ANNUAL HONEY REPORT - 20

May 2012

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Bee Culture

The Magazine Of American Beekeeping

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Air Almond - 26

Almond Bloom Blog

ROOT PUBLICATIONS
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With colony rental prices in almonds in the $150/range, having colonies stolen, then re-rented to another grower isn't uncommon. The thief collects the rent and vanishes. Later, the grower is stuck with the abandoned colonies. These have an embedded micro-chip in 'some' of the colonies, and can be identified from a distance even if they are repainted later. (photo by Kim Flottum)

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Bee Culture

FEATURES . . .

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Contributor to Mother Earth News

Two-Day Queen Cells

I just finished reading the April 2011 issue of *Bee Culture*. Yea, you're right; I'm almost a year behind in my reading. But catching up fast.

The article by Joe Latshaw (pp 29-31) caught my attention instantly. You see, I've been raising my own queens since my first year in beekeeping. I didn't want to be just a person that keeps bees. Over the next nine years I made changes in my queen rearing practices as I learned more and more from books and magazines and seminars.

In January of 2010 I made the most drastic change. I incorporated a process that entails the use of two-day queen cells as described to me by Dr. John Kefuss (personal communication). He's the guy that originated the Bond Method for *Varroa* control, but that's another story.

For queen rearing Dr. Kefuss distributes the two-dayers (inventing a new word?) just as Joe Latshaw does. Where Latshaw puts the cells into cell finishers, Kefuss puts them directly into the splits.

Here is the procedure:

Day 1 – Graft the very young larva into queen cell cups. Install in cell starter.

Day 2 – Make splits as described by Jennifer Berry in the same issue, p.51-52.

Day 3 – Here is the kicker: Graft the two-day cell directly into the nuc (split).

Resist the urge to "have a look" before day 25.

What is really important is the bees will "finish" the queen cell just like a "cell finisher" will do. And they have only one cell to worry about. Because the bees finished the cell by themselves there's a high level of acceptance.

Sanuel Atsaides
Rhodes, Greece

Sweet Corn Protection

I just read Kathy's blues about losing the battle with raccoons over sweet corn.

An effective cure – one line of electric fence, 18" off the ground. Add aluminum disposable pie plates, or fold over foil between alternate fence posts. Smear some peanut butter on them. Electrify! Raccoons investigate everything with their little black palms or nose, which transmit electricity quite efficiently. No more corn coon cuisine. Also effective on deer.

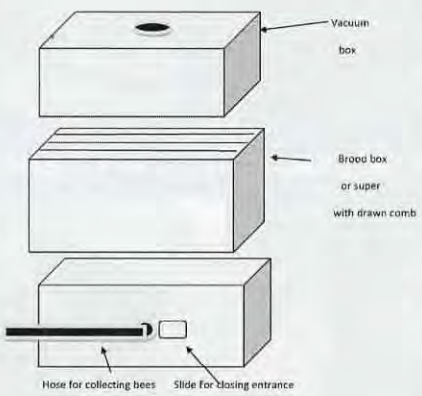
Michael Huebert

Empty Lot Beekeeping

In no way do I wish to criticize your correspondent regarding his bee vacuum as I'm sure a lot of thought went into making it but I thought your readers would like to see the one I have made and have been using for 20 plus years. I feel it is easier to use and is much easier on the bees.

It consists of two parts, i.e; two trays to fit above and below a Langstroth brood box. The trays are 4" deep. The top one contains the vacuum, or takes a hose from a vacuum cleaner and the bottom one takes the hose for collecting the bees. In between is placed a brood box with drawn comb. These are strapped tightly together. The bees enter through the hose at the bottom and go straight onto the combs. The equipment is then left for a short while to allow the bees to settle. It can then be placed next to where the swarm is to go, the strap removed and the brood box placed on a floor, the top tray removed and replaced by a roof. Job done. Or the bees can be left in the box with the bottom slide open from which they can fly until the beekeeper has time to deal with them.

P.G. Newton
Peterborough, England



AIA Resolutions

The Apiary Inspectors of America (AIA), exists for purpose of protecting he health and welfare of honey bee colonies in the United States. This year's resolutions:

• Be it resolved that the AIA, at its annual meeting on February 10, 2012 hereby expresses concern and requests the U.S. Environmental Protection Agency (EPA) re-evaluate the protocol used to assess the risk of pesticide chemistries on honey bees, with particular interest in the potential sub-lethal and synergistic activities of pesticide chemistries under field conditions, and take such action as needed to understand the activity of pesticides on all life stages of honey bees and to provide adequate protection of honey bees in the U.S.

• Be it further resolved that AIA would like to work cooperatively with the EPA and USDA in an effort to exchange knowledge regarding honey bee health concerns, and in the development of pesticide registration protocols affecting honey bee health.

• Be it resolved that the Apiary Inspectors at its annual meeting :

•Urgently requests USDA, both APHIS and ARS, to fund and continue to implement surveys of honey bee colonies not only for *Tropilaelaps* species, but for virus complexes, *Varroa* species and their variants as well as other organisms capable of adversely affecting honey bee health.

•Such survey should continue to utilize current infrastructure among cooperating state agencies to collect and prepare samples for USDA analysis. Therefore, assum-

ing state cooperation in supplying in-kind services utilizing current personnel, AIA requests that adequate funding be budgeted and approved for this much needed baseline survey.

Paul Poling
WV Dept. of Ag, Hambleton, WV

Progressive Hopguard Use For Varroa

I write this letter from a personal view point and observations I've made using the product called Hopguard. Many of my observations were also confirmed in talks with other beekeepers.

I'm a hobby beekeeper living in the Klamath Basin of Oregon. I not only maintain my own hives, but also hives owned by an organic farm near Weed, California. The climate out here is crazy. We are at 4200 feet of elevation with dry summers and long winter. This region is considered high desert, and we are surrounded by wonderful Ponderosa pine trees. We have over 300 days of sunshine and very little rain. Summer is usually six months without any rain. Winters can be cold and sometimes bring lots of snow. A normal Winter can have three inches or six feet of snow. Night temps can go below 0 in Winter. Summer highs can be low 100's. Temperature swings of 50° are not uncommon. Beekeepers here joke about the climate and call it the two season zone: Winter and warm Winter. This climate has defined the type of bees and equipment I use. I have Carniolans and use eight-frame equipment.

Hopguard is a new product on the market to treat honey bees for *Varroa* mites. It can be used with honey supers on the hive, but should not be used over honey super frames. It is not temperature dependent, which makes it ideal for those living in colder climates. Ideally you treat in Spring and in Fall, but you can add a Summer treatment, if needed according to the manufacturer BetaTec.

It's plus side is that it is of a food grade product, meaning you do not need to wear a respirator or have to take other major precautions when using and handling it. This product is presently added to human foods, and in beer making particular. Hopguard consists of paper strips soaked in a hops based product called potassium salt of hop beta acids. Recommended personal protection is eye wear and plastic gloves. You do not want this to get into your eyes, and the gloves keeps the sticky mess off your hands. Disposable gloves are perfect for applying this product.

Hopguard is a soft treatment option and does not get the mites in the closed brood cells. It does not contaminate the wax, but it will stain wooden ware. Normally you use two strips for each deep brood box of 10 frames placed in opposite sites over the 3rd and 6th frame. You don't remove it and let the bees clean it up. The bees will walk over the product or brush on it with their bodies and carry it throughout the hive. Most mites drop in the first 24 hours, and the strips are most effective in the first three days. It is supposed to last in the hive for three weeks.

I did apply Hopguard on all my eight-frame hives, by using two strips per deep. Prior to usage I did a drop mite check using a sticky board. I did not count the exact number of mites, but rather just took an overall look. The weakest hive had about twice as many and also noticeably less bees inside of the hive.

I've observed after a week that strips appear dry or have been completely removed by my Carniolan bees. A very strong hive may be done with it in as little as five days. You may find some fluffy left over on the bottom board, but most of it will be right in front of the hive, if not blown away. The photo shows a one week old left over strip which was left by my weakest hive, and some of the fluff you find. The weakest hive has less population so this accounts for some being left over.

I believe regional climates and hygienic behavior may have an impact on Hopguard strips, and its usage requirement. Mites rebound fast if not caught in a full breeding cycle. With other words, if your strips are gone in a week, you might as well have just powder sugared your hive daily for a week. You end up with a temporary knock down only. Because of this it may be a good idea to use the 'progressive' treatment option I call it.

In the progressive treatment you replace the strips every week over three weeks to have the best treatment effect. I have done this in my eight-frame hives, where I placed two strips per deep and replaced them weekly. My hives do have screened bottom boards, which I close off during treatment.

The bees took the Hopguard treatment very well, showed no signs of aggression, no bearding, or slowing down of the queen. At times it seems that they enjoyed this treatment. As crazy as this sounds, I did put in the strips and they were all over it before I was done with the hive. They remained calm during application so I don't think they really saw this as a poison or harsh chemical. They have never moved away from the product. My hives did smell like a brewery in fall when they were fermenting their pollen into bee bread, perhaps the active ingredient resembles that smell to them. I did check the mite drop during the first 24 hours of application and the amount of mite drop was quite impressive. The weakest hive dropped about twice as many as the rest.

The progressive treatment option does make it more expensive then some of the other treatments out there. A hive with two deeps will cost you about $7.20 to treat over three weeks, so commercial beekeepers may not use Hopguard unless it's price comes down. It's ease of use does make it worthwhile. I sometimes wonder if this product can be made available in a tube as a gel to put over the frame bars. It may be easier to apply this way.

Interestingly I've also noticed dead red and black ants on the bottom boards while using Hopguard. Apparently kills them too. Sprinkling cinnamon seems to deter the sugar ants, but does not have equal effects on the larger black and red ants that rob the bees of their honey and pollen stores.

Preliminary reports also show a positive effect on treating American and European foul brood, and even chalk brood with Hopguard. It is promising but further studies are needed. In the meanwhile BetaTec has applied for patents using Hopguard for both European and American foulbroods.

It is now the first day of spring in my apiary and we have gotten five inches of snow over night. Did I mention crazy mountain climate? The grass was green yesterday and the bees were flying. My weakest hive would have not made it through the Winter without some form of treatment. I happily report that it is now a very strong hive, which I contribute to this treatment method. Overall I like this product, and will continue with the progressive treatment option of Hopguard.

Katharina Davitt
katharina@davitt.com

Using Liquid Smoke

Kim I need help. I started bee keeping five years ago and I love it. I have 30 hives and enjoy every moment in them. I can talk till the cows come home as they say about my girls. I have read everything I can get my hands on, but I have read nothing about the use of the liquid smoke product.

The reason I am asking is I guess I have some lung problems I hate to admit it, they have developed as I have gotten older. But I have had a very hard cough that has gotten worst and shows up when I use and light my smoker. I have started using a mask to try to lessen it but it is not to successful. How well does the liquid smoke work and is there any other product that can help someone with diagnosed pulmonary problems. I have to find a way cause I ain't quitting bee keeping.

Tell me where to start or if there is someone who is having the same problems and has an answer.

Charles Brock

Reponse *– Many beekeepers in California use Wright's Liquid smoke, diluted in water, as their "smoke" in the Summer. It is bone dry around here, and we can start raging wildfires very easily. When I came to California, I was amazed at how docile our bees tend to be during Spring and Summer, so the little bit of liquid smoke smell is all we need to keep things under control. That may not be the case where you operate.*

Liquid smoke still contains some of those pungent amines that are part of the odor of real smoke (from which it is distilled) and of American foulbrood odor. The smell of liquid smoke can be "felt" on the back of your throat if you smell the concentrate, so please try the dilution out gingerly, when you are not around the bees.

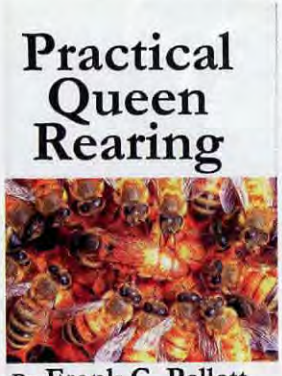
I'm not sure that there is a truly specified concentration that is used, but one beekeeper says use one ounce of liquid smoke concentrate in a Windex type sprayer, mixed thoroughly with enough water to fill the sprayer. Two sprays are supposed to do it.

I hope this helps a bit.

Eric Mussen
Extension Apiculturist
Davis, CA

New For All Beekeepers –

The following four books are published as reprints with new typesetting by X-Star Publishing Co. and are available from Amazon. All are printed on offset paper and are black and white only, dimensions are the same for all at 6" x 9". Each has had some additional information added, on the author(s), the original edition, the translation or other material, provided by Michael Bush, who, it seems, has found a calling by finding and making again available these historic texts.



