the cage which has openings much like a queen excluder to attend to the queen and feed young larva. The cell cup bases are removed from the back side of the cage and transferred to cell bars with the special cup holders. The protective cages,¹ candy cup and closure caps are not really necessary if the beekeeper is transferring the mature queen cells into nucs before the queens emerge. However, with the wide range in egg-laying times, one might find that a queen will emerge before all others and kill the other queen pupae before the beekeeper can remove the queen cells. This could cause some disappointment when you are expecting a number of queens and end up with only one. Generally,

¹These protective cages are interestingly called "hair roller" cages. They look like hair rollers with the ends closed.

acceptance by cell builders² is good if the eggs hatch into larva before being placed in the cell builder.

The basics of the average Queen Production System

Step one

The breeder queen is placed in the cage where she will need to be observed for egg laying activity. Eggs are allowed to hatch into young larva before transferring the cell cup to a cell bar. A cell building hive needs to be made up just like in all other methods of queen rearing one or two days before the transfer of cell cups takes place.

Step two

Cell cups are removed from the back side of the Jenter cage and fastened to a cell bar using the specially designed queen cup holder. These holders are prepared well in advance of this step.

The frame holding the cell cups is then placed in the cell builder hive.

Step three

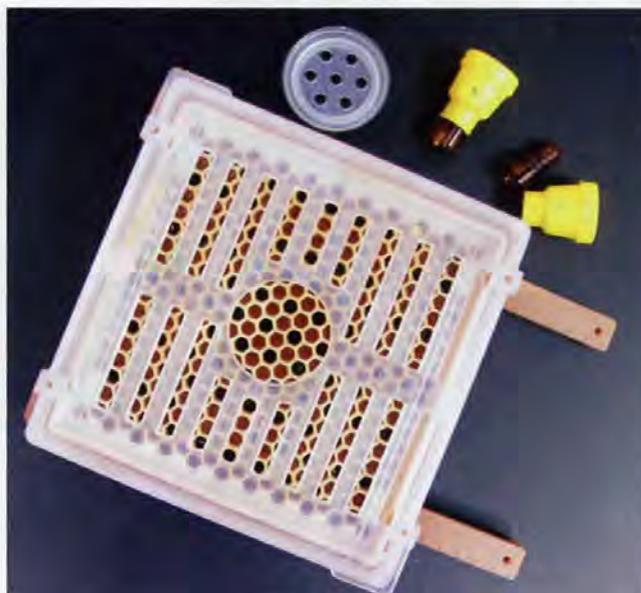
You will need to follow the calendar for transferring the queen cells to the nucleus hives you have prepared. The only difference is that the queen cells produced in the cell builder will most likely vary more in age than the traditional Doolittle grafting method. A close examination of mature cells is required. The Jenter system allows the use of a protective cage that can be placed over queen cells to protect it from a queen that emerges early.

Some advantages to this type of queen production system

1. As has been discussed, at length, actually grafting (or transferring) larvae from brood combs to cups are eliminated when using one of these systems. Make no mistake, this is a **big** advantage. Nurse bees are completely demanding when accepting the grafted larva. You need to be good at grafting to get by discerning nurse bees.
2. By coming in a kit format, all the components the new queen producer will require are available.
3. Queen production has historically been a popular area of advancement for the experienced beekeeper. Though not perfect, these devices help teach the new queen producer the technique and biology of queen production.
4. All of the parts – except the cell cup – can be reused. Strangely, nurse bees do not like to reuse these components. Normally, once plastic has been used, a subsequent use of the plastic piece becomes more agreeable to the bees.
5. Nurse bees can pass thru the queen excluder front of the cage to feed and care for young larvae. Larvae never go hungry as they occasionally do when the Doolittle system is used.

Some disadvantages to this type of queen production system

1. As has been discussed, at length, queens normally do not like these confining devices. As usual, queen



The primary components of the Jenter System.

tolerance varies widely, but some queens will resist using these devices for several days or will only use them somewhat erratically. So, the resulting age of the cells may be different by several days.

2. There are many small parts that require organizing and storing. I know that sounds weak at this point, but parts get dropped or lost in the grass. Parts get left in the ash tray in the truck or a center desk drawer. I know this because there were parts – here and there – in multiple places in my lab.
3. The plug used to close the queen entrance opening is dreadfully easy to lose and dreadfully difficult to replace. Once is it lost, the device is useless.
4. The modified frame requires special care and storage. As I write this, there are two Jenter boxes somewhere in my colonies. The frames are marked and they will turn up. I feel that allowing the bees to be around the device and to prevent wax moths from destroying the comb results in a device more agreeable to the bees next season. Normally, I can remember which hive has them – but not always.
5. Specifically with the Jenter device, the yellow cell bases are large and clumsy when trying to attach them to the cell bars. Later, they are difficult to

Jenter Device mounted in comb (photo by Bill Mullins and Hal Green, Flint River Queens)



²A cell builder is a strong colony with a good population of young nurse bees that feed and build the cell around the developing queen.



A full cell frame of "graft-less" cells. (photo by Bill Mullins and Hal Green, Flint River Queens)

push into the comb face. Other systems have done a good job of addressing this problem.

6. The number of queens produced is limited. For most of us, the potential of 110 queens is a gracious plenty, but for even a small commercial queen producer, this would be too serious of a restriction.
7. The cost of the device may be a negative attribute. If only a few queens are produced, individual queens will be pricey. If many queens are produced – or if a small number of queens are produced many times, the device is a good investment. On a different note, the price range is something like \$90 - \$150 which might make this a potentially good gift at Christmas or for a birthday.

Reflections

You may very well be disappointed when you first use one of these systems, but you probably would have been just as disappointed the first few times you used other grafting systems, too. If raising queens was an easy task, all beekeepers would be doing the job.

Though this seems like a slam-dunk procedure, this is not a system where you can put the queen into the cage and four days later move cells directly into your cell building hive. You need to observe the eggs and young larva in the cells. This is often difficult because the device and cell cups are light in color making it hard to see eggs and young larva.

But ultimately, when all is said, these devices are easy to use and you don't move larvae. If you get just 20 to 30 cells from this cage, it is worth the purchase price and the pain caused by the learning curve.

I'm not selling any of these devices, but I rather like

them. I know – I know – one can use the traditional ways, such as those developed by Doolittle or Miller, to produce any number of queens. But other than using plastic cell cups and goose quill grafting tools from China, the Doolittle method has not changed in about eighty years. At once, that is both good and bad. It's good in that this traditional technique has become the "standard" but it bad in that queen production is presently trapped in time. The average small beekeeper needs technology and procedures that help him or her crank out queens as needed without complicated schedules and tedious colony manipulations. These devices do not address those shortages, but they are new and different. Somewhere out there right now is the next Doolittle. Is it you? **BC**

Jim Tew can be reached at Tewbee2@gmail.com.



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Sunchokes

Larry Connor

These edible sunflowers are good for people and bees.

In the October 2008 *American Bee Journal*, I discussed the use of sunflowers in the Great Sunflower Project, a program which encouraged tens of thousands of private individuals to watch a sunflower bloom for bee visitors for a set time period in a wide range of conditions around North America. In 2011 there was a Great Bee Count on July 16th. It showed that the average person saw a bee every 2.6 minutes, or about 12 bees per hour. Yet 20% of the participating gardeners never saw a bee (<http://www.greatsunflower.org/>). A map on that site shows the 2010 results indicating that most states had areas with good pollinator numbers, yet nearly all of them had some locations with poor pollinator densities, often not too far away. Poor pollinator numbers appears to be related to issues of entirely LOCAL conditions. In other words, *Every Village needs to support a Beekeeper – as well as a Native Bee Conservationist.*

This is about sunflowers in North America but not the large, cultivated *Helianthus annuus*, supplier of seeds and sunflower oil. Instead let's look at a less well known sunflower, *Helianthus tuberosus*, called the Sunroot by North American native people who undoubtedly selected them for vigorous tuber production and healthy plants (as compared to wild types still found in nature). After Samuel de Champlain introduced tubers to France in 1606, they eventually became known as *girasole articiocco* in Italian. Girasole means turn-toward-the-sun. Americans (without Italian roots) heard this as Jerusalem. Champlain thought the taste of the tubers reminded him of artichokes. Thus Jerusalem artichokes. I will call them sunchokes or sunroots, the newest and oldest names I have discovered for these plants and their roots.

This is not an important honey plant, but it is a valuable addition to the home garden. It is an ideal plant for local growers to produce and market at the area Farmers' Market. The plants can be grown in containers, making them a possibility for rooftops and container gardens everywhere. The plants grow large, and will provide a privacy screen if staked to kept from blowing over in strong winds. Flowering is late in the season – in late Summer and into Autumn in the northern states. Each plant will produce a dozen or more two to three inch flowers. It is not a mass of bloom, but this is a colorful backdrop to the multicolored asters that are in prime bloom at the same time as the sunroot flowers. The vigorous green foliage is a wonderful backdrop for the garden, and one small tuber will generate an enormous plant.

I don't recommend this plant for the new gardener (except in a large container), since the plants become large and will take over any location where they are planted. Under the management of an experienced gardener, however, they can be put into cultivation for tubers, help the



Honey bee foraging for nectar on Sunchoke flower.

bees a bit, and be kept from dominating the entire garden by spreading uncontrollably. There is a tremendous opportunity to go crazy, and grow lots of these plants, and solve the world's hunger problems! Anyone who wants to grow a tuber-based plant in a soon-to-be-forgotten corner of their property should consider sunchokes. Plant them early in the season and let them grow. A little water when the soil cracks will help, but otherwise leave them alone. They can be one of the first things you plant in the Spring, and the last plant you harvest in the Fall!

My first introduction to this plant was through my brother, E. James Connor or Challis, ID. Brother Jim would return to Michigan with all sorts of goodies from his garden, and the sunchokes were a great addition to salads and stews he conjured up in the kitchen. The

Topping the growing Sunchoke plants in late July or early August promoted lateral branches to grow. That increases the number of flowers in September.





Last year's Sunchoke tubers were kept in the refrigerator with few storage or food quality issues.

chokes are a great replacement for water chestnuts. Two years ago he handed me a plastic bag and suggested I plant them "carefully."