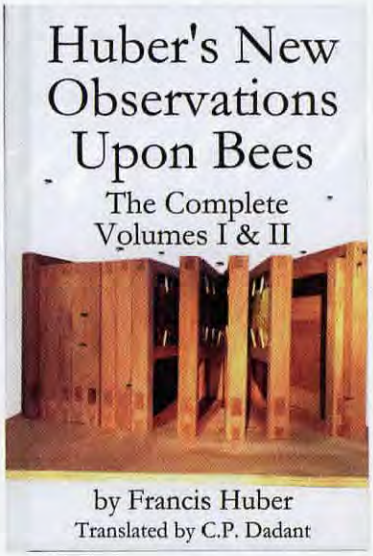
Practical Queen Rearing, by Frank C. Pellet, originally published in 1918. ISBN 9781614760573, 125 pages, $17.

A review of several methods of queen rearing. All original plates plus two. Pellet wrote extensively for the *American Bee Journal*, on honey plants, but history of beekeeping, the business of beekeeping and on queen production. He was, truly, one of the pioneers of American beekeeping.

Classic Queen Rearing Compendium, by Doolittle, Miller, Alley, Smith, Hopkins and Pellett, with an overview by Michael Bush. ISBN 9781614760597 700 pages. $54.

This is a 700+ page book that is a collection of several excellent books, and summaries of books on queen rearing. It contains all, or the best from Practical Queen Rearing, Pellet; Scientific Queen Rearing, Doolittle, The Alley Method, Alley; The Miller Method, C. C. Miller; Queen Rearing Simplified, Jay Smith; and Better Queens, Jay Smith.

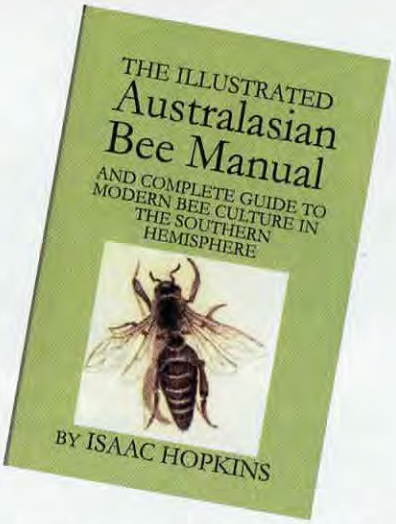
Huber's New Observations Upon Bees. The Complete Volumes 1 & 2, as translated by C. P. Dadant. 674 pages, 149 illustrations. Includes illustrations not in many translations. A memoir of Huber by Professor De Candolle. ISBN9781614760566 $49.



Huber, as you may, or may not know was the blind scientist who studied bees with assistance of his student, Burnes and his wife. His observations, experiments and notes were, and to a great extent still are the foundation of what we study as honey bee biology. His best known, but certainly not most important contribution to the science of apiculture was his invention for study of the famous leaf hive.

Wasp and Bee Management. A common-sense approach. By Jody Gangloff-Kaufmann. Published by PALS Publishing Book Catalog (formally NARES). 88 pages, full color, spiral binding, 5" x 8". Soft cover, ISBN 978-1-93395-22-7. $14.00. Available at **www.NRAES@CORNELL.EDU**. 607-255-7654.

In-depth reference based on integrated pest management principles, including detailed wasp, hornet, yellow jacket and bee species identification. The author discusses the risk for stings, swarms, and property damage and non-chemical recommendations given when appropriate. Useful for landscapters, homeowners, schools, and obviously pest management businesses. 60+ color photos, profiles of 22 wasp and bee species, trap-assembly (especially useful) instructions, seasonal management task checklist, common species identification in appendix, and a through list of resources. If you are in the bee business...removal, management or identification you will not find a more useful, up-to-date resource.



The Illustrated Australasian Bee Manual and Complete Guide to Modern Bee Culture in the Southern Hemisphere. Isaac Hopkins, New Zealand. Fifth Edition, published 1911. 187 pages. ISBN 9781614760580. Hard Cover, black and white throughout. $29.

A most influential book for New Zealand and Australian beekeeping in its time, the Transcriber states that Hopkins presents in this version of the book on of the simplest ways of getting a lot so queens that also does not require a lost special equipment. This is known as the "Hopkins Method" of queen rearing. Topics range from very basic to practical sideline beekeeping.

Millerbees Feed Easy

The feeder is a wooden frame with aluminum screen sandwiched in the middle. The feeder is placed over the opening in the inner cover. The bottom side of the frame is 3/8 inch thick for the bees to access to the syrup of both jars. Two quart jars fit in the feeder. When refilling bees are trapped under the screen, robbers, small hive beetles, wax moth or roaches can't get to the feeders, and there's still good ventilation. Find out more at Millerbees Manufacturing, 152 Calm Cove, Anderson, SC 29626

The Bee Garden

The Bee Garden includes a 16 page detailed planting guide and the following 8 House of Bees flower and herb seed packets:

- Phacelia - *Phacelia tanacetifolia*
- Catnip - *Nepeta cataria*
- Lemon Mint - *Monarda citriodora*
- Purple Coneflower - *Echinacea purpurea*
- Bachelor's Button - *Centaurea cyanus*
- Coriander/Cilantro - **Coriandrum sativum**
- Lemon Balm - *Melissa officinalis*
- Borage - *Borago officinalis*

This collection is perfect for backyard beekeepers, fruit growers and gardeners who want to encourage more pollinators to their yards.

Packaging details – The Bee Garden includes eight individually packaged seed packets in a 6x9 envelope. The Lemon Mint, Lemon Balm and Catnip contain 500 mg of seed. The Purple Coneflower contains one gram of seed, and the Phacelia, Borage, Bachelor's Button and Coriander contain two grams of seed.

Cost is only $10 available from **www.houseofbees.com**, and **www.laneyhoney.com**

J and B Creative Bee Ware

A collection of adult clothes, some kid's items and coffee cups, including men's T-shirts, ladies V-necked T-shirts, hoodies, sweats, tank tops, three styles of hats, a visor, kid's bibs, and coffee mugs, all with these designs. Check it out at **www.JANDBCREATIVE.COM**

INNER COVER

Some of the almond experience isn't dominated by photos or stories of heroic, or less than heroic beekeepers or growers or truck drivers. Some of it isn't shown by frames with lots of bees, or frames with no bees. Some is, simply, listening to those other people who make the almond crop work. People like Mel Machado, the Special Project Coordinator for Member Relations for Blue Diamond Growers. He's the guy who gets the update bloom photos on the web every week so everybody in the world knows what's going on in the almond orchards in the south, central and north sections. I wonder if he knows how much that no-small-task is appreciated? Or his sidekick Dave Baker, the Director Of Member Relations for Blue Diamond. Or Joe Traynor, a pollination broker and long time observer of this special annual activity. Or catch what Richard Tipton, an insurance agent for Pacific Ag has to say about all this, while trying not to sound like he's selling insurance at a beekeeper's meeting (he did a good job, just so you know). Or Dan Cummings, part of the force behind Project Apis m, an almond grower himself, and a past member of the The California Almond Board. Certainly listening to Richard Waycott would be necessary. He's the President and CEO of the Almond Board Of California.

Of course all of these folks have their own experiences, agendas, backgrounds, businesses, turf and piece of the sky to promote, protect and cover, but as a whole, those voices from the almond industry are pretty unanimous about almost everything when it comes to policy, promotion and growth. So alike, it seems, that it's almost scary. There are good reasons for this one-voice, and the beekeeping industry could well learn a thing or two from these people.

So what I'm going to do is ramble a bit...throw in a comment from somebody or other that fits the topic of the moment. And, since my conversations with all these folks were pretty much the same...I asked a lot of the same questions...the answers were all pretty much the same. It was interesting... sometimes like an echo, sometimes like a chorus, sometimes like a prayer recitation. So...from various sources, read some comments from an almond orchard....

A beekeeper from southern California who pollinates with most of his colonies...."Beekeeping is changing. Water is the issue. Climate is changing, and mites are running the show. Because of water orange honey isn't a factor in my business anymore".

Over several conversations, Joe Traynor mused about several subjects.... Have your contracts by July. Don't delay. That's so you know how much you can spend to get your colonies ready to go by February. Food, labor, more food. How much will you get paid, how much will transportation cost both ways, how many will you lose between now and then, and how much will you make on the remaining colonies, minus all the costs on the remaining colonies and the colonies you lost. Will you make more money than if you had stayed home and babied those same colonies and chased a honey crop instead? Are you just trading dollars?

When is the release date? This year it was later than usual from some orchards. And that meant a lot of trouble because spring was early in the Midwest and east coast. So beekeepers had bees in California chasing a dozen blossoms, and millions of apple blossoms were looking for bees on the east coast. No easy answer to that one, but it may be one more piece to the "Do I go next year?" puzzle. Almond growers want healthy colonies, and aren't happy when beekeepers deliver less than they expected, but at the same time there has to be some leeway in release dates, too. Honey is again becoming an attractive alternative to hauling bees west...and buying colonies in an emergency to fill pollination contracts is NOT a cheap experience.

It was interesting to note that most orchards had nothing growing between trees. No grass, weeds or anything growing. Some of that is because the floor has to be clean when harvesting nuts, some of it is because grass or weeds use water that needs to go to trees, and Dan Cummings, a 7000 acre grower, shared that grass between rows held the cold and the sun couldn't warm the soil surface. This in turn led to freezing temperatures lasting longer. Blossoms and small nuts are the most vulnerable to freezing temperatures...that magic 28°F is the one that does the damage.

Dan also talked about pollination as a cost of doing business, and an issue if it wasn't available. This past year pollination was running about 13 – 15% of his orchard's production costs. Coupled with that was the fact that although a 30% loss for beekeepers was a recoverable event, it was made so because pollination prices were so high. Almond growers have a vested interest in solving continued winter losses for beekeepers.

There was a referendum in California last winter brought up by several almond industry executives, where California beekeepers and almond pollinators were asked to contribute to a research fund administered by the CDFA. The donation was $1.00 per hive and it was defeated by the beekeepers. This had a ripple effect across the almond industry since they are heavily invested in

Almond Talk

paying for beekeeping research and actually thought beekeepers would help their own cause. The California Beekeeper's Association makes a substantial contribution every year toward their research fund, but this referendum also included beekeepers from out of state but who participated in pollination in California. The question I was repeatedly asked was – almond growers are helping beekeepers, why aren't beekeepers helping beekeepers? Some of the more critical Californians were a bit more pointed . . ."Beekeepers", they said, "are good at asking, but not so good at contributing." The bottom line, of course was that had beekeepers accepted the referendum, the cost of pollination would have gone up to cover that donation – the growers would have still been paying. That shortsighted action by beekeepers did not sit well with most of the growers I talked to.

One of the themes that kept creeping into discussions was the fact that the almond industry seems to be so well organized, while the beekeeping industry is all over the map. And, those who actually look at the situation have a reasonable answer. The almond industry is located in California's central valley...and only in California's central valley. They aren't in 50 states, they all have about the same weather, the same customers, the same government issues, the same everything. It's easy being the same. The California Almond Board runs a pretty tight ship and has managed to standardize much of what the industry does. Membership is mandatory, but they do great things with their money. The cost of doing business is that every grower pays $0.03/lb to the Board for its operation. Last year that came to about $52 million. 39% of that is spent on North American marketing, 31% on international marketing, 17% on administration, 10% on research, 2% on industry relations and 1% on regulatory affairs. Of the research dollars spent, fully 10% is spent on pollination – which, out of $5 or so million is a chunk of change.

California produces 80% of the world's almonds. Interestingly, per capita consumption of almonds in this country is greater than honey – honey is just a tad over a pound – almonds 1.57 pounds per person, per year. Kern County, where Bakersfield is located is the largest almond producing county – but receives the least amount of almond country rain in a year – on average 5.5 inches. They produce 403.5 million pounds of almonds there each year – followed by Fresno country at 344.5 million pounds. Everybody else pales in comparison.

This year there will be 1,950,000,000 pounds of almonds produced at about $2.00 a pound – that's $3.9 billion farm gate value – that's a B, just so you know (and in 2002, it was a one billion pound crop, just so you know). Almonds are the biggest, most lucrative food crop grown in a state known for its agriculture.

But here's a kicker. To get bees into California to pollinate those almonds, beekeepers have to pass through an inspection station at the border. There are several but none of them seem to have received the message that almonds are paying the way for California's agriculture. So at the border truck loads of bees are held under the October sun while an inspector checks the load. If something is found – and the list includes wax moth larvae, unknown weeds stuck to pallets, certainly fire ants – or any ant for that matter, small hive beetles or beetle larvae, or anything that's not a honey bee – it must be photographed and that photo sent to someone in Sacramento to be identified. Oh, the folks in Sacramento go home at the end of the day and they don't work weekends. So trucks full of bees sit in the hot October sun. And wait.