And I did, the five golf-ball sized tubers grew well, but I did not harvest them until March of this year. There was no evidence that the Winter damaged the tubers in any manner. Then I dug out a sizable bag and replanted some of them a row against the cedar-stained fence. They look great against the fence, and have done well except for the 70+ mph winds that I mentioned last month writing about the white sweet clover. I just cut out the fallen stems and let them grow back without any apparent harm! I did top (remove the top of the main stem) of all the plants so they have branched out. My goal it to produce more side shoots, and side flowers. Instead of a dozen flowers per plant I aim for 50 to 100. The tallest plants tower over the six-foot fence.

Lovell (*Honey Plants of North America*, 1926) only says this about the plants: "Jerusalem artichoke (*Helianthus tuberosus*), cultivated in New York for its tubers, is also a good honey plant."

Other references focus on growing the plants and eating the tubers. They seem to be experiencing a period of rediscovery by local foodies and chefs. They appear at the farmer's markets in October in northern states, with harvest delayed until after the first or second frost. My chokes survived the winter in the ground, as one would expect from a native plant well adapted to the wide range of growing conditions in which it thrives.



Sunchoke and sweet potato (yam) strips were sprinkled with oil and Louisiana spices and grilled in foil. Chicken strips were marinated in honey and lime juice and grilled on a hot, oiled grill.

Culture

The name sunroot is closer to the Native American name for the plant. They should be planted in a sunny location in loose, well-drained soil. They tolerate dry conditions better than potatoes. Dedicate one area for the sunchokes, as they will spread rapidly and will require serious grubbing out after getting established. They form a wonderful five to 10 foot hedge, although they are inclined to fall over in very strong wind. That does not interfere with tuber growth, as the plant will send up side branches from a horizontal plant.

The sunchoke is a hardy perennial that has rough-textured leaves four to eight inches long, and small yellow flowers two to three inches wide. The flowers come late in the season, around the Fall equinox; in my area a deep freeze stops the flowering season – the flowers tolerate light frosts. I feel the number of flowers per plant is relatively low, yet they are very good attracting native pollinators, especially *Bombus* spp., as well as some honey bees. I want to think that the late season pollen and nectar are highly beneficial to all bees. Dedicated choke growers cut off flowers to force energy to the roots. The tubers are ready to harvest after the leaves die – then dig with a spading fork. Tubers left behind will regrow the next year. You may need to screen the soil to get out every tuber, as any that are left behind will be there next season!

Cooking and Eating

Sunchokes may be eaten raw or used in an unlimited number of ways in cooking. They end up in soups, stews, mixed with vegetables, with roasted meat and fish, browned in the oven and deep fried. They are very low in starch, but contain natural polysaccharide called Inulin (related to Insulin but not the same). The flavor is sweet, and is used to replace sugar, fat and flour. It contains 25-35% of the food value of starch or sugar. Inulin increases calcium absorption. It also promotes the growth of intestinal bacterial. It is a soluble fiber and is sometimes classed as a probiotic. The human body is *not* well equipped to digest inulin, which can be very good for diabetics because it has a minimal impact on blood sugar. Note that with refrigerated or ground-stored sunchokes, the inulin eventually is converted to fructose.

The down side of consuming sunchokes is that the inulin stimulates bacteria in the human rectum to digest the material, and carbon dioxide, hydrogen and/or methane result, along with potential bloating. People who are likely to produce gas should be cautious with sunchokes, and consume a very small amount and wait to see that happens. The general rule is to add such a food gradually to the diet. Other plants high in inulin include chicory, garlic and leek.

When food supplies were rationed in World War II, sunchokes were very popular and "one of the most available vegetables in a time of rationing." When the war ended, they were replaced by more popular, less gassy, crops.

My experimentation with this food is just starting. I have stored a bag of the 2010 chokes in the coldest part of my refrigerator, and they have stored well. I simply shook off the soil and stored them unwashed. In late Summer they had a few sprouts, an inch or so long, but were still firm and unblemished. Storing is not an issue, so a few bags of the chokes will last a long time.

Because of the gas potential, I suggest you go slowly with use of the sunchokes. Start with a little added to familiar recipes. Add some to the stir fry instead of water chestnuts. Add to stews and soups as a replacement for or to reduce the number of starchy potatoes. Shred the tubers over a salad, or an omelet. Add strips to the next batch of dill pickles you make, and stand back as they take on the dill flavor. And garlic, if you add it.

The stored sunchokes are high in fructose, so they need to be cooked quickly at a high temperature or they will caramelize and burn. Instead of making or using potato chips, slice the sunchokes as thin as you are able and fry them in a hot sunflower oil as quickly as you can. Watching for rapid darkening and burning – they are extremely fragile to use because of the fructose level.

For years I have roasted thin sweet potato slides in aluminum foil on the grill. I make the slices about ¼ inch thick, and coat with oil and a Louisiana spice I purchased on my last trip (along with chicory coffee). Now I add a few thinly sliced sunchokes to the mixture. The sweet potatoes and sunchoke flavors mix well with the hot spices and steam quickly on a hot grill (wrapped in a thin package of aluminum foil). This I serve with boneless, skinless chicken breasts or thighs (depending on what is on sale), marinated in fresh squeezed lime juice and honey for several hours before grilling. It is a sweet and healthy meal, and there are rarely leftovers when I have friends and family visit.

For those of you who have presented me with some of your honey during my travels, this is probably where I used your honey – in the chicken and lime marinade. I do

not add salt to the marinade – I like the honey and lime flavor to come out of the chicken, and not a briny flavor – my major complaint against many premade marinades! **BC**

References:

<http://www.wemoss.org/profiles/sunchokes.pdf>

Lovell, John H. 1926. *Honey Plants of North America*, The Root Company, Medina, OH.

Pappalardo, J., 2008. *Sunflowers (The Secret History) The Unauthorized Biography of the World's Most Beloved Weed*, Overlook Press, Woostock & New York.

Check out a new book coming out from Dr. Connor's Wicwas Press at www.wicwas.com. It has nothing to do with sunflowers.



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HONEY HOUSE IDEAS

Duane Waid



If you are a new beekeeper, with a hive or two, you may not have given much consideration to building a honey house. However, if you are like most of us, the time will soon arrive when you will be ushered out of the kitchen, the enclosed porch or garage or wherever you might be doing this less than neat process of extracting. Maybe you should start thinking about one.

How big a honey house you need would depend on how big an operation you intend to have, but let me insert a warning here . . . don't make it too small. Your beekeeping just might grow beyond the parameters that you expect it to. Ours did and we went thru the pains of operating out of space much too confining to do the job neatly and conveniently. What ever the size of operation you

have now, build it at least **double** the size that you expect to need.

Also, whatever size you decide on, the following considerations are important, not necessarily in this order: cleanliness, convenience, animal and insect free, spacious, well lighted, free from toxic materials and having available hot and cold running water.

"Pure". It is probably the adjective we honey producers use the most often in describing our product. "PURE HONEY". Sounds good doesn't it?

Of course the effort to keep our honey pure starts in the beeyard as we feed and treat our bees for various problems but it must continue throughout the process of removing, storing, extracting and packing our product for sale.

Location

If you plan to limit your beekeeping operation to only a hive or two, a small room or the corner of your garage can be temporarily set up each time you extract. However, if you plan to increase to, let's say, 20-30 hives or more, and have to build from scratch, a standard two-car garage or similar sized building, with 300-500 square feet of floor space, would not be too large to consider.

The building should be located far enough away from the property line so that additions are possible when and if necessary. For instance, if one were to start with a two car garage, and found it to be too crowded, a lean-to could be added, to provide perhaps for a hot room, storage area, wax handling room, carpenter shop or whatever is needed.



This addition provides a covered area to unload honey supers. Note the double door which makes loading and unloading easier.



Here Rob Sorrensens uses a hand truck to wheel a stack of filled honey supers from hot room into the extracting room.



This extra large uncapping, holding tank will contain several days cappings which drain through a screen, reducing the amount of honey going into the wax melter.

The ideal location would be on a slope, so that a loading dock could be in line with the truck bed, outside, and the shop floor, inside, so that honey supers can be easily unloaded with a hand truck. We say this knowing that there are very few ideal situations, but some thought should be given toward making this convenience possible.

Our first honey house was a small house trailer, (too small), but with a loading dock. We later moved into a much larger building, with everything at ground level and no possibility to build a dock so honey supers have to be unloaded, one at a time. If you find yourself in this situation, a power tailgate would be a good investment.



Our set-up in Interlaken, NY is simple. Here Christopher Waid scratches open some cappings that were missed by our uncapper before placing the comb in holding tank to await extraction.

General Construction

Block construction or any other type that can be made animal and insect tight is acceptable, with doors wide enough to accommodate drums and any equipment expected to be moved in.

Floors should be smooth concrete, tiles or smooth, washable painted material. A floor drain is important as is both hot and cold running water and a large sink is almost a must.

Walls and ceilings should be made of smooth, washable material such as laminated paneling or tiles or other material with acid proof, washable finish, for easy cleaning.

Hot water heat (ideally under the floor) would be best in order to



Honey drains from our 50-frame extractor into the sump and is pumped into settling tanks.

minimize dust circulation throughout the plant but any safe efficient heater will do.

Ample lighting should be provided by florescent tubes with all tubes being shielded with sleeves. And remember, you can never have too many electric outlets. Don't forget windows, either.

A dehumidifier in the hot room and a fan to circulate the air helps to lower honey humidity. A window mounted bee escape or two, is convenient for letting bees out of the hot

Develop A To-Scale Replica Before You Begin

room and a hand held shop-vac is convenient to pick up those which don't choose to use the escape.

A dishwasher is a convenience but not absolutely essential. A hose long enough to reach all of your equipment, with a power nozzle is important and a power washer would be a plus. A restroom would make your honey house more comfortable.

Work Flow

Work areas should be set up to provide a smooth flow, from incoming supers of honey, and supplies, to outgoing honey, packed for delivery to customers. We prefer to bring in honey supers from the yards thru one entrance, in the rear, directly into the hot-room, to keep any mess from this sometimes "sticky" area from being tracked throughout the shop. On the other hand, empty jars and other supplies (coming in) and packed honey (going out) can share a "clean" entrance, perhaps on the front of the building.