There's no water to cool the load at most of the stations so bees either cook or the truck turns around and goes home. Everybody, absolutely everybody loses...the beekeeper, a lot of bees, the almond grower, the tax man, the huller, the processor, the seller, the buyer...tell me, what's wrong with this picture?

Sometimes the evil insect or weed is identified in time and the driver has a choice...go home or go back to town and have the truck unloaded, the pallets and truck bed power washed for about $1500.00, loaded back up and checked again.

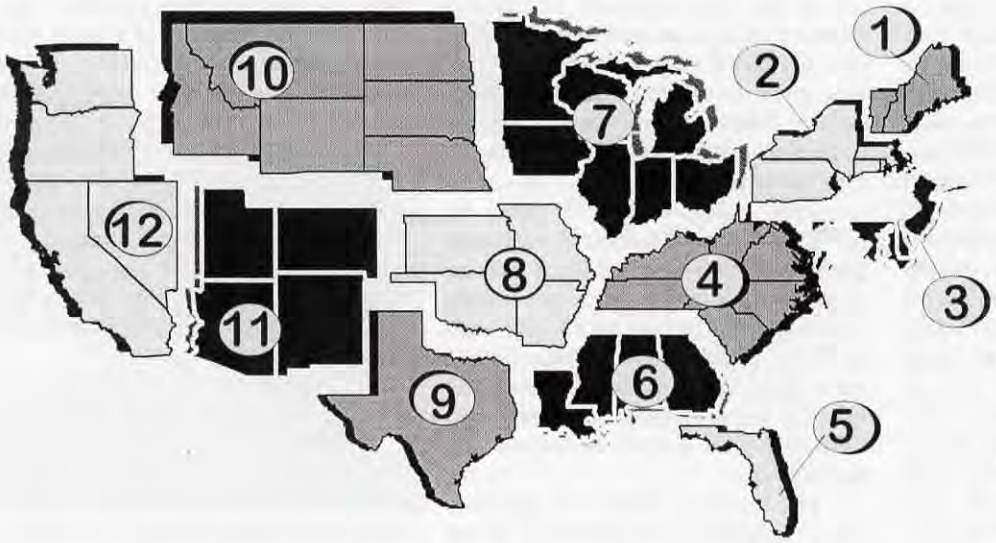
Now I know that nobody wants fire ants or baby-eating weeds in their orchards, but California pretty much has fire ants already – from both the nursery and beekeeping industries – and pretty much every weed known to man – and now they have the Citrus greening critter, too. Wouldn't you think that a state with the financial issues California has would take a broader view of this than they do? They are challenging a $3.9 Billion dollar crop because of a small hive beetle larva lying on a truck bed. And somebody asked, I don't remember who – what's the relationship between the guy who sends those trucks to the power washer, and the guy who does the power washing?

To round out this random discussion, I visited with Jeff Anderson, a California-Minnesota commercial beekeeper, Darrin Cox, another commercial beekeeper from Utah, and David Hackenberg, from Florida and Pennsylvania, about colony conditions this year. The past few years have had lots of mid-Winter crashes so the availability of strong-enough colonies at the time of bloom has been spotty at best, and downright short in many places. This fact has not gone unnoticed by any of the players in this game – growers, brokers, beekeepers with extra colonies, beekeepers with colonies that crashed, the Almond Board, Blue Diamond...and the folks in the federal government who have a vested interest in making sure there are enough bees. The Feds, you ask? Well, not directly, but think of this....When they call the people who are supposed to know if there are enough bees...why do they want to know?

If there are enough bees then obviously CCD is waning and the research dollars can be cut, pressure on pesticide companies can be relaxed, and they can get on doing whatever it is they do the rest of the time and not have to worry about all the noise those beekeepers are making, again.

This year...nope. Didn't happen. Colonies crashed. Yes, I saw them. And EPA officials came because they were called and told and asked and they looked and looked. And went home. And at the end of the day, there were just enough bees to do the job needing done. Just enough because somebody brought extra. Somebody bluffed, somebody raised, and somebody folded.

MAY – REGIONAL HONEY PRICE REPORT



Increasing production and pollination in 2012

We surveyed our reporters this month on what they think the coming season will bring relative to price changes in honey, demand for that product, plans on increasing, or decreasing production accordingly, and plans for pollination. The extremely erratic weather will absolutely have an effect on this season's crop, and shortages from Argentina, but increases from other countries will also affect the market. Last year's production was extremely poor, and stocks are minimal to buffer any shortages early in the season, or even later if there is another short crop this year. Too, the noose is getting tighter on illegal imports, with 8+ million pounds confiscated late last year and the importers captured. Those that were going to pack that honey, however, haven't been named. Once both doors are shut things may change, but nature abhors a vacuum, and without imports…due to shortages, crop failure or outright ban…there isn't enough honey produced in the U.S. to meet half or our requirements. Prices will increase.

Our reporters seem to sense this as none of them expect to lower prices this season…which may be a first for the beekeeping community. Being undercut by a competitor who doesn't know costs, and doesn't know the market is a perennial reality…up to now anyway. Fully 57% of our respondents will raise prices this season. Only 43% will remain at the same…but I wonder if they will as the season progresses when they see the shortages mounting.

I think expectations on demand will continue to change later in the season given the situations already stated, but already 63% our reporters think demand will increase, while only 37% feel it will remain steady.

Given these expectations, 57% of our reporters will increase production this year…if the weather lets them…43% will keep it steady, but nobody is reducing production this season.

As far as the pollination business is concerned, only 43% of our reporters do any pollination during the season. Of those, 16% plan on increasing prices this year, 72% will keep their prices the same as last year, and interestingly, 9% will lower prices to meet competition. I hope they know their costs when it comes to this business. But business is slowing…only 5% of those customers will require more colonies this summer, 82% will need the same number, and fully 13% are reducing their pollination needs this season.

Take a good look at the analysis (the only one in the business by the way) of the annual honey crop report in this issue, and plan your honey year accordingly.

	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	1.84	1.95	1.84	1.59	1.85	1.73	1.79	1.70	1.80	1.81	1.72	1.80	1.59-1.95	1.78	1.74	1.67
55 Gal. Drum, Ambr	1.69	1.71	1.70	1.55	1.70	1.61	1.74	1.70	1.60	1.75	1.61	1.65	1.55-1.75	1.67	1.78	1.55
60# Light (retail)	165.00	179.00	149.00	151.40	160.00	153.33	136.00	156.67	160.29	160.29	159.00	170.00	136.00-179.00	158.33	152.95	140.57
60# Amber (retail)	175.50	160.00	149.00	154.40	160.00	148.00	133.29	142.33	140.00	147.00	149.50	173.33	133.29-175.50	152.70	154.89	145.23
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	71.19	68.50	48.00	62.30	70.14	53.75	52.12	70.14	70.14	55.44	58.50	71.50	48.00-71.50	62.64	64.99	61.37
1# 24/case	102.07	80.00	105.45	79.92	114.00	92.09	83.51	91.60	72.00	109.60	95.10	121.40	72.00-121.40	95.56	86.94	84.53
2# 12/case	105.20	77.69	75.90	74.50	78.00	79.62	78.26	93.00	63.00	83.72	69.50	92.75	63.00-105.20	80.93	79.25	75.80
12.oz. Plas. 24/cs	97.49	95.00	74.20	72.60	93.60	72.42	69.44	79.60	66.00	68.04	84.00	81.80	66.00-97.49	79.51	75.60	72.65
5# 6/case	115.00	93.41	89.25	80.93	96.00	91.48	83.18	97.50	80.00	84.99	77.25	103.33	77.25-115.00	91.03	92.46	84.73
Quarts 12/case	120.00	114.25	142.00	110.00	102.00	98.88	111.12	105.00	138.98	127.65	107.15	141.50	98.88-142.00	118.21	111.49	113.10
Pints 12/case	63.00	87.65	84.30	70.33	68.00	61.13	71.38	69.70	70.00	81.50	65.25	79.67	61.13-87.65	72.66	84.67	74.95
RETAIL SHELF PRICES																
1/2#	4.18	4.35	3.12	3.69	4.04	3.33	3.08	2.89	4.04	3.41	3.76	4.60	2.89-4.60	3.71	3.62	3.52
12 oz. Plastic	5.50	5.15	3.46	4.08	5.00	4.42	3.63	5.10	4.00	3.93	4.49	5.50	3.46-5.50	4.52	4.45	4.09
1# Glass/Plastic	6.16	5.80	6.14	5.14	6.50	7.09	5.77	5.38	5.00	5.93	5.34	7.11	5.00-7.11	5.95	5.66	5.25
2# Glass/Plastic	10.81	8.90	10.46	8.96	9.50	8.50	8.27	8.26	8.00	9.68	8.68	12.33	8.00-12.33	9.36	9.33	8.42
Pint	7.50	8.74	8.50	6.97	6.80	7.12	9.12	7.09	8.75	8.45	7.35	9.67	6.80-9.67	8.00	7.88	7.16
Quart	13.25	16.32	12.83	11.42	12.00	11.42	12.67	12.31	15.00	13.02	11.73	17.78	11.42-17.78	13.31	12.78	12.28
5# Glass/Plastic	24.20	19.81	21.72	17.80	25.00	23.50	17.97	20.33	18.00	18.62	19.10	25.00	17.80-25.00	20.92	21.47	19.92
1# Cream	8.55	7.78	7.16	6.35	8.20	6.75	6.09	5.46	8.20	6.65	7.66	9.50	5.46-9.50	7.36	6.86	6.29
1# Cut Comb	8.33	7.32	7.80	5.81	7.96	5.75	7.63	6.00	7.96	9.00	8.50	9.25	5.75-9.25	7.61	9.19	8.14
Ross Round	9.75	5.48	7.80	5.88	7.90	7.00	8.10	6.95	7.90	6.60	8.15	7.90	5.48-9.75	7.45	7.64	6.95
Wholesale Wax (Lt)	4.90	4.49	4.88	3.74	2.94	5.75	4.22	5.00	4.50	4.56	3.46	4.33	2.94-5.75	4.40	4.31	4.35
Wholesale Wax (Dk)	3.88	4.25	4.38	3.45	2.60	4.33	3.78	4.00	3.82	3.92	2.88	3.58	2.60-4.38	3.74	3.75	3.71
Pollination Fee/Col.	80.83	91.00	83.33	56.33	71.67	60.00	55.43	75.00	135.00	60.00	106.00	103.00	55.43-135.00	81.47	72.79	80.35

U.S. Honey Production – 2011

Honey production in 2011 from producers with five or more colonies totaled 148 million pounds, down 16 percent from 2010. There were 2.49 million colonies producing honey in 2011, down 7 percent from 2010. Yield per colony averaged 59.6 pounds, down 9 percent from the 65.6 pounds in 2010. Colonies which produced honey in more than one State were counted in each State where the honey was produced. Therefore, at the United States level yield per colony may be understated, but total production would not be impacted. Colonies were not included if honey was not harvested. Producer honey stocks were 36.8 million pounds on December 15, 2011, down 18 percent from a year earlier. Stocks held by producers exclude those held under the commodity loan program. Stocks held by producers exclude those held under the commodity loan program, which totaled 4.7 million pounds when this report was prepared.

Honey prices increased to a record high during 2011 to 172.9 cents per pound, up 7 percent from 161.9 cents per pound in 2010. United States and State level prices reflect the portions of honey sold through cooperatives, private, and retail channels. Prices for each color class are derived by weighting the quantities sold for each marketing channel. Prices for the 2010 crop reflect honey sold in 2010 and 2011. Some 2010 crop honey was sold in 2011, which caused some revisions to the 2010 crop prices.

Prices for each color class are derived by weighting the quantities sold for each marketing channel. Prices for the 2011 crop reflect honey sold in 2009 and 2010. Some 2011 crop honey was sold in 2010, which caused some revisions to the 2010 crop prices. You can read the entire report, that is from 2009 and 2010 at **http://usda.mannlib.cornell.edu/usda/current/Hone/Hone-02-25-2011.txt**.

This report, while revealing in many ways, is only one set of data contributing to our annual analysis of the U.S. Honey Market. We sort out for you 16 years of honey prices so you can see any possible trends, and we look indepth at the top 10 producing states each year, compared to the top ten for the previous six years, again so you can spot trends and make plans.

Overall, USDA's calculated honey prices continue to be encouraging. From their "All honey prices", that is basically bulk prices, prices increased from $1.61.9/lb in 2010 up to $1.729/lb in 2011, nearly a 6% increase in an at best flat year for most price increases. Bulk prices in Bee Culture's monthly honey report increases were nearly identical rising from $1.65/lb to $1.72. USDA calculated retail prices were up also, going from $3.11.6/lb up to $3.28.4/lb, just over a 5.2% increase. Bee Culture calculates our retail figures differently, using unweighted averages. Our figures show a retail price last year of $4.80, rising to this year's $5.21, a 8% increase across the board for a pound of honey at the retail level.

Honey: Number of Colonies, Yield, Production, Stocks, Price, and Value by State and United States, 2011

State	Honey Producing Colonies[1]	Yield per Colony	Production	Stocks, Pounds Dec 15[2]	Average Price per Pound[3]	Value of Production[4]
	x1,000	Pounds	x1,000	x1,000	Cents	1,000 Dollars
AL	9	50	450	63	250	1,125
AZ	23	53	1,219	427	150	1,829
AR	22	64	1,408	239	161	2,267
CA	370	48	17,760	3,730	161	28,594
CO	31	55	1,705	443	168	2,864
FL	180	61	10,980	988	165	18,117
GA	65	43	2,795	196	161	4,500
HI	9	74	666	246	471	3,137
ID	87	36	3,132	1,879	178	5,575
IL	7	50	350	98	398	1,393
IN	8	51	408	147	206	840
IA	25	62	1,550	961	195	3,023
KS	7	44	308	117	215	662
KY	4	39	156	12	280	437
LA	36	77	2,772	471	167	4,629
ME	4	30	120	17	191	229
MI	74	64	4,736	2,084	176	8,335
MN	120	53	6,360	2,099	159	10,112
MS	18	115	2,070	104	153	3,167
MO	8	43	344	76	209	719
MT	145	92	13,340	3,202	164	21,878
NE	41	59	2,419	653	173	4,185
NJ	11	41	451	135	376	1,696
NM	7	56	392	153	166	651
NY	49	56	2,744	1,235	193	5,296
NC	14	62	868	95	282	2,448
ND	460	71	32,660	7,512	166	54,216
OH	15	66	990	228	226	2,237
OR	60	34	2,040	755	174	3,550
PA	24	44	1,056	306	242	2,556
SD	250	66	16,500	4,290	165	27,225
TN	7	44	308	68	298	918
TX	78	58	4,524	633	177	8,007
UT	23	39	897	170	175	1,570
VT	4	43	172	43	230	396
VA	4	40	160	21	400	640
WA	71	38	2,698	836	176	4,748
WV	4	53	212	45	242	513
WI	57	63	3,591	1,508	180	6,464
WY	35	54	1,890	265	176	3,326
Other States[5,6]	25	46	1,156	211	286	3,306
US[6,7]	2,491	59.6	148,357	36,761	172.9	256,509

[1]Honey producing colonies are the maximum number of colonies from which honey was taken during the year. It is possible to take honey from colonies which did not survive the entire year.
[2]Stocks held by producers.
[3]Average price per pound based on expanded sales.
[4]Value of production is equal to production multiplied by average price per pound.
[5]AK, CT, DE, MD, MA, NV, NH, OK, RI, and SC not published separately to avoid disclosing data for individual operations.
[6]Due to rounding, total colonies multiplied by total yield may not exactly equal production.
[7]United States value of production will not equal summation of States.

Honey Prices 1995-2010

Cents/lb.	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
All Honey	68.5	87.8	75.7	65.5	60.1	59.7	70.4	132.7	138.7	108.5	90.4	104.2	103.2	141	144.5	160.3	172.9
Retail Shelf	100.0	117.3	125.7	114.7	126.6	130.4	142.2	152.5	188.5	188.7	183.3	191.0	196.1	197.6	278.4	305.4	328.4
%Difference	31%	25%	40%	34%	53%	54%	51%	13%	26%	42%	51%	46%	29%	28%	48%	48%	48%

Honey production was down 27.5 million pounds from the year before. North Dakota was down 14 million pounds, California down 10 million pounds, South Dakota was actually up a million, Florida steady, Minnesota down 2, Texas down 3.5 million...you can see where the loss occurred...the top ten alone lost almost 30 million between them. But then, these ten top producing states lost colonies, too. Down from 1.9 million to 1.8 million...a slight drop – 1% - or so, compared to the overall drop of 7% overall for the other 40 states from 2.7 down to 2.5 million. My home state of Ohio dropped 3,000 colonies, but produced 4,000 pounds more honey...it must have been good somewhere here in Ohio last year...certainly not my backyard. Be sure and check out your state's production, colony count and honey value on the chart. Then, take a look at the web page on the previous page if you haven't already and start looking for trends.

Snap Shot Of Colony & Honey Production

YEAR	COLONIES (x000)	PRODUCTION (000 lbs)
1989	3528	180.6
1990	3220	198.7
1991	3211	220.9
1992	3045	221.7
1993	2875	230.6
1994	2783	218.2
1995	2655	211.1
1996	2581	199.5
1997	2631	196.5
1998	2637	220.5
1999	2652	203.1
2000	2622	220.3
2001	2550	186.1
2002	2574	171.7
2003	2599	181.7
2004	2554	183.5
2005	2409	174.6
2006	2394	154.9
2007	2443	148.3
2008	2342	163.7
2009	2462	144.1
2010	2684	175.9
2011	2491	148.4

Per Capita Honey Consumption

One of the more revealing analyses we do each year is to calculate the per capita honey consumption in the U.S. This is an arbitrary figure in a way, because you and I know lots of people who never, ever eat a drop of honey. Can't afford it, don't like it, too messy . . . take your pick. Some folks just won't and don't eat the stuff. I even know beekeepers who don't eat honey . . . or don't eat enough to amount to a teaspoonful a year. I'm always amused when I meet one . . . but so it goes.

The per capita consumption figure does, however, provide a tool we can use year to year to see how things are moving along. The final figure has to do with U.S. production, imports, exports, stocks held over from last year, and honey still in warehouses this year, and the amount of honey beekeepers have taken out of the commerce stream and put under loan. Here are the figures:

Honey Income

Imports – 289 million lbs. (up from 252 million lbs in 2010)

U.S. Production – 148 million lbs.(down from 176 million lbs last year)

Stocks held over from 2010 – 45 million lbs.

Honey placed on loan (from 2010) – 4.7 million lbs.

TOTAL – 487 MILLION POUNDS

Honey OutGo

Exports – 12 million lbs. (down from 30.4 million lbs in 2010)

Stocks held this year not yet sold – 36.7 million lbs.

Honey placed on loan (from 2011) – 3.9 million lbs.

TOTAL – 52.6 MILLION POUNDS

To calculate honey consumption in the U.S. during 2011, subtract the amount of honey not consumed in the U.S., that is exports and honey still not sold (stocks), from all the honey that came into the country, that is imports, U.S. production, stocks held over, and honey under loan, and the total is 434.4 million pounds of honey were consumed last year. Now, divide that figure by the total U.S. population of 311.6 million people, and you get per capita consumption of 1.26 pounds per person . . . which comes to 20.2 ounces. This figure has remained relatively constant for years, rising ever so slowly from 16 ounces/person about 20 years ago to 20 plus or minus ounces now. However, when you think about it, there are more and more people every year, and even FOUR ounces multiplied over 311 million people amounts to 77 million pounds . . . 27% of what we import, or 52% of what we produced in 2011.

Of course per capita honey consumption in the U. S. vanishes in comparison to per capita consumption of sugar and high fructose corn syrup (and the battle between the sugar and corn people only gets worse as time goes on...is corn sugar the same as cane and beet sugar? Some think yes, some think no, and only the lawyers will win). USDA figures indicate we consume 35.1 lbs/yr of HFCS, which equals 166

Top Ten Producing States Each Year

2006			2007			2008			2009			2010			2011		
State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	x1000 Col	x1000 Prod lbs	State	X1000 Col	X1000 Prod lbs	State	X1000 Col	X1000 Prod lbs
ND	350	25.9	ND	420	31.1	ND	390	35.1	ND	450	34.7	ND	510	46.4	ND	460	32.6
CA	380	19.8	CA	340	13.6	SD	225	21.4	SD	270	17.8	CA	410	27.5	CA	370	17.7
FL	170	13.8	SD	255	13.3	CA	360	18.4	CA	355	11.7	SD	265	15.6	SD	250	16.5
SD	225	10.6	FL	160	11.4	FL	150	11.9	MT	146	10.2	FL	200	13.8	MT	145	13.3
MT	132	10.4	MT	135	9.2	MN	122	9.5	FL	150	10.2	MT	157	11.6	FL	180	10.9
MN	125	10.0	MN	130	8.8	MT	134	9.4	MN	122	7.9	MN	126	8.3	MN	120	6.3
WI	64	6.0	TX	105	8.6	MI	71	5.2	ID	103	4.7	TX	100	7.2	MI	74	4.7
TX	82	5.7	ID	92	3.8	TX	77	4.9	TX	74	4.7	WI	68	4.4	TX	78	4.5
ID	95	4.2	MI	72	4.6	WI	58	4.6	MI	66	4.0	MI	70	4.0	WI	57	3.6
MI	72	4.0	WI	60	5.0	GA	55	3.9	LA	37	3.8	NY	47	3.0	GA	65	2.8
Total	1695	110.4		1769	109.7		1642	120.3		1773	109.7		1953	141.9		1799	112.9
All Sts.	2392	154.8		2442	148.5		2301	160.9		2462	144.1		2684	175.9		2491	148.4
% of Tot.	71%	71.3		72.4%	73.8		71%	75%		72%	76.1%		73%	80.6%		72.2	76.1

calories/person/day, and 37% of the added sweeteners we consume. Meanwhile, we also consume 47 lbs of sugar/year, for 222 calories/person/day, for 49% of the added sweeteners we consume. See **www.ers.usda.gov/Briefing/sugar/data.htm** for that report. As far as honey is concerned, a single ounce of honey weighs in at 86 calories, so our 20.2 ounce consumption per year, comes to 1737 calories/year, or 4.8 calories/person/day. Sugar = 222 calories/day, HFCS = 166 calories/day, and Honey = 4.8 calories/day.

But what about all those beekeepers with five or fewer colonies that don't get counted every year? So, OK, what about those 125,000 or so folks who don't get counted (our estimate here is that about 25,000 of these are new this year, so honey production will be minimal, if at all). But the remaining beekeepers out there? Well, let's see. If every one of them produced 100 pounds of honey . . . and you know beekeepers with five or fewer who do more, and a lot that do less, but for the sake of this computation, let's figure 100 pounds/beekeeper. That comes to an increase of 10 million pounds (or 158.4 million lbs produced this year). Divided by our population of 311 million, would increase per capita consumption by five ounces per person. That rounds it out 25.2 ounces, or 1.6 pounds per person. Certainly a more respectable figure, though perhaps a bit optimistic, and certainly insignificant compared to the other sweeteners.

A final note on colony counts. Not surprisingly, colony numbers dropped this year from 2,692,000 to 2,491,000, a 7.5% drop. And, since these numbers are primarily those of commercial beekeepers in the U.S., the easy money would have bet that colony numbers would have increased because of the increase in honey prices, and the increase in both demand for, and rental price of colonies for almond pollination. Fully 65% of these counted bees sat in almond orchards this year. According to Wikipedia, California's eight county central valley, where the almonds grow, covers about 22,500 square miles, making it slightly smaller than the state of West Virginia, and about 13.7% of California's total area. Looking at it another way, there were about 72 colonies per square mile (or about 1 colony for every 10 acres in the central valley) sitting in that state in February. According to almond growers the area of almonds is only going to increase, adding pressure to the remaining 35% of the U. S. bees to venture west, because, it seems, those who are running the active 65% aren't having as much success in keeping bees alive as growers, beekeepers, and researchers had hoped. The story this year was that in January there was a surplus of almond bees, by early February there was just enough boxes, and by mid-February, even boxes were in short supply. If honey goes up even more next year, and almond rentals hold steady...well, stay tuned. The fat lady hasn't yet sung.

It's Summers Time –

Teaching Beekeepers

Every Spring Kim teaches a beginner's class through our Medina County Beekeepers' Association. I'm not sure how long he's been doing this, but for about the last 10 years or more I've been helping him. I'm very good grunt labor. I make the coffee, provide the snacks, provide technical support, help get people registered and during the breaks I answer questions along with several other Medina County beekeepers who show up for support. And at the end of the sessions we always say we're not going to do this anymore. It's a lot of work!

Some years we do three or four all-day Saturdays in a row and other years we'll do seven or eight weekday nights in a row. One year we did both – two separate classes running simultaneously on Saturdays and Mondays. That one almost killed Kim and the rest of us. Even though he's taught the class for years each year Kim spends hours updating his lesson plan. Before the sessions start we set up tables and chairs, make sure the computer is working, gather catalogs and magazines to hand out and haul smokers, hive parts, hive tools, and any piece of equipment that might be helpful in showing the new folks what to do.

And then the new or soon to be new beekeepers show up. This year we had about 55 which is good. A couple of years ago we had almost 100. And it starts. They get their coffee, get signed in, pay their money and gather their materials. Kim starts right on time and he doesn't stop until one of us old timers gives a yell for a break. The students won't stop him, they want to hear every word he has to say. And on the break they bombard him with questions or they find one of us that can answer their questions. They know they only have a short time to try and learn it all and be ready when those bees arrive.