The hot room, or area and un-



Sorrensens extracting room is bright, neat and organized with plenty of space to work. The smooth concrete floor makes cleaning easy.



If you have some lumber left after constructing that honey house, don't forget to add a honey stand, like this one of Rob Sorrensens.

capping and extracting areas are considered "sticky" areas and should be kept together, and convenient to a water source, so that operators can be fastidious in keeping the floor clean.

Organizing Equipment

In my past life as a printer, we would occasionally have to reorganize our plant in order to accommodate a new piece of equipment. To do this, we would cut pieces of cardboard to scale, to represent various pieces of equipment. These we would place on a piece of graft paper, moving them around until we were satisfied with the arrangement. This should work for organizing a honey house.

In laying out your plant, allow plenty of work space around each piece of equipment. Keep each piece

Another back saver is this "super lift" built by Richard Linck at his plant in Marcellus, NY. It raises the stack to eliminate all that bending necessary when taking frames from one or two supers at floor level.



far enough away from the wall so it is accessible from all sides for cleaning or repair. Consider turning room for hand trucks.

Work flow of course is a matter of opinion and must be worked out by each individual beekeeper, but must be considered when placing equipment. We will run through our system, not claiming it to be perfect, but it works for us.

Honey supers come in thru the back door directly into the hot room (unfortunately we do not have a dock) and are stacked seven to the pile. Each pile is eventually wheeled on a hand truck, just inside the door to the extracting room where the frames are scrapped, uncapped, placed into a holding tank and then into our 50 frame extractor. The extracted frames are returned to the supers and wheeled to another area where they await being taken back out to the yards or put into storage. Dropped wax or honey is immediately scrubbed up, in an effort to keep stickiness from being tracked to the front of the plant.

The honey flows from the extractor into a sump and is pumped, thru a strainer, into a settling tank and from there into bottling tanks or into buckets or drums for storage. Boxes of jars enter thru the front door, jars are labeled and filled and stacked, ready for delivery. By separating the areas as we do, very little "stickiness" gets to the front of the plant.

And how should one handle the cappings? Again, "ideally" a cappings spinner would be the answer. However, we could never seem to justify this expenditure, so here is how we do it.

The cappings from one days



A power tailgate is a great back saver as demonstrated here by Richard Linck.

extracting are left in the collection tank, beneath our Maxant uncapper, to drain overnight. The next morning they are dumped into a similar tank in our hot room where they drain for another day. They then go into our old Kelly wax melter and the temperature is set to about 130 degrees overnight, warm enough to separate more honey from the wax, but not warm enough to melt the wax or heat the honey enough to harm it. This honey goes back into our system.



Interior of cappings spinner which leaves the cappings very dry and ready for the wax melter, a great time saver as well as a honey saver.



Several large fans, in Richard Linck's hot room, force warm air down through honey supers and out through screens in the ventilation boxes, on which they are stacked, to remove moisture which, in turn is

Finally, the temperature is turned up to about 190 degrees to melt the wax along with any honey that remains. This mixture runs into a separator, a beeswax cake forms on top and the now darkened honey runs into a bucket, not to be used by us.

This is not an article about how to extract honey but a few hints here might be helpful. Use stainless steel all the way thru if possible. If you reuse returned jars, a dishwasher makes the work much easier (and even then, check carefully for odors). Do not store anything toxic or any chemicals in the honey house. Do not allow smoking and insist that your help wear clean, appropriate clothing.

And, before you start, be sure to check with the local government to learn what rules you have to abide by. **BC**



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BACK DOOR BEES

There are lots of ways to improve both Summer and Winter ventilation in a beehive. Your bees will be glad you did.

Ross Conrad

One of the factors for successful beekeeping that is often overlooked is adequate ventilation in hives and an upper entrance. I am just as guilty of this as anyone . . . but more on that later. Despite the fact that feral hives often don't have an upper entrance and research indicates that bees seem to have a preference for hives with an entrance in the lower portion of the hive, an opening in the upper portion of a hive should be considered. Acting like a back door, an upper entrance improves Summer ventilation for cooling and Winter ventilation to remove moisture from the hive. It also is an alternative exit for the colony should their primary entrance at the bottom board becomes clogged during winter with ice, snow, and/or dead bees. This alternate route out of the hive can be critical in allowing the bees to get outside during a thaw so the bees can make those all-important cleansing flights and relieve themselves of the indigestible material that builds up during Winter meals.

During the Summer, the upper entrance will often be heavily used by foragers returning with loads of nectar. This alternative entrance gives them a shorter more direct route to the honey storage area within the hive. By speeding up the unloading process so that foragers can turn around and go out for more nectar faster an upper entrance may help to increase the amount of honey a hive can gather during the season and help ensure the colony has enough to make it through the dearth of Winter.

During the Summer upper entrances can be created by manipulating the equipment in an out of the ordinary fashion. One example is to simply raise the outer cover up so it sits on the outside lip of the inner cover. This will provide increased air flow up through the top of the hive between the inner and outer covers. In extremely hot climates, some bee-

keepers will offset the supers an inch or so. While this greatly increases the ability of the bees to ventilate the hive, it also exposes the combs to an increased risk of robbing and makes it easier for potential scavengers to gain entrance to the hive. As a result, such alternative entrances should only be used on colonies that have a very high population with enough bees to keep every comb occupied fully. Sure rain will be able to get into the hive, but unless you experience a monsoon, the amount of water that wets the ends of some of the frames will not do much damage.

Rather than manipulate the equipment in order to create an upper entrance, beekeepers and hive manufacturers will sometimes modify the equipment itself in order to provide an alternative entrance. Some beekeepers like to drill a small hole (about $\frac{3}{4}$ of an inch) into the side of a honey super or brood box. This works best when the hole is located off to one side, or below the hand-hold. This way the entrance is not blocked by the beekeeper's hand every time the super or hive body is moved.

Some manufacturers of beekeeping equipment cut a notch cut out of the inner cover rim on one end in order to provide the hive with an upper entrance. If the outer cover does not fit too tightly when flat and there is

room to slide the outer cover forward on the hive so there is enough space for the bees to come and go, the notch in the inner cover rim can be used by the bees as an upper entrance, as well as for ventilation.

Ideally, though not critical, the notched side of the inner cover is kept in the up position during the Summer and in the down position for the Winter. Paying attention to this detail will allow the air flow to pass through the middle of the hive and the brood nest and then through the hole in the middle of the inner cover during the Summer maximizing cooling while venting the hive. With the notched side of the inner cover facing down and the outer cover tightly covering the hive, air is unable to flow through the hole in the middle of the inner cover and instead is drawn along the inside wall of the hive as it travels between the bottom board and the inner cover. This helps to prevent a draft from moving through the center of the cluster during the cooler months helping the colony to conserve heat and maintain proper brood nest temperatures during Winter. Plus, it moves moist air out of the hive, keeping the bees dry from condensation.

Long-time beekeepers who rarely (if ever) replace or repair their bee equipment often don't have to be con-

A busy front entrance means there might be a traffic jam inside. An upper entrance would reduce some of this congestion.





The inner cover notch, and raised outer cover greatly increase ventilation and provide an upper entrance. Guards will be hanging out here though, so smoke both the regular entrance below, and up here.

cerned with providing their colonies with upper entrances. Their equipment is usually in such bad need of repair that their hives already have numerous openings, cracks, etc., that provide the bees with plenty of ventilation and alternative entrance options. This provides great cover for the beekeeper looking for the rational to support their lackadaisical approach to hive maintenance.

The one caveat about incorporating an upper entrance or two into your hive is that you will want to remember to smoke **all** the entrances prior to opening the hive! When I say smoke the entrances, I don't mean blow a little smoke across the front of the entrance. Doing so will only cover up the pheromones given off by the guard bees that are visible on the outside of the hive. It is critical that one blow smoke directly **inside** each entrance so that the guard bees that are located just inside the hive entrances also get a whiff of the smoke and are unable to communicate effectively and organize resistance to your intrusion into their home. Without being exposed to smoke these guard

bees are going to become defensive, and the experience (for both you and the bees) will not be as enjoyable as it could be.

For those with a penchant for high tech gizmos, a solar-powered hive ventilator may be tempting. Manufactured in Vermont, this hive addition will only provide ventilation however and does not offer the bees an alternative entrance for Winter use. At a cost of \$129.95 each, it is also not something that a frugal (read cheap) beekeeper like myself would bother with. It does, however, provide good ventilation during the warm Summer months, speeding honey dehydration.

Whatever type of approach we decide to utilize in order to increase ventilation, we must be aware that an entrance reducer will drastically reduce the ability of the colony to ventilate the hive. The same is true for a screened bottom board that is closed off and has a board installed blocking the screen. Now if I am using an entrance reducer when it is appropriate, then the resulting reduction in venting ability is usually not an issue

because the population of the hive is so small that they don't generate much heat to begin with.

I was recently reminded of this fact when I observed a hive in one of my beeyards that had a reducer in the entrance even though it was what I would call a regular size hive. This particular colony was on the weak side coming out of Winter and the reducer was installed in the Spring. One thing led to another during the course of the season and the hive grew in population, eventually requiring the addition of a honey super.

During the Summer I had not removed the reducer in the entrance until one day when walking through the beeyard I noticed that there were many more bees gathered out in front of this particular hive compared to the rest of the colonies. Now I had not inspected the hives in about three weeks since I last supered them up, as it was mid-August and I was planning on harvesting the excess honey soon. Since it was rather late in the season for a hive to be thinking about swarming in my area I figured the reducer was either inhibiting the ability of the colony to ventilate the hive, or slowing down the foragers as they came and went, or both. I removed the entrance reducer and sure enough, two days later when I checked on them, the number of bees out in front of the hive was about the same as the rest of the colonies in the beeyard.

The amount of hardship I caused this hive by failing to remove the reducer in a more timely manner I will never know. However, it should be noted that my bees are fortunate enough to forage in an area where there are typically nectar sources available from early April well into September. As a result robbing is not much of an issue unless hives are too weak to defend themselves. If my bees were foraging in an area where a long dearth of nectar is common during the warm season (such as in some southern parts of the Northeastern U.S.) then I may use reducers on hives during times of no nectar flow even when hives are strong. **BC**



Offsetting a super an inch or so also improves ventilation in the Summer. Watch for guards, and close up for Winter.

Ross will be teaching a two-day course on Getting Started With Organic Beekeeping October 29-30, 2011 in at the Metta Earth Institute in Lincoln, Vermont. Call 802-349-4279 for more information or to register.

Bees for Beef

Let me tell you about Certified Naturally Grown Bees, and Beef

Jennifer Berry

"Environmentalist, naturalist, tree hugger, preservationist, eagle freak, greenie, anti-pollutionist, ecologist," and "green geek" are some of the terms used to describe those concerned with protecting the environment. Often, they refer to people working in some capacity to solve environmental issues such as population growth and pollution, for example. I find it interesting that, prior to 1962, these terms did not exist. It was only after Rachael Carson's novel, "*Silent Spring*," was published, that the environmental movement began. Since that time, the movement has sprouted, grown, and took on a life of its own.

As the human population continues to increase, more and more food must be produced in order to feed the masses. However, with such rapid growth, humans are exhausting the world's land base. As land is consumed for non-agricultural needs or overworked and overgrazed, this resource is in jeopardy. Hence, day after day researchers and farmers are working to find better ways to cultivate the land so that at harvest time, yields are at their peak; it's a constant struggle to improve land-use efficiency. Another struggle is to achieve this while decreasing the cost of production. One thing is

for sure, there is only so much land, and we ain't making any more. "Land is the only thing in the world worth workin' for, worth fightin' for, worth dyin' for, because it's the only thing that lasts," goes the saying.

Since the end of World War II, populations have flourished along with technology. This has given rise to industry-standard, monocultural farming. Some examples are the vast acres of corn, soybeans and wheat fields that consume miles of America's heartland. Given such advances, in the past, the small, local farmer all but disappeared, only to survive in the paintings of Norman Rockwell. While large farming systems efficiently produce massive amounts of food, I ask, "But, at what price to

humans and the environment?" Desertification, salinization, loss of biodiversity, depletion of ground water and eradication of genetic diversity are just a few of the issues that have surfaced over the years.

Another concern is the pollution of soil and water. With a whole landscape sowed with the same crop, pest and disease populations can rapidly explode infesting and infecting virtually everything overnight. So, pesticide use is a must! Insecticides are used to kill the insects that devour the food. Herbicides are used to kill the weeds that compete for precious resources and fertilizers are used to grow the food-bearing plants big and strong. Granted, the use of these chemicals has enabled great gains in food productivity over the years, but, again, I ask, "At what risk to humans and the environment?"

It is understood that with the growing population on this planet, organic or alternative agricultural operations cannot feed all the inhabitants. However, these farms are growing by leaps and bounds all across the country. Over the years, many people have gained a better understanding of how the food they consume is grown, harvested, processed and packaged. With this knowledge, they're making better-informed decisions about what to buy and from whom, as evidenced by the appearance of more organic and local products in

larger supermarkets, led by, of all stores, Wal-Mart.

For a food product to be labeled "organic" it must have been produced, handled and stored without the use of any synthetic chemicals. Plus, the land in which it was grown must have been chemical free for more than three years. There are other rules and regulations that must be adhered to in order to receive the label, which is why it's almost impossible for honey to be labeled organic. This is not because of the beekeepers' practices, but where the bees themselves fly. Bees do not discriminate between organic and non-organic fields. They forage in areas that provide the biggest bang for the buck. So, unless our bees' flight range is completely encompassed by a pristine area,



Annie and Nolan Kennedy with Certified Naturally Grown beehives.



Happy cow (steer actually).

free of insecticides, fungicides, herbicides, or genetically modified organisms, then, the “Organic” label will always be just outside of our grasp. Yet there’s still hope!

The closest to an organic certification, that MOST beekeepers can get, is a grassroots program called Certified Naturally Grown, or CNG, which is modeled after the *Participatory Guarantee Systems* or PGS. PGS is a peer-review certification program of over 10,000 farmers, primarily outside the US, which has been in practice for decades. PGS recognizes organic practices yet draws upon local resources, as opposed to relying on large bureaucratic organizations, to inspect and educate. This avoids frustration, excessive paperwork and high fees.

Certified Naturally Grown started as an alternative to the USDA National Organic Program and, since its inception in 2002, has begun to sprout across the U.S. The program caters to the small-scale farmer, who sells products locally at farmers markets, roadside stands, restaurants, and through community supported agriculture (CSA) farms. It is a brilliant choice for beekeepers since it offers a common sense option to the organic standard. Plus, there are less restrictions and costs involved.

The process for being certified as CNG is quite simple. First, go to www.naturallygrown.org and read the requirements for the certification. These are basic, common sense approaches to keeping bees (treatments for pests, apiary location, feeding, comb removal, etc). If your apiary practices meet the requirements, you will want to connect with several beekeepers in your area who are also committed to natural beekeeping methods. Next, you will need to fill out the application on line. After your application has been accepted, you will receive a declaration by mail along with information about the program and the annual contribution. Finally, you will have your apiary inspected by a beekeeper whom you know and, with success, become a member of the CNG community.

I became a member a few months back and am proud to be a part of this organization.

Last year, I was asked by a local beekeeping family to certify their apiary as CNG. It was the first apiary certification for the state of Georgia; so, I was excited to be apart of the process. Annie and Nolan Kennedy along with their three children, live on a farm outside of the small town, Colbert, Georgia.

Annie and Nolan met while attending school at Texas A&M. After graduation, Nolan went into USAF pilot training program. He eventually became a F-16 flight instructor. Years later, this training lead him to a career as a Delta pilot, a job he continues today. Annie worked in the Human Health Division of Merck industries as a Pharmaceutical Representative until she retired. They remained in Texas until Delta transferred Nolan from Dallas to Atlanta. They opted for the farm in the country as opposed to the overcrowded, polluted madness of Atlanta.

Annie and Nolan began to explore living a healthier lifestyle when their youngest daughter was diagnosed with food allergies and autoimmune disorder. What they discovered in the grocery stores was not to their liking. Meats, dairy and eggs were full of hormones, antibiotics and other chemicals. Very little-to-no organic vegetables were available, but there were plenty of processed foods loaded with ingredients they no longer wanted to feed their family. So, they decided to take matters into their own hands and make a move back to the basics with not just their food, but their environment as well.

Covenant Valley Farms, the name of their farm, is the place they call home. At first, they had no intention of having more than just a few horses, but this proved not to be enough. As time went on, the population of the farm began to expand. First, a rooster named Michael Angelo needed rescuing. Next, they got, chickens, sheep, cattle, bees, and, finally, turkeys. The farm has become a full time job, but one they love.

The Kennedy’s cattle are a mixed-breed of Angus. They have better immunity and resistance to common ailments versus the commercial stock widely-used today. Hence, there’s no need for injections of antibiotics. Further, the fields where the cattle graze are not treated with synthetic pesticides, herbicides or fertilizers, which is one reason why their stock is also Certified Naturally Grown.

The Kennedy’s cattle are grass fed, which is what nature intended. Most beef operations will “sweeten” cattle for 60-120 days (some, actually, for their entire lives) on grain (predominantly corn) to add additional fat before they are slaughtered. Unfortunately, a cow’s stomach is not designed to digest corn. Once on a corn diet, the cow becomes “sick;” this is one reason why antibiotics are continually fed. Grain feeding also promotes the growth of E. coli, which is another reason why such cattle must be fed antibiotics. Finally, cramming 100’s to 1000’s of potentially diseased animals into small areas (stockyards) can be a recipe for disaster.

Another debate circulating the country is the use of hormones within the meat and dairy industries. In recent years, there have been many questions and concerns about the effects of these hormones on people eating beef and drinking milk. During their life, cows are fed or injected hormones to accelerate their growth and make them more “beefy,” so to say. These hormones are the same

muscle-building androgens (testosterone) that nefarious athletes consume. Dairy cows are also fed hormones in order to increase milk production; traces of which are detected in the meat and milk. But, what may be more disturbing is the amount of these hormones finding their way into water sources (rivers, streams, creeks, ponds, lakes). Waste from the cows runs off into waterways and eventually make it into our drinking water. So, how is this affecting our health or the health of the environment?

The industry has modeled this current system of raising cattle to be more cost effective, which is why beef in this country is so cheap compared to other parts of the world. Plus, American consumers have grown accustomed to the fat-marbled meat which has been produced for decades. However, meat from grass fed cattle has about one-half to one-third less fat. It is lower in calories and is much higher in vitamin E, omega-3 fatty acids, and a beneficial fat called linoleic acid (CLA), which supposedly reduces the risk of cancer.

Folks raise cattle unconventionally, and buy the beef as well, to minimize the risk of contracting deadly diseases like Mad Cow and Foot and Mouth. Plus, it greatly reduces the chance of being exposed to E. coli infections, which kill people each year in this country. Some feedlots not only feed grain to cattle, but feed the animal remains of horses, and pigs, as well. Also, in his book, *"Fast Food Nation,"* Eric Schlosser reports that about one quarter of minced beef sold in this country is made from worn-out dairy cattle, which are likely to be riddled with disease and antibiotic residues.

Journalist and food researcher Michael Pollan explains that, "...the chronic diseases that now kill most of us can be traced directly to the industrialization of our food: the rise of highly processed foods and refined grains; the use of chemicals to raise plants and animals in huge monocultures; the superabundance of cheap calories of sugar and fat produced by modern agriculture; and the narrowing of the biological diversity of the human diet to a tiny handful of staple crops, notably wheat, corn and soy. This loss of nutrients (and replacement by superabundant yet non-nutritious calories) has contributed to the rise in chronic degenerative diseases in humans over the last 60 years." (Pollan, 2008)

Back at the farm, while sitting down and chatting with the Kennedys, we actually did some bartering. I purchased ½ a steer in exchange for five nucs and five queens. Not bad. It is more expensive than what you find at the grocery store, but, for me, I'm willing to spend more for fresh, local, organic, or CNG food because I BELIEVE it is healthier, better tasting, grown with a respect to animals and the environment. It also makes me feel good. But, something that I find ironic is that natural foods usually contain fewer ingredients; they are just common, everyday, simple fare. The fancy-dancy, premixed, fast cooking, dinner in a bag, box, or plastic tub is cheaper than the real thing because the chemicals and additives are cheap to create and easy to apply. Next time you are at the store, read some of the labels from a few organic products and compare them to their "fast food" counterparts. Interesting read!