And then we realize why we do this. Why it's time well spent. These folks want to be beekeepers and they want to do it the right way. They are spending their time and their money to come and learn from the expert. So we give them as much as we can, we put our all into these classes. They learn how to light their smoker and keep it lit. They learn how to install a package. They learn how to choose a good location and they learn so much more. We want them to be good at what they do. We want them to be active members in our local association. We want them to spread the word about honey bees and beekeeping. It's what we do. It's how we keep this hobby/activity/industry (you pick a word) alive and thriving – by teaching new people.

The group dynamics have changed over the years. Ten years ago it was mostly men over 40 who took the class. Maybe they had kept bees years ago and wanted to get back into it or maybe their dad or granddad kept bees. The past few years our classes have included many more women, young couples and young men and women. The number of women coming to the class alone is the most drastic change I think we've seen. And that's good news. It's refreshing to see women realizing they can do this alone. With eight-frame equipment and many cities saying you can keep bees within the city limits, it's much more realistic for women to manage beekeeping.

Urban beekeeping has also opened a pathway for new beekeepers. You can have one or two hives in your backyard. And serious gardeners are seeing the value of having bees close by. So logistically it's just easier now to keep bees.

Of course, not everyone who takes the class sticks with beekeeping, and that's OK too. Even if they decide not to keep bees they've still gained that knowledge and they'll forever be advocates of honey bees and beekeeping.

If your local group doesn't hold a beginner's class yet, it's something you really should consider. It's a lot of work, but it's not the hardest thing you'll ever do. And don't we all have a responsibility to share what we know and to teach others if we can. Any time you share knowledge both parties benefit.

So next Spring Kim and I, along with Tracy, Mike, Peggy and Floyd – and hopefully some others – will be there teaching those new beekeepers. It's what we do and even though we're all a little older and get tired a little quicker we love it.

I hope you are enjoying Spring and that your bees are alive and thriving. And if you're one of the ones who took our class – thank you for your time.

By the way, the chickens arrived and are doing wonderfully, growing fast and seem to be happy and healthy. We ended up with 15 of various breeds and we're having a good time. We've had some pretty cold nights, but we managed to keep them safe and warm. I'll try and have photos next time. It's going to be a busy Summer. Have fun!

Hardy Summers

A Closer LOOK

FLIGHT ENERGETICS

Clarence **Collison**
Audrey **Sheridan**

Worker longevity is directly related to the type and amount of foraging an individual performs during her career.

The metabolic cost of flying is very high for insects in general, especially for those responsible for collecting resources in or on their bodies – the foragers. Foraging honey bees masterfully economize on the metabolic cost associated with hovering, load-carrying and high speed travel. The production and consumption of energy during flight occurs primarily in the tergal muscles, or wing muscles, which comprise approximately 75% of the honey bee thorax (Harrison and Fewell, 2002). The metabolic rate of these muscles varies greatly with age and activity level of bees, and also with ambient air temperature at time of flight. In honey bees, the metabolic rate of the thoracic muscles can be 100 times higher in flight than in rest (Harrison and Fewell, 2002), testifying to the specialized function of these muscles for sustained flight. The thorax of the honey bee is also the center for endothermy (heat production), a byproduct of the high metabolic activity required during flight. Therefore, flight muscles are as critical to honey bee thermoregulation as they are to foraging.

Flight metabolism in honey bees has been studied for over half a century using a number of protocols, several of which were reviewed in Harrison and Fewell (2002). Metabolic rates of flying bees were typically measured in respirometers, which are devices that quantify the carbon dioxide output from bees as the bees consume a known amount of oxygen. Respirometers were either closed systems – wherein oxygen was not replenished in the chamber in which the bee was flying, and thus the bee eventually consumed all of the available oxygen; or open systems – wherein a steady stream of air containing a known amount of oxygen was passed over the flying bee. Using tethered bees in closed-system respirometry studies has enabled investigators to concurrently measure lift, thorax temperature and metabolism during flight. Free-flying bees have been assayed in a number of ways: in stationary hovering flight in vertical tubes, "agitated" flight in larger enclosures and forward flight in wind tunnels. Other hovering assays have allowed for the testing of air pressure, temperature and load-carrying on metabolic rate. The biochemical and physiological variations in flight metabolism from bee to bee is attributed largely to genetic predispositions, race or subspecies and environment. These variations have been measured in terms of glycogen storage, hormone titers and the production of enzymes during agitated flight.

One of the great mysteries of honey bee flight energetics is that individual foragers vary their foraging strategies to maximize colony reproduction. Their behavior and physiology are highly adaptable to this end. The adaptation is usually detrimental to the individual bee; worker longevity is directly related to the type and amount of foraging

The increase in juvenile hormone, which accompanies the shift from hive to foraging duty, has been demonstrated to be important to the proper development of flight muscle and the increase in muscle metabolic rate.

an individual performs during her career. It has been shown that the strategy of nectar-foragers can be predicted by their tendency to maximize net energetic efficiency (i.e., to get the most bang for the buck). To demonstrate the effect of physiological constraints on foraging strategy, Wolf et al. (1989) monitored oxygen consumption of free-flying foragers under different nectar loads and flight conditions. Individual bees from a single colony were fed a 50% sugar solution before being introduced to a wind tunnel for flight metabolism assessment. Depending on the amount of syrup administered during pre-trial feedings, sugar loads varied from 23% to 75% of total body mass for the nine bees that were used in the final data analysis. Bees were subjected either to free forward flight at 0.5 meters per second (n=9), or hovering flight at 0 wind speed (n=3); each bee received multiple trials per flight assay, each trial with a different sugar load. Results from this study indicated that the energetic costs of nectar foraging increases with nectar load, and the increase ranged between 20-30% above the energetic cost of unloaded flight. Interestingly, there was no significant difference in oxygen consumption between forward-flying bees and hovering bees. A similar observation was made in a study on bumble bee flight, where the subjects were tested at a range of forward-flight velocities, and oxygen consumption was nearly constant during all tested flight velocities and hovering flight.

Age poses another physiological constraint to foraging performance. In their commentary on the supporting literature, Roberts and Elekonich (2005) reported distinct age-related shifts in metabolic activity in the

Environment and genetics have a great influence over foraging performance, and that the plasticity of flight metabolism is critical to honey bee survival and fitness.

flight muscles of bees. During the first three to four days of adult life, there is little change in flight muscle metabolism, although thermoregulatory capability appears to develop during this time. For example, one-day-old bees generated only 0.1 Watts per gram (W/g) during agitated flight, and their thoracic muscles remained the same temperature as the surrounding air. Two-day-old bees showed the first signs of endothermy and generated 0.3 W/g during hovering. At about the third week of life, when bees transition from nest duties to foraging, there is an approximate 15% increase in agitated flight metabolic rate, and an almost doubling of muscle glycogen levels, as well as increases in pyruvate kinase and citrate synthase activity in the thorax. Furthermore, bees entering foraging duty have comparatively greater expression of heat shock ("stress") proteins in their thoraces than nurse bees, possibly as a result of having hotter thoraces in general, but probably due to the rapid muscle regeneration needed for five hours of flight per day. Finally, the increase in juvenile hormone, which accompanies the shift from hive to foraging duty, has been demonstrated to be important to the proper development of flight muscle and the increase in muscle metabolic rate.

The variation in metabolic rate of flying bees is inarguably attributable to age and activity level, but there may be other contributing factors. Feuerbacher et al. (2003) set out to determine whether the variations were caused by changes in flight kinematics (wing beat frequency, stroke amplitude, body angle and inclination of stroke plane) for each type of resource, or whether genetics pre-determined metabolic rate. They tested three assumptions about flying foragers: 1) The type of load (pollen or nectar) may affect the body position and wing movements to maximize lift during hovering, and consequently require a metabolic adjustment; 2) Genetic differences between pollen and nectar foragers, expressed in the production of the enzyme malate dehydrogenase-1, may program pollen foragers with a faster metabolic rate; 3) A higher cooling capacity in nectar and water foragers could lower the flight force output and thoracic metabolic rate compared to pollen foragers. The first assumption proved false, as load type did not independently alter flight metabolism or wing kinematics. Pollen carriers had higher hovering metabolic rates than nectar carriers, regardless of the size of their load. Loaded pollen and nectar foragers both had significant increases in metabolic rates over unloaded foragers (27% and 40%, respectively), when taken independently of the respective increase in body mass, the increase in metabolism was a significant 6%. In pollen foragers, power output significantly increased with increased loading, suggesting that muscle efficiency improved with a heavier load. There was a difference in the production of malate dehydrogenase-1 in pollen and nectar foragers, but further evidence for a genetic component was not provided in the study.

Thermoregulation during flight is a tricky business. The mechanism governing thermal stability in flying insects is controversial, but it has been observed that honey bees achieve thermoregulation by varying the metabolic heat production in their wing muscles in air temperatures of 21 and 38°C (Roberts and Harrison 1999). To test this theory, a study was carried out to determine whether metabolic heat production, evaporation, radiation or convection is the dominant mechanism of thermoregulation in bees (Roberts and Harrison, 1999). Bees from three colonies were used to allow the investigators to compare intercolony variations in thermoregulation. Individual bees were allowed to fly in a respirometer for measured periods of time at three ambient temperatures (21, 33 and 45°C) to allow the investigators to monitor heat production, heat loss and water loss during flight. The results showed that heat production decreased as air temperature increased across this range of temperatures; supporting the theory that varying metabolic heat production was the principle mechanism of honey bee thermoregulation from

21 to 33°C. At a much warmer ambient temperature (45°C), however, bees employed evaporative cooling and metabolic heat production nearly equally to maintain thermal stability.

The rules change when we look at drone flight energetics. In general, as the body size of an organism increases, the surface area-to-volume ratio decreases, thus making it more difficult for the larger organism to get rid of excess heat. Drones have twice the body mass of workers and three times the thoracic mass, therefore it is expected that they accumulate a lot more heat in their muscles than foragers when flying. Coelho (1991) explored the cooling mechanism of drone flight muscles, as well as heat production and heat transfer in comparison to the mechanisms employed by foragers. He found that drones, when exposed to thoracic heat stress, do not regurgitate nectar to aid evaporative cooling, as their sisters do. Nor did they shunt hot hemolymph into their abdomen, as other large species of bees do to relieve heat stress on the flight muscles. Rather, they appeared to retain high thoracic temperatures in flight, even near-lethal temperatures. Coelho reasoned that drones deal with their inefficient thermoregulatory system by simply not flying at peak hours of heat and solar radiation.

Higher metabolic capacity of the flight muscles of some bees could improve their foraging performance over bees with lower metabolism. For example, African honey bees have a higher mass-specific metabolic rate in the thoracic flight muscles than their European relatives; they also appear to have a fitness advantage over European bees in Neotropical climates. Harrison and Hall (1993) compared the flight energetics of African, European and three types of hybrid-cross bees by measuring the output of carbon dioxide during flight. Typically in nature, smaller flying animals metabolize more rapidly than larger ones, and the relationship of body mass to flight muscle metabolism can be represented in a mathematical model. In Harrison and Hall's experiment, Africanized bees had higher energy consumption and European bees had lower energy consumption during flight than the mass-specific model predicted. Hybrid bees with a European matriline had much lower energy consumption than full-blooded European bees, contrary to the predicted values. This phenomenon is called "negative heterosis," for the European matriline hybrids actually performed more poorly than either pure parental line. The results of this study may explain in part why African-European hybrid colonies do not persist in Neotropical environments. The study also validates the conjecture that environment and genetics have a great influence over foraging performance, and that the plasticity of flight metabolism is critical to honey bee survival and fitness. BC

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Managed Pollinator CAP
Coordinated Agricultural Project

Sunlight, Water And Nosema Spores

Thomas C. **Webster**

Let The Sun Shine In

This article discusses two issues: the possibility that sunlight may be used to sterilize beekeeping equipment, and the danger of outdoor water for bees as a possible source of Nosema infection. There is good news on both accounts.

When we think about Nosema disease, and ways to control it, it is helpful to consider the life cycle of the disease. The organism spends part of its time developing and reproducing inside the midgut of the bee, where the bee's food digestion occurs, so it is very important to know what's happening. Moreover, the midgut is where the antibiotic fumagillin acts. It prevents the growing, or "vegetative," stage of Nosema from developing further into spores. Mature spores leave the bee mainly in feces and can last for very long periods on comb and other beekeeping equipment. Fumagillin has no effect on the spores. Consequently, it's important to work on methods for the elimination of the spores left inside our bee hives, often after a colony has died or has struggled with a heavy infection.

To eliminate spores we must find their points of vulnerability and also consider what can work for practical beekeeping. The ideal control method for any disease should be highly effective, safe for bees and people, simple, quick, sustainable and relatively inexpensive. To date, no method to control Nosema hits all of these buttons but we can hit many of them.

And one note here. This article is about *Nosema ceranae*, the recently discovered and very widespread species. However it applies largely to *Nosema apis* also, the type we have known for over 100 years. The biologies of these two Nosema species are similar in many ways.

Sunlight – can it help us clean our equipment?

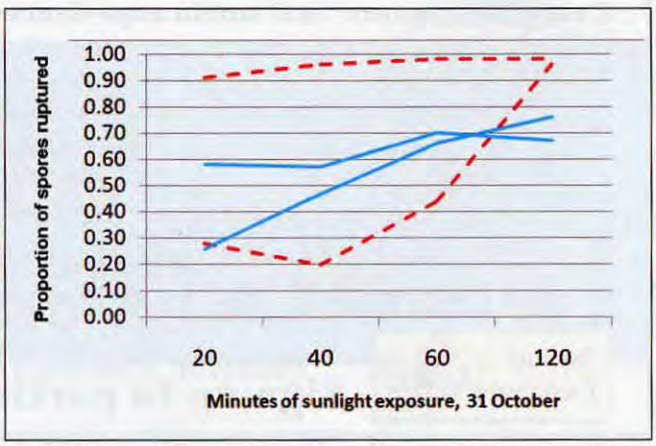
We can begin with sunlight, a priceless resource we get every day. Part of the energy in sunlight comes in the form of ultraviolet light, a potent sterilizing agent. To get an understanding of the effects of sunlight on Nosema spores I worked with KSU student Emily Hogue. She put a preparation of spores onto glass microscope slides so that they could be easily examined later. She then put the slides out in the sun for periods up to two hours. The next step was to add a stain that would penetrate the spore if the spore was damaged by the sunlight. This stain glows a rose-red color when viewed under a fluorescent microscope.

Sunlight and some other agents make spores "leaky" by breaking their cell membranes. Leaky spores cannot build up the pressure needed to push out their polar filaments, just as a punctured balloon cannot be inflated. So a leaky spore is effectively dead. The spores that take up the red stain are the leaky ones.

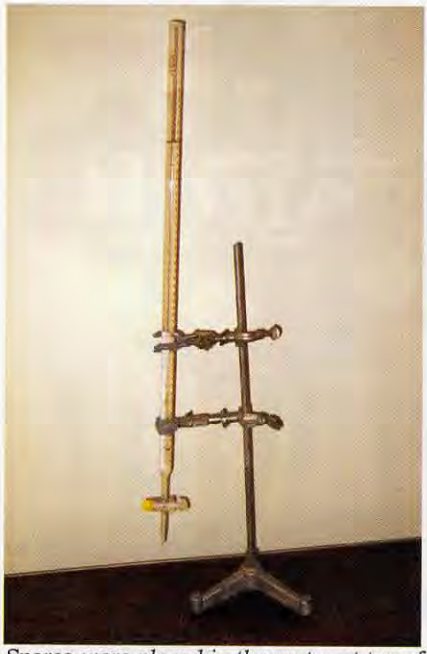
Sure enough, sunlight made for a lot of leaky, red spores. But there's more to the story. Pure spores never exist in a hive or on stored equipment. Normally spores are shed in the bees' feces. Occasionally a beekeeper may crush a few infected bees during a colony manipulation. This too would release spores in feces and bee tissues.

So it seems that feces, however unpleasant, must be part of the Nosema picture. I asked Emily to add this to the study. She made up some mixtures of spores with feces removed from the rectums of bees. Small amounts of these mixtures were placed on microscope slides and exposed to sunlight along with the slides with pure spores. I was quite confident that the fecal material would block some of the sunlight, and that this would complicate hopes for sunlight treatment of hive equipment.

In fact we saw the reverse. Feces made the sunlight more effective at killing the spores. One of our runs is described in Figure 1, when the slides were exposed to sunlight during mid-afternoon in late October of



Spores exposed to bee feces (red dashes) are more vulnerable to sunlight than the spores exposed to water (blue solid lines) for the same two-hour time period. Two other replications of this study, during October and November, showed this same effect.



Spores were placed in the water at top of the buret, and collected at later times from the spigot at the bottom.

last year, when the sun is relatively low in the sky. Most likely a stronger effect of sunlight would be seen in early Summer when the sun is higher in the sky, and at latitudes closer to the equator, and at higher elevations. Our campus is at an elevation of about 1000 ft.

What's going on here? My first thought was that some aspect of the chemistry of the feces was attacking the spores. This idea has been supported by further studies. While this apparent effect may not lead directly to a new method of control, it might show us something about conducting research. In general, those of us who study Nosema spores begin our studies by collecting the spores from the midgut. Perhaps we are missing something critical that happens in the rectum.

Water for bees – do we need to worry about spores? All good beekeepers know that bees need water, especially during the hot, dry periods. The water is collected by a specific group of forager bees that specialize in finding and collecting water. This water is taken to the hive and placed drop by drop in cells, where it helps bees to cool their hive. Bees fan their wings to circulate air through the hive, and the hive is cooled as the water evaporates. In Summer we must be sure that a water source is nearby, and provide it for our hives if it does not exist naturally.

We know also that bees defecate as they fly out of their hive, and that Nosema spores will be shed by infected bees. So it seems logical that we should not place a water source directly in front of the hive.

I agree that an artificial water source should be placed a considerable distance from the hives, but the danger of Nosema transmission at the water source is relatively low. This is because the spores are quite a bit denser than water, and quickly sink to the bottom.

To get an idea of how quickly the spores settle in water, I filled a glass buret with water, and added spores at the top. A buret is a vertical tube with a spigot at the bottom (Figure 2). The spigot allows one to carefully release a particular volume of the liquid in the buret. The buret I used held 23 inches of water, from top to bottom. At specific periods after I'd added the spores to the top, I released a milliliter of water from the bottom of the buret.

I found that most of the spores settled down quickly through the 23 inches of water. During the first hour, 21 million of the spores were collected. During the following two hours about a tenth as many (2.2 million spores) had settled to the bottom. Very few spores remained at the top of the buret. This goes along with the general lab observation that spores settle quickly in water and most water-based mixtures. We often use centrifuges to concentrate our spore preparations.

Consequently we can assume that virtually all of the spores dropped from bees flying over a water source will settle quickly to the bottom where they cannot be consumed by bees. Any spores that fall at the edge of the water where the bees might perch will be quickly killed by sunlight if the water source is in the sun. This is a reason for us to locate artificial water sources where they will receive as much direct sunlight as possible.

The next step will be to see whether spores on contaminated equipment can be killed by sunlight. Of course this will be for those beekeepers with small numbers of hives, and room to spread the equipment out where they will receive enough sun. The equipment will have to be rotated so that all surfaces receive the sun. So there is some time involved here. But on the other hand, sunlight leaves no chemical residues. Spores will not develop resistance to this treatment. And it's free. BC

Pittsburg Community Apiary

Stephen **Repasky**

"Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has."
Margaret Mead

Interest in urban agriculture is growing and part of that interest includes keeping honey bees in cities throughout the United States. Building on this popularity, in 2007, a handful of Pittsburghers started with a simple but ambitious dream: to create a community apiary where city dwellers could keep honey bees, much like urban gardeners tend plots in community gardens. By the Spring of 2011, a once trash-strewn vacant lot in the Homewood section of Pittsburgh had been transformed into a beautiful haven where 25 honey bee colonies are tended by trained, committed beekeepers in the midst of a vibrant pollinator garden. Recently visited by 60 elementary students on a field trip from a nearby school, the Burgh Bees Community Apiary is a vivid example of anthropologist Margaret Mead's oft quoted inspiration: "Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has."

This is the story of Burgh Bees and America's first urban community apiary, complete with lessons learned along the way. As urban beekeeping takes off across the country, Burgh Bees hope is to inspire committed beekeepers in cities throughout the nation to follow our lead and create urban apiaries in their home towns.

Burgh Bees' initial founders included a Carnegie Mellon University MBA student, a lawyer, a corporate pilot, a Penn State University communications professor and an architect with little more than 15 years of combined beekeeping experience among them. A year into the organization's development, this core group was joined by a state wildlife biologist and another CMU MBA graduate, both of whom are second-generation beekeepers and also have become certified master beekeepers by the Eastern Apiculture Society. About six months later, the Director of Penn State Extension – Allegheny County joined the board. While this might seem like a uniquely impressive group of professionals, cities are particularly rich places to find people with a dazzling array of skills that can provide essential resources to build the kind of organization that sustains

an urban apiary and the new beekeepers it will be training. Though organizational skills are important, devotion is absolutely essential. America's first community apiary is a reality only because a small group of people were dedicated to making it happen.

In 2008, in its first full year being an organization, Burgh Bees founders offered a year-long beekeeping course that helped to create a strong community of "new bees" eager to work with each other and realize the dream of a community apiary. Fifty people signed up for this first class, which demonstrated a strong community interest in beekeeping. That year, Burgh Bees also began organizing monthly "meet ups." Held at local watering holes throughout the city, the meet ups brought people together, enabled friendships to form, and made the gatherings fun and festive. Burgh Bees also received an $8,000 seed grant from The Sprout Fund, a foundation that supports innovative grassroots community projects. Those funds enabled the purchase of beekeeping equipment, provide educational materials for the classes, set up a website (www.burghbees.com) and obtain basic infrastructure (such as fencing) for the apiary.

Early on, Burgh Bees partnered with a community garden in the city's Hazelwood section where their first two colonies found a home. That same year, the innovative mayor of Braddock, PA, a small town on the outskirts of Pittsburgh, asked Burgh Bees members to remove an unmanaged colony of honey bees that had taken up residence in a vacant building. He also offered space behind an old convent to place two colonies. The convent became a key site for beekeeping classes and honey extraction and the mayor's support buoyed the organization. Publicity from the colony extraction in Braddock attracted interest from the horticulturists at the Pittsburgh Zoo & Aquarium. Burgh Bees placed two colonies on the zoo's green roof and helped to train two of their staff members to keep bees.

Also in 2010, Burgh Bees faced a new challenge. Pittsburgh did not have any regulations or ordinances regarding beekeeping. That year, city officials began developing a new Urban Agriculture Ordinance and Burgh Bees became very involved in helping to frame the regulations. Through the support of many urban agriculture enthusiasts and city beekeepers, the Pittsburgh city council passed an ordinance that permitted urban beekeeping with some limitations (these included set backs from property lines and numbers of hives allowed based on property size).

In 2010, working with the City of Pittsburgh's Urban Redevelopment Authority, the mayor's office and City Council representatives, Burgh Bees members secured a lease for a vacant 1.5 acre lot in the city's Homewood section. While the necessary paperwork was being completed, Burgh Bees held meetings with residents of the neighborhood as well as with those interested in bees and beekeeping. These "bee curious" sessions were a means of garnering support for the organization while at the same time educating non-beekeepers about the importance of honey bees, how safe it would be to keep bees in the city and, of course, the joys of beekeeping.

The concept of a community apiary is very similar to that of a community garden. A spot within the apiary is rented out to the city beekeeper on a yearly basis but the beekeeper owns, manages and keeps any honey harvested from that hive. Each person renting a spot is required to participate in Spring and Fall clean-up days as well as volunteer a certain number of hours at a Burgh Bees event.

The concept of a community apiary is very similar to that of a community garden. A spot within the apiary is rented out to the city beekeeper on a yearly basis but the beekeeper owns, manages and is allowed to keep any and all honey harvested from that hive.

In March of 2010 Burgh Bees erected a six-foot high privacy fence on a 32' x 50' section of the 1.5 newly leased acres. Immediately, Burgh Bees moved most of its hives into the enclosed area, leaving only two hives at the Pittsburgh Zoo. America's first urban community apiary was official! Well, almost. There was still a lot of work to do. The rest of the vacant lot was overgrown with weeds, old tires were strewn about and then there was the issue of how to get the apiary filled with beekeepers willing to keep bees in the city. In early 2010, $3,600 in funds from a Kickstarter campaign helped supply plantings, raised beds, a sign and other equipment for the apiary.

Once the apiary had been established, Burgh Bees also began offering "open apiaries" (much like an "open house") where people interested in beekeeping could learn more about this fascinating pastime. Open apiaries helped many overcome long time fears of "bees," attracted new beekeepers to the classes and fostered a broad appreciation for the honey bee for all who attended.

Also in 2010 Burgh Bees formally partnered with the Penn State Extension of Allegheny County, a partnership that furthers the educational arm of Penn State Extension and the mission of Burgh Bees. In fact, beekeeping

classes prove to be as valuable to Burgh Bees as it is to the people who took them. In effect, Burgh Bees trains its own membership and helps to build the numbers of urban beekeepers in the city. In addition to the introduction to beekeeping course, increased demand led to adding a second year beekeeper course, as well as classes on honey harvesting, products from the hive. And workshops on queen rearing and splitting hives are planned for the future.