Annie and Nolan believe in food quality over quantity. They want to raise the animals humanely and with as little impact to the environment as possible. They want the food that they eat, feed to their children, and sell to



Annie holding a baby chicken which will soon be supplying eggs for the family.

their customers to be like yesteryear: full of nutrients, but not artificial, four to 12 syllabled ingredients that nobody can pronounce.

"Thank you," to all the small, local farmers out there like the Kennedys! Glad you're no longer just a memory. **BC**

Jennifer Berry is the research director at the University of Georgia Honey Bee Research Lab.

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Beekeeper Mind

A talk delivered at the Marin County California Beekeepers' Celebration Of The Bee by M.E.A. McNeil.

The Great Ah-ha in the history of beekeeping is that moment when a New England minister connected the realization that bees build consistent distance between natural combs with the concept of a movable frame hive. I wonder, though, if there was not a more deeply felt moment for Lorenzo Langstroth. He suffered terribly from what was then called a "nervous condition," and it calmed him, he said, to work bees.

The effect for those of us who work his eponymous hives today, whatever our multiple stresses, is the same. The pop of the propolis seal when we wedge a hive tool under an inner cover is a Pavlovian signal, summoning an immediate focus that throws off all extraneous thought.

If not, we get that way in a hurry. A distracted mind recognizes too late the banana smell of alarm pheromone, a final warning from a carelessly crushed worker. By then, the beekeeper becomes more offender than partner to the colony, and what could be a dance becomes a duel.

But with attention, human fingers slide in among the bees on a top bar. The frame is pulled up with an exacting move; a thoughtless angle can roll the queen. This care is not a luxury of boutique apiaries; I have watched commercial guys work a hive with balletic grace.

We learn to read stories from patterns: Here eggs, like succulent white exclamation points, stand up at the base of adjoining cells; there they are hatched into ravenous larvae lying in a creamy feast of protein; an expanse of undulating light cappings covers morphing pupae; the nursery is held in a new moon of yellow, orange and purple pollens and a band of wrinkle-capped honey. All is well; we are not needed here.

Somehow, when we finish working the bees – even on days when randomly laid drone brood signifies the desperation of a queenless hive – even then, at the closing of lids, our own troubles have withered from neglect.

I'm not saying that beekeeping is a kind of gateway drug to some new-age guru. If we are going to call it mystical, then we have to include bowling and card playing and any other of the pastimes that divert and renew us. Beekeeping, though, is different. It's as though, in order to get a full house, our queen has to find another deck in the next county. We tend wild creatures that range our surroundings, and our sharpened awareness reaches out to all that the bees touch.

We acquire apian thermostats, sensing when it is warm enough for them to move their thoracic muscles enough to fly, when the cluster will contract to keep its 95° core, when it is expanding so far that bees will soon be bearding at their entrance.

Learning the little pollinator flowers, we lose our taste for the big showy garden blooms that bees cannot get a proboscis into. Finding a new bee plant is like money in the street, only better. It is gratitude that we beekeepers feel toward the first Spring buds, the willow and eucalyptus, and a nectar flow brings rapture over the bees arcing through the sky like a meteor shower. When we eat their honey we are ingesting the landscape itself.

We may be the keepers of the bees, but they can be the keepers of our own keenness of mind. And so it is that when this mindset expands to the wider world that our bees forage, we know with certainty that what they bring back is part of why they are failing. It seems to follow that we want the same careful frame of mind for those who tend the plants they feed on and the water they drink. To contemplate it is to see it is all of a piece, the parts are not separate. A full house for our bees is the one we all live in. **BC**

OBSERVATION HIVE IDEAS

Jeanne Hansen

Something needs to be said about how to connect an observation hive to the outdoors. Clearly the bees have to be shunted either through the wall or through a window. Some sort of bee-proof passageway has to run from the hive to this opening, and it is seldom provided.

Perhaps a good place to start is by dreaming up the kind of corridor you want for the bees. Large diameter, transparent, flexible tubing is fun to look through, but some kinds are so smooth the bees can't get a grip to walk on it. Flexible accordion tubing, from a sump pump for example, is easy to bend into position and has a good

size of 1¼ inch in diameter. I myself cut a diagonal strip of old window screen, rolled it into a tube and sewed it shut with fine wire.

Modern plastic plumbing supplies make it easy to connect the corridor to both the hive and the house. Get some pipe nipples/connectors with threads on one end. On the observation hive, drill a hole about 1/8" smaller than the connector. Then using a channel-locks or large pliers, simply screw the threads into the wood of the hive. Pipes to fit can be slipped into place or tubing can be clamped on using an automotive hose clamp.

EXTENDED TEW OBSERVATION HIVE

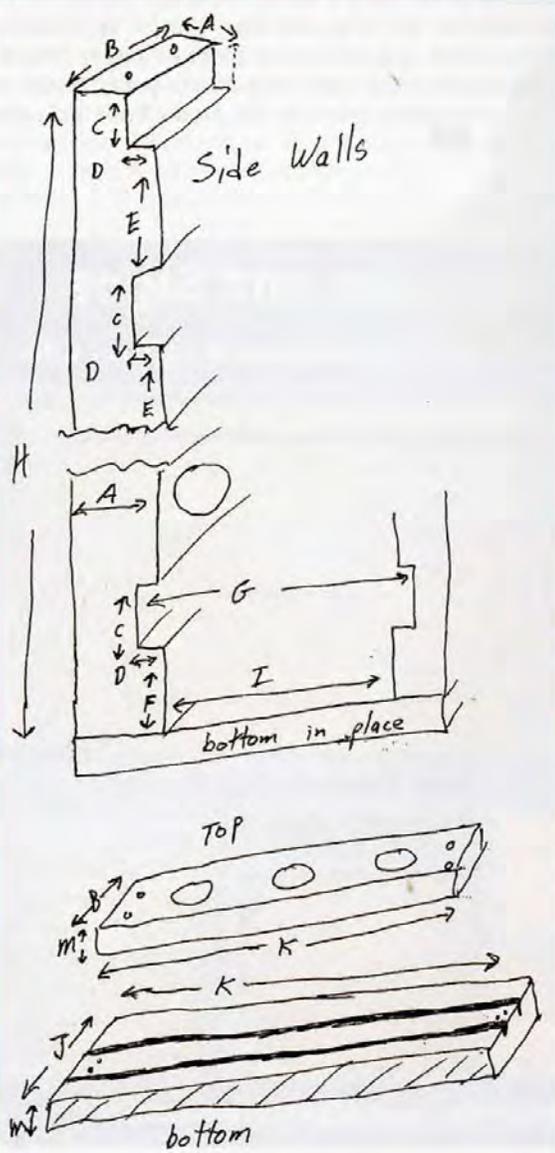
This very simple hive is easy to build, and lets you see every bee all the time.

Note: A bee space is 5/16" (anything from 1/4 - 3/8 is OK)

- A = Non critical, 1½" is good.
- B = Critical dimension! 1-7/8".
- C = Thickness of your top bars plus a bee space.
- D = A ledge deep enough to hold your frames, but shallow enough to keep the end bars a bee-space away from the wall. A good size is 3/8".
- E = Depth of your frames, not counting the top bar.
- F = Length E + 1" to give room for dead bees and debris.
- G = Length of top bar + 1/8" play, for example 19"+1/8".
- H = Add up all the vertical dimensions. My hive is 38" for example.
- I = Length of bottom bar + two bee spaces, for example 17 6/8 + 3/8 + 3/8 = 18 4/8.
- J = The broader, the more stable. About 3½" is good.
- K = Length A + I + A, for example 21½".
- L = Critical Dimension! Make two kerfs with your table saw EXACTLY 1-7/8" apart, (or exactly B) into which you will slip your glass panels.
- M = Any thickness, for example ½".
- o = Location of screws. Use long ones to give stability to the frame, for example 2½".
- O = Ventilation and feeding holes of about 1" diameter, covered with screening. A hole will also be needed for the entrance which you dream up, see article.

Decide on the material for the windows. Glass is heavy, but easier to clean. Plexiglas must be cleaned carefully with soap and water and then a little mineral spirits, but is light and easy to work with. Design the window panels to fit into the kerf on the bottom, and then extend generously over the wood all around.

After trying a variety of hardware to hold the windows firmly in place against the wood of the hive, I have settled on long strips of wide, transparent packaging tape. It keeps all the bees inside, is easy to apply, and easy to remove when it is time to service the hive.





The easiest way to connect this corridor to the outdoors is through a slightly open window, with all but the corridor opening blocked by boards. Drill appropriate holes to fit your tubing or piping. I myself was able to shunt my bees outdoors through a pipe left in the wall from some forgotten purpose.

There are a few requirements for the bee corridor. It should be kept as short as possible. If the entrance pas-

sage is very long, bees will exit, but may not find their way back. To ensure that the bees learn how to exit and enter, it is best to train them slowly over time by gradually lengthening the tube. If the corridor is too narrow and has corners or bends, the bees can have difficulty removing dead workers, and the passage may become blocked, or dead bees may accumulate there and become infested with fly maggots. The passage should slant downward from the hive to the outdoors if possible, so dead bees and debris can fall out more easily.

In order to carry the observation hive outdoors for maintenance, the connecting passage must be easy to disconnect. I've tried a variety of fancy gadgets to disconnect the hive and block the incoming and the outgoing bees. None have worked that well. What I end up doing is taking two pieces of cloth large enough to cover the tube and two rubber-band hair-ties, which are easy to work with. I disconnect the tubing and quickly cover both ends of the opening with cloth and rubber bands. I separate them just enough to slip in the cloth first. If someone is available to help, I have them hold the cloth on one end while I rubber band the other. Then I go outside and block the entrance out there, so the corridor won't be filled with bees when I'm trying to re-connect the hive.

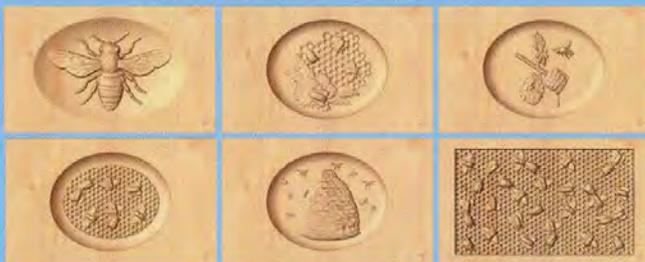
I almost never have a bee get into the house. If they do they will just try to go out the window and you can catch them with a glass and a piece of paper. Put the glass over the bee and slide the piece of paper under the glass. You now have a bee in the glass. Take it outside and let it go. **BC**

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A Trip To The Amish Mall

Peter Sieling

I thought I could save gas by doing a couple errands on the way to the Steuben County Honey Bee Association field day, so on Saturday morning I put my bee gear in the van, along with an old extractor. On the way I picked up Lindsay, my 12-year-old apprentice. To save time and gas, I planned to show the extractor to Melvin Yoder, an Amish gentleman who was interested in buying it, then make a quick stop at the Amish Mall to buy a straw hat to replace my defunct pith helmet. Doug Schroeder, our field day host, lived just over the hill from the Amish settlement.

Lindsay has been to the Amish Mall several times and thought I should go. It consists of rows of old house trailers packed with assorted merchandise at great prices.

"You're sure you can find it?" I asked Lindsay.

"Don't worry, Mr. Sieling, I'm a human GPS."

"Great."

The Amish settlement sits on a plateau, overlooking Interstate 86. You turn onto one of several dirt roads that ascend through glens, gullies and gorges. On top of the plateau, the dirt roads twist, turn, double back, fork, and later rejoin. You can find County Road 13, for example, where it begins on Route 53. You can find the other end in the village of Avoca on the other side, but don't try to follow Route 13 from one end to the other. They say some folks have tried it and never returned.

I found Melvin's clock shop. He looked over the extractor, stroking his beard. "Ya, I guess I could fix this and make it work." He peeled \$50 out of his wallet. We talked about bees as Lindsay paced back and forth and rolled her eyes.

Twenty minutes later I backed out of the driveway. "Now to the Amish Mall, Ms. GPS."

"It's just down the road from the bulk food store, next to the stove shop."

"That's easy - right on this road."

We passed the stove shop. The bulk food store was gone, including the buildings. "So where is the mall?"

"Maybe it's the other side of the store." We continued for a couple miles, till we started seeing cars in driveways and people driving riding lawn mowers.

I checked my watch. "The field day starts in 15 minutes. Let's skip the mall. Which road do we take to get off this plateau?"

Lindsay shrugged, "You're the pilot."

"You're the GPS," I reminded her. "Well, I know for sure we're too far north." I turned on a seasonal dirt road. It gradually veered north. I turned on a still smaller road. It again curved toward the north. We stopped where two roads diverged.

"Look Mr. Sieling," said Lindsay, pointing down the left fork. "There's Melvin's house. We just drove in a circle."

"We'll retrace our route from the beginning and follow that other fork. That's the road I usually take." We passed a mill, then another mill, a bakery, and a cabinet shop. I guessed left at the next T. Lindsay guessed right. Turning left, I lectured my captive student on Amish history, beginning just after Luther's 95 theses in 1521, then Zwingli and the Anabaptists, the Muenster rebellion, and a brief synopsis of the lives of Menno Simons and Jakob Ammann, and why the Amish split from the Mennonites. Lindsay stared raptly out the passenger window.

"Look Mr. Sieling, There's Melvin's house! Your extractor is still in the yard. Maybe we should ask directions."

"Don't be silly. I have a human GPS in the car."

"I think you should ask directions."

About a mile further, a man was guiding a draft horse pulling an ancient diesel engine on a hay wagon. I rolled down my window. "Do you know where the store is?"

He grinned. "Ya, I guess I do. Turn around and go one mile. You'll see a barrel that says, 'barrels for sale'. That's the store. It sets quite far back from the road."

We found the "barrels for sale" sign next door to Melvin Yoder's house. The extractor was still in the yard.

Lester, the proprietor, stood bare-foot in the driveway, talking to a customer. He paused and asked, "What are you looking for?"

"A hat," I answered.

"First trailer on the left." He turned back to his first customer. I found several stacks of straw hats in flat and round tops. Lindsay thought I looked stylish in a round top hat. I rather fancied the flat top, but have learned that in matters of style a wise man should generally defer to the woman.

As we left, Miss Know-it-all said, "You probably should have asked directions to the field day."

"Thanks for suggesting it now."

"Let's turn here," she said.

"We already tried that one."

"No we didn't."

"Yes we did."

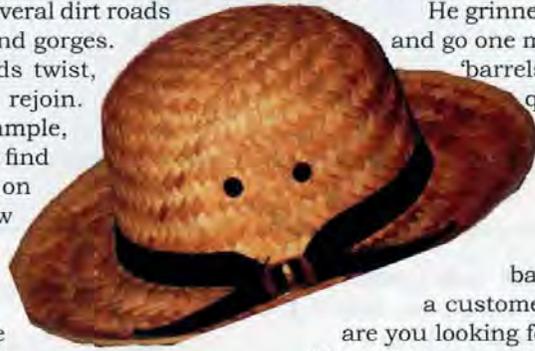
"Whatever you say, Mr. Sieling. You're the driver."

I turned. We descended through a wooded glen and found our destination at the bottom, arriving at the field day an hour late. The other beekeepers hunched over one of Doug Schroeder's hives, looking for the queen.

"You're late." Doug scowled, crushing a queen cell with his hive tool.

"We got lost coming over the hill. My GPS malfunctioned."

"You drove over the hill?" Doug looked astonished. "I knew a guy that tried that a few years ago. He never returned." **BC**



An Informal, Educational Honey Show

This month's meeting of the East Cupcake Beekeepers Association is going to be fun, interesting and educational. The beekeepers decided to invite the West Gumshoe Beekeepers Association to participate. The theme of the meeting is a Honey Show. But this show will not be a fierce competition but rather one in keeping with the ancient tradition of agricultural shows.

Agricultural shows have a centuries-old history. They originated as a way for farmers to present their wares for market. Livestock and crops were to be shown to prospective buyers. Today we call it advertising. And we do that in many modern ways. So a honey show is really about your ability to produce a clean, attractive product in a suitable clean container filled to give the customer the correct amount of honey. That is your goal. A honey show gives you the opportunity to see how well you are preparing your honey for market.

Your market may be just relatives and friends or it may be various small and large stores; it could be in small sample jars or bulk in pails. No matter the size of your honey business, your customer deserves a first-prize product.

Take a minute and think about your visits to grocery stores where you buy fresh fruits, vegetables, bottled and canned goods, bread and potato chips in plastic bags. Do you really buy a peach that has gone all squishy, a jar of sauce that seems a bit sticky, a badly dented can, a bag of potato chips that seems to be mostly crumbled bits? I don't think you do.

So let's get ready for the meeting. You do need to find a refractometer and a polariscope. Perhaps someone in the two clubs has such. Refractometers can be expensive but some are available for a reasonable price. A polariscope can be easily and cheaply made. It is a worthwhile item for a club to own or shared with another club. If several

of these two are available it will speed up examining the honey.

You can obtain the polarizing film from the following: Edmund Optical. Go online to www.edmundoptics.com; put brown polarizing film in search box, open Visible Linear Polarizing Film (first on the list that appears) and scroll to Product NT70-887, 8.5 inches X 18.5 inches, brown

polarizing film, \$26.00. Cut it in half crosswise to give you the two pieces you need. Then you need a light bulb, a fixture to hold the light bulb, a piece of lamp cord for the light fixture and a plug. The basic holders for the film and support for light fixture can be made from scrap wood, although I have seen some fancy ones made from cabinet-grade wood.

Get a big box of plastic coffee stirrers from a grocery store and bring some things to wash off and dry the refractometer between samples. It can be a good idea to have some water handy in case of a spill. Actually honey seems to be able to get everything around it sticky the second you open a jar. Never figured out how it does that. At the end of the

meeting please leave your meeting room clean so you will be able to use it for future meetings.

By October everyone should have harvested honey, except possibly first-year beekeepers. They should be encouraged to come so they will know how to prepare their honey for sale in following years.

Everyone, including those running the meeting, needs to bring a container of this year's honey. The easiest container to judge is actually a one-pound queenline type glass jar. If such a container is not available perhaps the club could purchase a case or two of queenline type glass jars to provide one jar for those who never use them. The jar, of course, can become the show jar and used by the member each year.

The meeting should open with a brief explanation of



A polariscope is easily made, and the required polarizing sheets are available. See text.



Hand held, and now digital refractometers are available.

the actual purpose of honey shows – preparing a quality product for market. Then an explanation of the purpose of the refractometer and polariscope can follow. The correct fill of the jar is important so explain that it is one of the criteria to be examined.

Have the participants examine their jars for cleanliness. Anyone have a sticky jar? Oh oh. Dinged or dirty lid? Not good. Every jar is clean and the lids are perfect? Applause, please.

Now the fun begins. And the education, too. Some members can start with refractometer readings while others start with the polariscope. After these two plus the fill of the jar have been done then the jar of honey is ready for tasting. Now you know why a big box of plastic stirrers is needed. The amount of honey that clings to them is just right to taste the flavor but not dull the taste buds.

When a jar is opened for refractometer reading, have the beekeeper note the surface of the honey. This is the time to notice bubbles and foam on the surface. If a jar is found with significant foam on the surface, here is a good start for the educational part of the show. It can be pointed out that beekeepers know that the foam is really honey but to a customer foam means something else – perhaps the honey has “spoiled.” Remember, always, the customer is not a beekeeper and is not familiar with extracting and bottling procedures.