By 2011, the Burgh Bees Community Apiary boasted 20 new beekeepers, all graduates of Burgh Bees Beekeeping 101 classes. Over the course of the next several months, a group of dedicated volunteers put the final touches on the apiary. Nearest the fence is typical urban landscaping that benefits pollinators with plant species such as *liatris, rudbeckia*, and various types of sage and mints. A large native pollinator meadow comprises the apiary complex. Volunteers planted a seed mix of 17 pollinator friendly species and as Summer progressed, a beautiful display of native flowers erupted, creating foraging habitat not only for honey bees but also for many other species of pollinators in the area. To connect it all together a walking path in the shape of an infinity loop enables visitors to walk around and observe honey bees and other pollinators at work.

Increased numbers of beekeepers led to a different type of challenge. Where do I get bees? My hive swarmed, now what? When can I harvest honey? What do I do about mites or wax months? All are common questions to the new and veteran beekeeper alike. Burgh Bees adopted a two pronged approach to meeting these needs. First, a Google Discussion Group was formed where questions like these can be asked and answered by the many beekeepers on the list. The Google Group helps to illustrate that there is no single way to approach beekeeping, while also enabling beekeepers to share ideas.

Second, by using social media, Facebook and Twitter accounts were established where information is disseminated on classes, meet-ups, hot topics in beekeeping – even passing along the location of a swarm for someone local to capture. Burgh Bees website (**www.burghbees.com**) adds additional resources to all those interested in honey bees.

Growing pains are inevitable for any group or individual. Change can't be avoided if progress is to be made. Burgh Bees has certainly has had its own changes and challenges along the way. As the group grew, they faced the need to reorganize, develop formal by-laws, elect officers and establish a board of directors. Another constant challenge is leadership burnout. As the initial founders stepped back, reorganization and a more formal structure empowered the remaining leaders to guide new members into leadership roles. Their hope is that the excitement of new beekeepers will provide a steady stream of energy and new leadership as the organization progresses. Also, in previous years, Burgh Bees received no push back from residents about beekeeping in the city. However, they experienced community resistance when they tried to develop an apiary of a few hives in one Pittsburgh neighborhood. Due to that resistance, there was a change of plans. While no harm came from this experience, it increased awareness that more focus was needed on education. As a result, Burgh Bees have stepped up informational sessions throughout the city.

Establishing the nation's first community apiary has been exciting and inspiring, but it did not happen without hard work. To call it successful is an understatement. Currently, Burgh Bees has nearly 200 dues paying members, has trained over 250 new beekeepers from Pennsylvania, Ohio and West Virginia, is expanding its teaching component and is working on adding a formal mentoring program to its organization. The community apiary continues to gain in popularity not only for the city honey it produces but even more importantly the educational opportunities it presents. As with the community apiary in Homewood, a core group of committed beekeepers and volunteer community members is helping to make a second apiary a reality, creating a wave of enthusiasm and community support. The community apiary energy has even garnered the attention of a national natural handmade cosmetics company. LUSH, which has stores in 150 cities in the U.S and Canada. LUSH has generously pledged $9,000 in support to begin construction of the apiary in Brookline which consists of a 50' x 50' fence on 1.4 acres. Local businesses are showing interest in sponsoring honey bee colonies for educational use. A waiting list is forming for those wanting to place colonies in the apiary or assist with beautifying the site.

Urban community apiaries are a growing trend. With a little bit of hard work and a group of dedicated people, urban apiaries can begin buzzing in a city near you – bringing communities together, utilizing vacant space, and providing a vibrant, healthy place for honey bees, beekeepers and nonbeekeepers alike to thrive. BC

Stephen Repasky is an EAS Master Beekeeper and Community Apiary Director for Burgh Bees. He currently runs 20-30 hives in and around the city of Pittsburgh, PA. Jennifer Wood, who contributed to this article, is a founding member of Burgh Bees. She and her husband, Robert Steffes, keep bees at their home in Aliquippa, PA. Stephen can be reached at ***srepasky@gmail.com****.*

Meet Reed Johnson

Ohio Has A New Bee Guy

Kim **Flottum**

Reed Johnson grew up in Missoula, Montana, where, through Boy Scouts and summer camps, gained an appreciation and strong interest in the natural world. After high school, he earned his BA in Biology from Wabash College in Crawfordsville, Indiana, but he gained his interest in honey bees back in Montana over those summers, working as a bee wrangler for Dr. Jerry Bromenshenk.

After college he went to Hungry for two years to teach conversational English to middle-school students there, but returned to gain his Masters in Biology from Wake Forest University, studying a wasp-mimic moth native to Florida.

After receiving his Masters at Wake Forest, he went further in grad school at the University Of Illinois, with May Berenbaum and Gene Robinson as part of his experience there. His graduate work was studying insect toxins, and after receiving his PhD he did a two and a half year post doc with Marion Ellis, at the University of Nebraska in Lincoln looking at the toxicology of pesticides, and their interactions in honey bees. He could not have chosen a more intense, and timely topic if he had tried, and in 2009 he received the Eastern Apiculture Society's Student Award – about as prestigious as it gets in the world of honey bee research. He met his wife Courtney while studying at the Archbold Station in Florida and they have a 17 month old son.

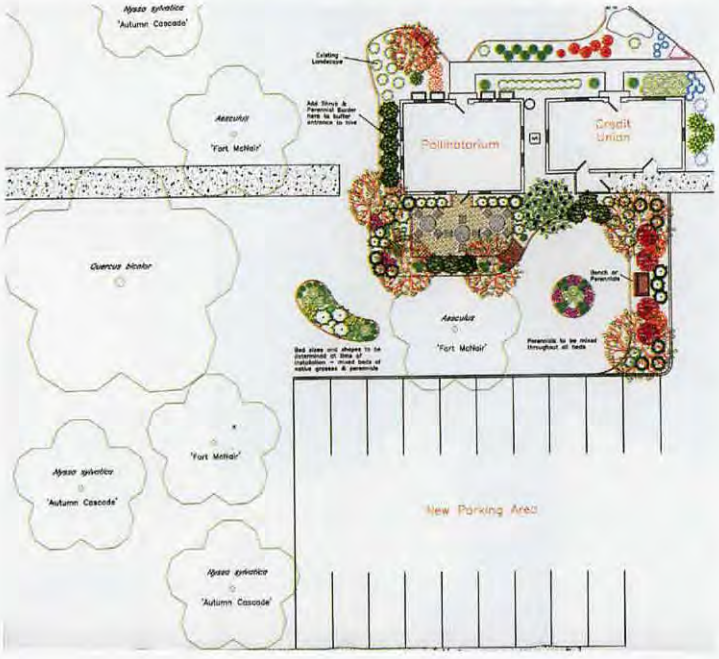
Reed and his family moved to Wooster, Ohio in October, 2011 so Reed could finally fill a spot left vacant when Dr. Brian Smith moved to Arizona several years ago.

Since the Bee Lab in Columbus has been re-occupied by additional extension personal after Dr. Smith moved, the decision was made to house Reed in Wooster, where, due to Dr. Jim Tew's recent retirement, there was a vacant bee lab, bees and other support services already set up to host a honey bee researcher. This, even after the destructive tornado struck the Wooster campus a couple of years ago, destroying much of Dr. Tew's surplus equipment and other beekeeping supplies, antiques and records and papers.

Since moving in Reed has spent a great deal of time rebuilding the lab's equipment, sorting the tangle left after the tornado and getting started on several projects he is most interested in . . . the interactions of various pesticides on honey bees. His early work is funded by Project Apis m and is looking at some of the issues that have arisen in California during almond bloom with queen breeders.

His studies moving forward will be working with other pollinators, in conjunction with other entomologists on campus, and even some of the chemistry people, looking at pollinator susceptibility to various pesticides and pesticide combinations, and trying to figure out if honey bees are good indicators of environmental problems, or if there are other, better indicator insects to watch.

The Spring of 2013 he will be teaching a beekeeping class, based



A.I. Root display at the Wooster Bee Museum.

in Columbus, but much of it done online, which will have a lab, as an undergrad biology class. He already has a grad student, looking at how successful honey bees are in urban areas compared to similar non-urban areas, conducting Spring and Fall surveys primarily in the Columbus area working with the Ohio State Beekeeper's Association members.

Since arriving in Wooster Reed has not been standing still. There's the tornado leftovers to work with, and now that some of the insurance money from that storm has finally come through he'll be getting more bees and more equipment to replace what was lost. The bee equipment museum has fallen under his watchful eye, also, but isn't his really. Some of the pieces there are owned by outside collectors...notably Jim Thompson, an occasional contributor to these pages, and David Heilman, a former technician for Dr. Tew, and now filling another position at the Wooster Campus. They, too have some say in the future of the museum, but so does the Campus administrators, who, after the tornado took out much needed office space, are looking for any place they can to house an expanding staff and student body. The future of the museum is uncertain, and Reed is looking for some answers for that.

Working with Denise Ellsworth, an Extension Specialist and Master Gardener who is filling part of the honey bee extension position that Jim Tew had, a new Pollinator Garden is taking shape on campus near the museum and the new honey bee exhibit building called the Pollinatarium. This building has meeting facilities for small groups and a series of displays for beekeepers, and others interested in many aspects of pollination. All three – the museum, the garden and the Pollenarium are only steps away from each other and lend themselves easily to serving all manner of beekeeping groups, gardeners and other pollinator specialists.

Down the road, Reed is still pursuing his quest for the answers to the pesticide/honey bee issue. Funding short term is coming from industry groups, but long term, multiyear projects are aimed at NSF, USDA and other sources with deeper pockets. And, since there are several, though not many scientists in the field more or less looking at the same thing, he sees a need for some sort of coordination so that some work doesn't get duplicated, while other, perhaps crucial areas remain unstudied.

"The discussion on pesticides" he says, "needs to continue". BC

Reed Johnson in the Wooster Bee Museum.

Using Virgin Queens

In Theory, A Single-Colony Beekeeper Could Use The Same Colony To Graft From, Start And Finish Queen Cells

Larry **Connor**

Pausing in the thread I have been writing on teaching beekeeper instructors, this month I want to discuss the role of using virgin queens in a beekeeping operation, the advantages, disadvantages and proven methods. I first experimented with using virgin queens in the late 1970s using 'double queens' in mating nucs. This system doubled up the queens in a mating nucleus so that an older queen was in the colony and free to mate and start laying. A second, younger, and newly emerged virgin queen, was added to this colony about seven days after the first queen was introduced, confined either as a queen cell ready to emerge or as a virgin queen in a cage with a candy plug. As the older queen was harvested, the almost ready-to-mate queen was released by removing the cork from the candy end of the cage. It is important to let this queen emerge while the colony is not disturbed, and best if she emerges at night and cannot fly out of the unit. This also allows for the queen pheromone from the first queen to dissipate and the pheromone from the younger and still present queen to dominate bee behavior.

The system works, and it is possible to increase the output from a nucleus by having a 'virgin in waiting' while an older one is mating and laying in the colony. There was little incentive to continue with this system because of the extra time, additional visits to the mating yard, and record keeping required. I still believe is it a technique northern-based beekeepers should consider to increase queen output during their shorter system.

Advantages of using virgin queens

This taught me an important lesson – beekeepers can use unmated queens in mating units just like ripe queen cells. Here are the advantages of their use:

1. The virgin queens are a few days older, and theoretically closer to mating, and thus closer to harvesting.

2. Virgin queens may be evaluated for color or defects. Many beekeepers select for color of queens, and emergence of virgins and sorting them by color means that only the desired colored queen is mated. Some beekeepers only want yellow queens, thinking they are Italian. It does not work that way, as color is one of the least accurate methods to use to determine genetic background. But for beekeepers that want all-yellow or all-back bees in their apiary, this is an advantage.

Defects, such as damaged wings, dented body parts, or a non-functioning leg, are easily determined and the queen is discharged from further advancement.

3. Virgin queens may be weighed. Dr. Tibo Szabo of Canada, (retired and working with his son in a queen rearing business in Ontario), collected data that showed that weighing newly emerged virgin queens provides queen producers with a method of selecting only large, vigorous queens. They weigh each queen using sensitive scales and refuse to use any virgin weighing less than 210 mg. Larger queens develop into laying queens that have more ovarioles in their abdomen and are able to produce more eggs. It is felt that larger queens also produce more queen pheromone and are more attractive to worker bees that feed and care for her.