Have the beekeepers look at the honey coating the underside of the lid. Does anyone see tiny black dots? Ask for a few guesses about the source of the tiny black dots. Chances are that nobody will guess they are soot from the smoker. Suggest better ways to remove bees from their honey.

Let's hope that at least one of the honey jars will have honey close to 18.6 or even higher and another jar with honey around 14 or 15%. Everyone gather around! Use one of the stirrers to demonstrate how really thick the low moisture honey is. Ask them to imagine spreading it on a biscuit or piece of toast. Now the participants can realize that a moisture content of around 16.5 to 17.5 is a good, marketable thickness for honey.

If you are lucky enough to find a jar with honey above 18.6 it is time to have a short discussion about natural fermentation that can occur when the water content is too great. Questions to be asked include whether the honey was capped before extraction and if the honey was exposed to high humidity for a while before bottling.

Since this honey show is not a points-scoring one nobody is being penalized for too high or too low moisture content. Instead the results are the basis for discussion.

Be sure to thank the beekeepers who brought the honeys. They made a good contribution to the show.

Now for the polariscope. This device will show lint, bubbles, dirt including mysterious objects, and crystals of every imaginable size and abundance. It is really fascinating to see all these things brought to view.

No, a customer may not see the assortment viewed in the polariscope but small crystals can lead to the crystallization of part or all of the jar. Unless a customer is familiar with the natural crystallization of honey the honey may be discarded. You could lose a customer who thinks your honey “spoils.”

Actually crystals look very sparkly and pretty when viewed in the polariscope. It would be nice if the assortment of honeys brought demonstrates various crystallization patterns – a jar filled top to bottom with millions of tiny crystals, another with just a small amount, one with a few quite large ones on the bottom. Sometimes these few large ones can be seen without the polariscope. To a customer it's a foreign object in the honey.

Bubbles are also beautiful. They resemble small silvery spheres. Be sure the club members see the difference between bubbles and crystals.

Lint, appearing as some short streaks scattered about in the honey, is a good topic for a brief discussion. Did someone use a towel to dry the inside of the jar? Or perhaps incorrect material for straining is the cause. Another good educational topic.

Everyone has had a refractometer reading and a look at the secrets shown in the polariscope. Now it is time for a really fun part of the honey show. Tasting the honeys.

Even though member of ECBA and WGBA may live in the same general area, bee forage can vary greatly within those areas. You still have plenty of stirrers for tasting. Perhaps a pitcher of water and some cups can be available to sip between tastes.

Suggest the members vote for their favorite flavor. If sufficient strongly-flavored honey and sufficient mildly-flavored honey has been brought then two favorites can be chosen. So here is a possible final educational opportunity – if no one particular favorite has been chosen, it shows that there is a flavor of honey for everyone.

It's time to announce the topic for next month's meeting – a beeswax show. Yes, it's appropriate for the West Gumshoe Beekeepers Association to be the host. See you there! **BC**

Ann Harman is an expert at honey judging and running honey shows, around home in Flint Hill, Virginia and all over the U.S.

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GLEANNINGS

OCTOBER, 2011 • ALL THE NEWS THAT FITS

GM POLLEN & HONEY DON'T MIX

The European Court of Justice upheld the rights of beekeepers and consumers to keep honey free from GM contamination.

Europe's highest court ruled in Brussels that honey contaminated with genetically modified (GM) crops would need full safety approval and would have to be labeled as GM.

Environmental group Friends of the Earth Europe says the ruling opens the way for Europe's laws on GM crops to be strengthened.

"This is a victory for beekeepers, consumers and the movement for GM-free agriculture in Europe," group's food campaigner Mute Schimpf says.

Honey should remain free of contamination from the biotech industry. This ruling rewrites the rule book and gives legal backing to stronger measures to prevent contamination from the likes of Monsanto.

The court ruling confirmed that existing laws that allow traces of unauthorized GM contamination are insufficient and need revising.

The ruling was the result of a legal challenge from a German association of beekeepers who took the Bavarian government to court following the contamination of honey from a governmental field trial of Monsanto's maize MON 810.

The case was forwarded to the European Court of Justice, which was asked to rule whether honey containing GM-pollen is defined as a GM product and if any trace of a GMO in honey needs an authorization as a GMO.

The court said it does need special authorization before it can be sold in Europe.

The German beekeepers are seeking compensation for honey and food supplements that contained traces of pollen from genetically modified maize.

The beekeepers had their hives near site where the Bavarian government was growing MON 810 maize for research purposes.

In its judgment, the court observes, first, that the pollen in question may be classified as a GMO

only if it is an "organism" within the meaning of the directive and the regulation, that is to say, if it is a "biological entity capable" either of "replication" or of "transferring genetic material."

It ruled that since it is common ground that the pollen in question has lost all specific and individual ability to reproduce, it is for the referring court to determine whether that pollen is otherwise capable of transferring genetic material, "taking due account of the scientific data available and considering all forms of scientifically established transfer of genetic material."

The court concluded that a substance such as pollen derived from a variety of genetically modified maize, which has lost its ability to reproduce and is totally incapable of transferring the genetic material which it contains, no longer comes within the scope of that concept.

It ruled that products such as honey and food supplements containing such pollen constitute foodstuffs which contain ingredients produced from GMOs within the meaning of the regulation.

In that regard, it found the pollen in issue was "produced from GMOs" and that it constitutes an "ingredient" of the honey and pollen-based food supplements. It ruled pollen is not a foreign substance or an impurity, but rather a normal component of honey, with the result that it must indeed be classified as an ingredient.

"The pollen in question consequently comes within the scope of the regulation and must be subject to the authorization scheme provided for thereunder before being placed on the market," a statement says.

It said the authorization scheme for foodstuffs containing ingredients produced from GMOs applies irrespective of whether the pollen is introduced intentionally or adventitiously into the honey.

Last, the Court ruled the authorization obligation exists irrespective of the proportion of genetically modified material contained in the product in question.

Alan Harman

ABF TO GATHER IN LAS VEGAS IN 2012

Plans are underway for the "Luck BEE a Lady" 2012 North American Beekeeping Conference & Tradeshow, Jan. 10-14, in Las Vegas, NV. The annual meeting of the American Beekeeping Federation (ABF) is sure to be the conference you won't want to miss. And with an anticipated attendance of more than 600, beekeepers from all over North America and beyond will gather to share ideas and develop new contacts.

The conference promises to offer something for everyone, including many opportunities for learning, networking and socializing. From the new small-scale beekeeper to the seasoned professional, conference organizers have planned a schedule to incorporate educational sessions at all levels. The tradeshow, as always, will feature the latest and greatest deals and new products.

The conference will be held at the Rio All-Suite Hotel & Casino. The ABF has negotiated a discounted group rate for all conference attendees of \$109 per night single/double occupancy plus tax. The ABF is excited to be in Las Vegas, the city that attracts more than 36 million visitors a year by offering the grandest hotels, the biggest stars in entertain-

ment, the highest caliber of award-winning chefs, the brightest lights – and, now, the best beekeepers!

The conference will begin on Tuesday evening with a complimentary welcome reception for all registered attendees. Wednesday morning will kick-off with the Opening General Session followed by Shared Interest Group meetings, and then finish in the evening with the traditional Honey Queen Reception. The 2012 American Honey Show will also take place on Wednesday.

The tradeshow opens on Wednesday afternoon and remain open during conference hours until 1:00 p.m. on Friday. Thursday and Friday will be dedicated to general sessions, as well as the always-popular and well-attended Serious Sideliner Symposium. Interactive workshops will take place on Saturday morning. In addition, the ABF will host its annual banquet during the conference.

Registration rates, online registration and hotel reservation information is now available on the conference Web site at www.nabeekeepingconference.com. Be sure to check the Web site often as additional conference details will be posted as soon as they are made available.

RAPID REFILL FILLS BEE FRIENDLY FARMS' COFFERS

Partners for Sustainable Pollination (PFSP) applauded Rapid Refill as for its contribution of nearly \$4,000, the largest single contribution received by the young nonprofit to date, as part of a national campaign involving Rapid Refill's customers in supporting PFSP's efforts to help honey bees through the Bee Friendly Farming™ (BFF) initiative.

We are honored that Rapid Refill chose PFSP as its nonprofit partner in the company's nationwide "Empties for Earth" promotional partnership," said PFSP Executive Director Kathy Kellison. "The corporation's national outreach provided a huge boost to our efforts to expand the BFF™ initiative across the nation and increase public awareness about the challenges facing beekeepers

and our precious honey bees—and ways to help them."

"We believe that there are so many small yet significant steps caring customers can make every day to conserve and preserve our precious resources," said Jason Block, President of Rapid Refill. "Returning printer components to keep them out of landfills, planting native species to keep bees strong and then reaping the rewards of our work together in an abundant harvest all keep us connected to the natural world. Our customers really responded to this effort, and it was a team effort to make this succeed. When challenged, most people understand the interconnectedness of their actions and the natural world

Continued on Page 75

P.E.I. GETS GRANT

The Prince Edward Island government announces a C\$100,000 grant to aid the recovery of the honey bee industry on the Canadian island province.

Agriculture Minister George Webster says the grant was made because the honey bee industry is an important link in the province's agriculture industry as it provides pollination services to a variety of crops such as blueberries and canola.

"Improving the viability of the honey bee industry can have dramatic impacts on yields in blueberry production," Webster says.

"The honey bee development initiative, which focuses on enhancing breeding, skills training and beehive tracking will be instrumental to the long-term viability of this industry and the crops which it impacts."

The honey bee initiative involves four segments.

- The expansion program will foster the commercial development of the honey bee industry on P.E.I. Applicants must make their honey bee colonies available for pollination services within the province to support the increasing demand for honey bee colonies by the wild blueberry industry.

- The skilled labor program will support training for existing employees or new employees of commercial honey bee operations who show potential for increased effectiveness within those operations. This training will help disease identification and management from becoming limiting factors which result in poor health of the colonies and eventually high overwintering losses.

- The genetic stock selection pro-

gram encourages local beekeepers to select their best stock and then propagate that stock to the point where strong queens may perform well under local conditions.

- The colony tracking pilot project assists with the implementation of an integrated honey bee colony tracking system using modern tracking and records management technology. This will result in better knowledge of disease status, hive management and ultimately increased hive numbers within the province.

Webster says the wild blueberry industry in the province has been under expansion for several years. The increased acreage has dramatically increased the demand for honey bee colonies to the point where P.E.I. has a heavy reliance on bee imports from Nova Scotia.

It has been difficult for P.E.I. beekeepers to keep pace with demand to the point where the blueberry industry imports close to half its colony requirements annually to pollinate the crop. Blueberry pollination services cost growers upwards of \$700,000 annually. Effective pollination ensures growers obtain maximum yields.

Webster says the honey bee industry has faced many challenges in recent years. Increased pest and disease pressures, high overwintering losses, and a lack of local genetics and skilled labor have hindered expansion within the province.

"This is another example of the provincial government working in partnership for a proactive and profitable agriculture industry," he says.

Alan Harman

Bee Friend Farms ... Continued From Page 73

and will respect the resources we use every day."

The BFF™ initiative recognizes farmers and other land managers—from gardeners and schools to public lands—who provide safe, natural forage for bees. Consumers can reward Bee Friendly Farmers by purchasing their products bearing the BFF™ logo. The BFF certification count recently topped 100, with at least one certification in each of 28 states across the nation. An updated BFF map can be accessed at <http://pfspees.org/BFFMap.pdf>.

"We look forward to working with PFSP in the future as it continues the important quest of facilitating optimal environments to grow and sustain bee populations." Said

Rusty Hurley, Rapid Refill's Vice President of Operations. With headquarters in Minneapolis, Minnesota, the Rapid Refill chain of stores is already known as a sustainable retailer who remanufactures ink and toner cartridges to keep durable products out of America's landfills. A locally owned franchise is located in Santa Rosa, California.

PFSP is a volunteer-based non-profit headquartered Santa Rosa, California that is dedicated to improving the health of honey bees through a collaborative approach involving beekeepers, growers, scientists and land management agencies, with a concurrent objective of contributing to restoring native pollinator populations.

They Didn't Have One Already???

BASIC BEGINNER'S COURSE

The UK beekeeping industry is introducing the country's first regulated beekeeping qualification.

The British Beekeepers Association (BBKA) and Lantra Awards, a UK awarding and accrediting organizations, are creating the Level 1 Award in Introduction to Beekeeping.

They say the aim is to provide a sound industry foundation to learners who are entering the industry or seeking to formalize existing experience. The qualification will give learners the skills and knowledge they need to make the craft of beekeeping a sustainable activity and improve the quality of beekeeping.

"This new qualification is a huge step forward in the vocational training of beekeepers and will support the UK's food production in the future," says BBKA chairman of education and husbandry Chris Deaves.

The qualification offers:

- An outline of the biology, life-cycle and behavior of the honey bee, including interaction with plants and crops.

- An introduction to the appearance of a healthy hive, the basic indications of serious pests and diseases,

and how to manage infestations.

- An introduction to the hygiene of a honey bee colony, techniques to prevent the transmission of disease and the management of equipment.

- Practical beekeeping skills, including the set-up and use of equipment and the interpretation of the colony, and seasonal skills such as winter preparation, spring growth, swarm management and honey production.

- Skills for dealing with the removal of honey from beehives and the extraction and preparation of honey for sale.

- General health and safety advice for the hive, equipment use, how to deal with bees and skills for record keeping and customer service.

Lantra Awards Head of Product Development Lesley Barr says it is important that the future of beekeeping is safe-guarded by individuals with the skills to take care of the UK's honey bees.

"This qualification is designed to cultivate the next generation of beekeepers so now is the time to take your beekeeping career or hobby to the next level," he says.

Alan Harman

SERBIAN BEE JOURNAL FEATURES TWO BEE CULTURE AUTHORS

In the July – September issue of Serbia's Journal Of beekeeping, Editor In Chief Ivan Umejić featured two *Bee Culture* authors. First, they published a long interview with *Bee Culture's* Editor Kim Flottum, asking question on how he got started in bees, the recent rise of urban beekeeping, how the electronic edition of the magazine was faring, the most recent edition of *ABC*, and about the three books he has published. Several photos accompanied the article. Later in the same issue, they reprinted an article by Jennifer Berry, first published in *Bee Culture*, on the value of replacing old comb to rid colonies of contaminants.

Editor Umejić also shared several spectacular honey bee photos taken by his father that will be featured in *Bee Culture* later this year. Beekeeper to beekeeper...that's what these journals are all about.



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never dreamed I'd meet the world's most famous beekeeper, or that he would be so likeable.

It happened this Summer at the first of my weekly bee seminars on Aspen Mountain. I work as a "ranger" on the ski hill, and my boss thought a bee talk might be an interesting diversion for the tourists who ride the gondola to the top of the mountain for lunch, a bluegrass concert, or an alpine hike. It was a gamble. Who knew how popular this might turn out to be?

I was scheduled to begin my talk at 11 a.m., but by twenty past, no one had showed up. I was about to give it up when a family of four walked into the ski patrol shack – two teenage girls, an attractive woman of 45, her husband perhaps 10 years her senior. The woman approached me and in accented but perfect English said, "We're here for the bee seminar."

Eureka! I had a class! "You're in luck!" I said. "I'm your teacher, and you're my only students!"

"Excellent," she said. "My husband does not speak English, so I will translate for him. He is the president of the Brotherhood of the Ukrainian Beekeepers."

The few hairs left on my bald head tingled. I locked eyes with the man. I instantly recognized him. There was no doubt.

"Your husband was also the president of the Ukraine," I said.

"Yes," she said. "He was."

He smiled at me, and extended his hand.

And so it was that I met Victor Yushchenko. You probably know all about him. Everybody does. May I refresh your memory?

The year was 2004, and beekeeper Yushchenko was running for president of the Ukraine, when events took a most bizarre turn. Someone poisoned him. He survived, but his face became grotesquely transformed from "chloracne," chemically induced acne. The press dutifully sent his caricature of a mug shot round the world.

The Ukraine – and the world – was electrified. Rumors swirled. Who could have done such a dastardly deed? Could it have been his principal opponent, Russian-backed Viktor Yanukovich? Might it have been the KGB?

The toxicologists reported that his body contained massive amounts of TCDD, a potent form of dioxin – a key ingredient in the defoliant Agent Orange, used by American forces in the Vietnam War.

A run-off election took place in November, with Victor Yushchenko facing Viktor Yanukovich. The beekeeper Yushchenko led by a wide margin in exit polling but Yanukovich was declared the winner, amid widespread rumors of vote-rigging and voter intimidation.

Millions of Ukrainians took to the street in a series of non-violent sit-ins, protests and strikes against the election results, ushering in the famous "Orange Revolution." The Ukrainian Supreme Court ordered a re-vote, and under the watchful eyes of observers both international and Ukrainian, West-leaning beekeeper Yushchenko defeated Russian-backed Yanukovich on the day after Christmas, 2004, to assume the presidency of his country. He served until 2010.

I'm no expert on Ukrainian politics or even honey bees, really. What can a hack American sideline beekeeper tell the president of the Brotherhood of the Ukrainian Beekeepers about bees?

The correct answer is "not much." I explained how my little 80-colony operation works. I told him about important local honey flowers. I told him about my 10-hive beeyard almost under the gondola near the bottom of the ski hill. We talked about nosema and *Varroa*. I told him about our Colorado bears.

That took an hour. He asked a lot of questions. Then he turned the tables and told me about beekeeping in the Ukraine, the fifth-largest honey producing nation in the world.

Beekeeping has been an important part of Ukrainian culture and commerce as long as anyone can remember, Yushchenko explained. In 1814 his countryman Petro Prokopovych invented the first hive bodies with removable frames. Prior to this, Ukrainians marked "bee trees" to establish ownership, sometimes cutting down the trees to leave "bee stumps."

While large-scale "industrial" Ukrainian beekeeping operations employ the familiar Langstroth hive system, traditional backyard and sideline beekeepers

are more apt to stick with the "Ukrainian" or "Slavic" system, which uses 24 very large (29 X 43 cm.) frames. If I understood Mr. President correctly, this hive is not honey-supered. He feels this way of keeping bees is less disruptive to the little darlings, as it avoids squashing them as I often do when I super my Langstroth hives.

On a sheet of paper he illustrated Ukrainian hive types as he talked. "My husband is very artistic," Mrs. Yushchenko said.

He said the favored bee in his home country is the Georgian, noted for its calm demeanor. He waxed rhapsodic about honey bees in general, calling them "God's insects." He said we should "respect and love," not kill them. Gentle Yushchenko clearly has a love not only of bees, but of his country, and its traditional culture in which beekeeping prominently figures.

Finally he said, "Apimondia 2013 is in Kiev. I'm the host. You should come."

Me? Fly across the Atlantic Ocean practically to Russia for the biggest bee meeting in the world? Ever the thrifty traveler, I said, "How does the dollar fare in your country?"

"You'll be fine with your dollars," he said. "There will be a week of Apimondia and then a week of tours. You should come."

His wife Kateryna blurted, "I'll give you my personal e-mail. Write to me. I'll find you a place to sleep."

To say I was touched would be an understatement.

After we talked ourselves out, he kept shaking my hand. Odd the way those little darling honey bees sometimes bind strangers together, no?

Later, Kateryna wrote to me: "Our kids and I wanted to go to the top of Aspen Mountain, my husband did not. I went to the kiosk to buy tickets, and saw the sign about your lecture. I told him, and he immediately agreed – it was like an invitation for him alone!"

I walked the Yushchenkos to the door. I offered a lunch recommendation. I told them to be

on the lookout for my little apiary under the gondola. He shook my hand again.

I don't always think on my feet. We never posed for a photo. I never gave him a ski patrol ball cap. It never occurred to me to invite him to take a peek inside my Aspen Mountain hives.

The Ukraine . . . not a place I thought I might ever visit. And yet . . . a personal invitation from the Apimondia host and world's most famous beekeeper . . .

Think of it – Apimondia – the word rolls off your tongue. Imagine the sights,

the comradeship, the friends a beekeeper might make in Kiev.

I'm old now. Life's too short. Maybe I should do this.

Ed Colby



A Surprise Visitor