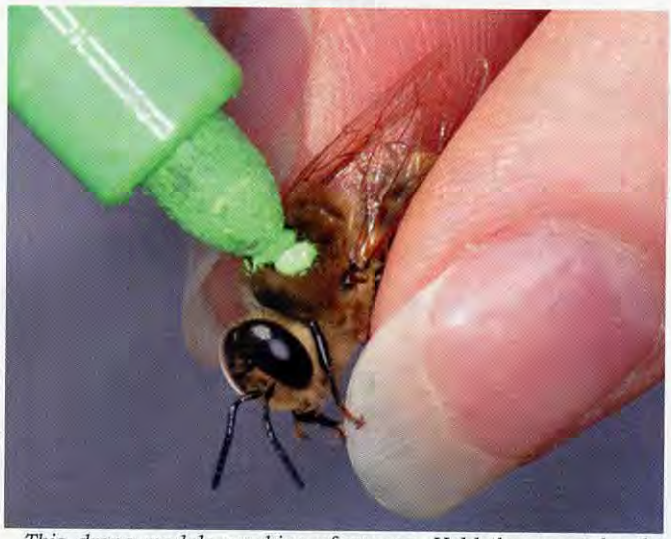
4. Virgin queens may be marked. This allows for accurate identification/confirmation when you open a mating nucleus and see the marked queen. I have seen no indication that there is any problem using marked queens in a natural mating situation, just as long as the queen is not damaged in the process.

Disadvantages of using virgin queens

Compared to ripe queen cells, those that will emerge in the next 12 to 24 hours, virgin queens require additional handling and add another step in the queen rearing process. This is why they are not used in commercial operations. But in small-scale queen production and breeding programs they are useful.

Compared to mated queens from a mating unit, virgin queens are like ripe cells and have the risk of failing to mate, failing to find their way back to the mating unit, and being eaten by dragonflies, birds or toads. As a means of requeening an operation they represent an

Virgin queens in plastic holding and introduction cages. Queen candy fills the tube into the base. When the queen is introduced to a nucleus a plastic cap is placed on the end of the tube to prevent queen release.



This drone models marking of queens. Hold the queen by the thorax while putting on a drop of paint on the center of the thorax. Use different paint colors to reflect different queen lines, or use the international marking color to reflect the year the queen was produced.

affordable method of replacing queens or making up increase colonies, but beekeepers should expect a 15 to 20 percent failure rate of virgin queens compared to mated queens. Hopefully the success rate of virgin queens compared to ripe queen cells will be higher.

My reasons for using virgins

In my tiny queen program at the farm in Galesburg Michigan I faced the reality that I did not have much time to spend running a mating yard for queens, and I did not have the required number of bee colonies to set up mating nucs to more than a dozen or two queens a season. I wanted to be able to produce hundreds of queens, and by using virgins I had a mechanism to do this.

In theory, a single-colony beekeeper could use the same colony to graft from, start and finish queen cells. These cells could be moved to an incubator (like an old chicken incubator) and the newly emerged virgin queens distributed to waiting beekeepers. If the queen in this single colony is from a known mite-resistant stock line, or from a survivor strain of queens, or the only strong colony in a large metropolitan area, it could be important in adding mite resistance or survivor genes to an area.

In 2011 I produced hundreds of virgin queens with the help of Craig Fuller and Cathy King at the farm. We had five breeder queens, but if necessary we could have used just one. We had four cell finishers and one starter-finisher, so we could have had just six colonies producing 50 to 100 virgin queens a week for a 10 to 15 week period in southern Michigan. Because the virgin queens were grafted from some of Tom Glenn's instrumentally inseminated breeder queens we sold them for about half of the price of a fully mated queen. Beekeepers understood that they could only get the queens by visiting the farm and getting a short tutorial (a mini lecture) from Cathy, Craig or I about how to use the queens to make a new colony or replace a queen that had failed in acceptance or buildup. We did not make much money, but we proved (to me, anyway), that the use of virgin queens was a viable method of getting excellent stock into the hands of small-scale beekeepers.

The Use Of Virgin Queens Was A Viable Method Of Getting Excellent Stock Into The Hands Of Small-Scale Beekeepers

We received excellent public relations from the website of the Kalamazoo Bee Club – perhaps too good because people think we have a huge operation. The truth is painfully modest.

Steps in using virgin queens

We produced queens using the starter and finisher colonies as outlined in *Queen Rearing Essentials*. We also used the cell builder colony that is made from frames of brood from all the colonies that form a queenless colony with very little open brood for cell production but a swelling number of nurse bees producing royal jelly but having no place to put it! They were very receptive to feeding the larvae we grafted into cells and put into this colony. Just one was all we needed, as once the cells were started we move the cells into cell builder colonies (queen below, brood above a queen excluder).

I selected the JZs-BZs plastic cell cups with the wide base as our grafting cells. We had a different color for each breeder queen, so we could look at the cells and visually know the colony that produced the larvae we grafted. These cells were removed from the grafting bar before the queens emerged (the closer to emergence the better, but we often had to adjust the bee schedule to our own because of work, travel, and other activities).

The sealed but not yet emerged cells were put into wood and screen cages that fit into a standard frame. These can be made at home or purchased. We returned the cells in these cages to the cell finishers. Other beekeepers emerge cells in an incubator with the temperature at 92 to 95°F.

Virgin queens in cages that hold cells. The frame is placed between two frames of open brood in a cell-builder/queen holder area above a queen excluder with the hive's queen below the excluder.

When the virgins had emerged (we followed the calendar for this most of the time) we removed the frame holding the cells, brushed off the attendant bees, and carried the queens to Dad's barn, rebuilt about 1951 and carefully maintained in that condition ever since! While a nice lab would be wonderful, we made this space work. We removed the queen cell base from the top of the screen-wood cage and let the virgin queen crawl out of the cell 'toward the light.' Unfortunately it requires some practice to carefully pick up rapidly moving virgin queens before they fly out the barn door (the barn is hot). Sometimes they buzz on the floor and we chase after them like the three stooges. Cathy and Craig use a queen 'mitt' for virgin handling inside a screen cage. I am pleased to report that most queens were properly handled, marked and transferred to a plastic queen cage filled with queen candy. These were put onto holding bars and returned to the queen holding colonies. Each cage was marked with line name (this year I want to incorporate color tags or pins that can be used on the outside of the hive to mark the colony as to line type).

Once counted, we let folks know the kind and number of virgins we had available. Most of customers just wanted a queen, many did not know they needed to mate, and I am sure our short mini lectures were way more than they wanted to hear!

The key to using virgins

Most of the mini lecture to people who purchased, bartered or were given virgin queens focused on the need to hold the queen in the colony or nucleus for three to five days before removing the plastic cap that prevented the queen from fast release in the hive. Because these were virgin queens they need to be housed in the colony for several days to allow their pheromones to increase in production and to mature more. Keeping the virgin caged prevented her from flying out of the entrance of a small colony and never being seen again! We also advised that when they returned to the colony to remove the cap that they time this at the end of the day, so the bees can consume the candy during the evening and the queen emerges from the cage at night, and cannot fly out. Since we tried to provide virgin queens that were between a few days to up to two weeks post emergence, these queens were quite close to mating age when they were released.

Emergence.

Users had good luck with virgins two weeks old. Our oldest reported mating (a friend who got free virgins at his own risk), was with six-week-old virgins. I do not recommend you use anything after two weeks, but it is nice to know how flexible Nature can be with bending the 'rules.'

Biggest problem

My biggest problem in using virgins is keeping good records so you know exactly which colony holds a caged virgin and when she should be uncapped and allowed to emerge. It is embarrassing to open a nucleus and find a virgin in a cage with the cap on the cage, and to do this three or four weeks after she should have been liberated. It is always good to know that there is room for improvement in the apiary. BC

Bee-sentials: A Field Guide by Dr. Connor is available for immediate shipping. Order from your favorite bee supply dealer or directly from Wicwas Press, 1620 Miller Road, Kalamazoo, MI 49001. The price is $29.95 postpaid in the United States. If you live outside the US, please email ***LJConnor@aol.com*** *for a quote payable via PayPal. Or check out the* ***www.wicwas.com*** *website for PayPal purchase. This full color book is ideal for use in bee classes and training programs, so contact Dr. Connor for quantity discounts to bee clubs.*

Air Almond

A Bird's Eye View Of Some Of California's Almond Orchards, Pollinating Honey Bees And Very Scarce Water

Kim **Flottum**

Sometimes you have to get above the normal to see what's normal. While we...my photographer Kodua Galieti (www.koduaphotography.com) and I...were in the Bakersfield area, we did just that. We took a look at what was going on below from hardly any to several hundred feet up in the air...at anywhere from 30 miles per hour – nearly a stall - to over 100 miles per hour in a dive.

Our pilot, Armando Lewin, flew up to Bakersfield from the Van Nuys airport, sort of between Ventura and Ronald Reagan Freeways just off of 405 near Los Angles, in his 30+ year old four-seater Cessna Skylane for our adventure. Armando's boss, Robin Petgrave has a hanger in Compton where the Tuskegee airmen hang out, and where they have a museum of sorts for the group. With the recent movie they've been pretty popular, so the plane Armando flew up in had been signed by the Tuskegee pilots that are part of that operation. Way cool, even before we get off the ground. If interested, you can see more at **https://sites.google.com/a/tamuseum.org/to-morr/.**

Armando Lewin, the pilot.

Touring almond orchards is a pretty rare experience for Armando it seems. A professional pilot, he spends time in helicopters and small and larger planes including jets ferrying people from there to here, doing stunts for movies, and, as he says, draggin' rags – pulling those banners behind him with advertising or Will You Marry Me proposals. That takes a special kind of skill it seems since you have to make sure the 'rag' doesn't get tangled up in any of the plane's gear. When he's not flying for a living, he flies for fun in his hang glider.

To get an unobstructed view when shooting from inside the plane we had to remove the support that kept the window from opening all the way. When it was gone the window could be opened completely and you could lean out. When the plane would fly with its wings nearly vertical instead of horizontal you essentially hang out of the plane and look straight down on your subject . . . trusting completely a 30+ year old seat belt. At the time, I didn't realize the plane, and the seat belt were that old.

That morning, Frank Eishen, from the Weslaco Bee Lab asked us to photograph one of the orchards he and his crew (read much more about this project later) were working in to see if he could get a measure of the reflectance of sunlight off the flowers in the orchard. He knew the percent bloom of that orchard that day because they had spent the day on ladders, that's Frank 12 feet off the ground, counting buds and blossoms, and wanted to see if there was a way to measure that percent easier than going there and counting flowers. We'll see if that works when he analyzes the photos and the data.

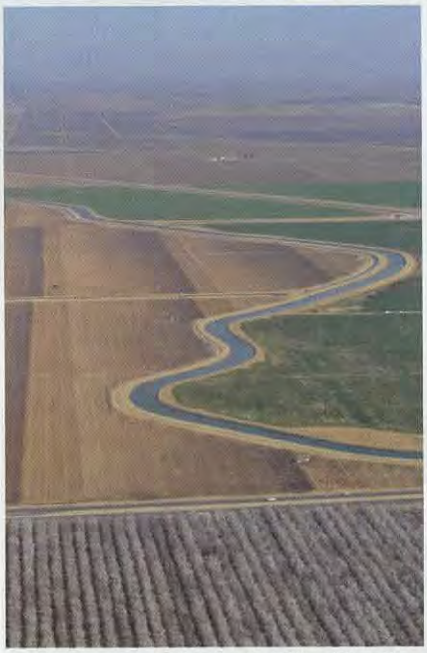
But almond orchards pretty much all look kind of the same from 500 feet, so to get to Franks orchard you needed one of Joe Traynor's township road maps that he marked with the red "X" on the orchard we wanted. And to find that orchard, Armando used an IPad with google maps while in the air – hey, it worked. Welcome to the new brave new world of air traffic control.

Not much above the tree tops and looking almost exactly straight down you can see six pallets of bees that are waiting patiently for more flowers. The bloom was a bit erratic early on due to cool weather, and the varieties were blooming unevenly. This can be a cause of concern for the growers if it lasts for any length of time because almonds need to be

cross-fertilized to set a nut.

I've mentioned before that although both Alaska and Texas are big, California does big things, and agriculture is no slouch. Considering that the Bakersfield area gets about 5.5 inches of rain a year, and according to Joe Traynor, who lives there, almonds need over 40 inches...and even more if a grower wants to get to that magic 4,000 pounds per acre crop – the amount of water consumed compared to the amount of water from the sky is incredibly unbalanced. So wells and water that's moved from somewhere else makes up the difference. And taking a look at the scale of the amount of water moved was one of my goals...you just don't get a feel for that standing on the edge of a ditch (if you haven't already, read more on Almond water in the Inner Cover, April 2012).

Because almonds require so much water, some growers are looking for less water-intensive crops,



and grapes fill that bill. Needing only about 32 inches of water, compared to almond's 40 some inches, the cost is less for a good crop, and with mechanized harvesting growing in popularity, producing good quality grapes isn't as much trouble as it used to be. Plus, there are more markets now for what are essentially commodity grapes. Almonds make more money, but they cost more money, and in dry years – like that last couple and so far this year – water costs add up big time fast.

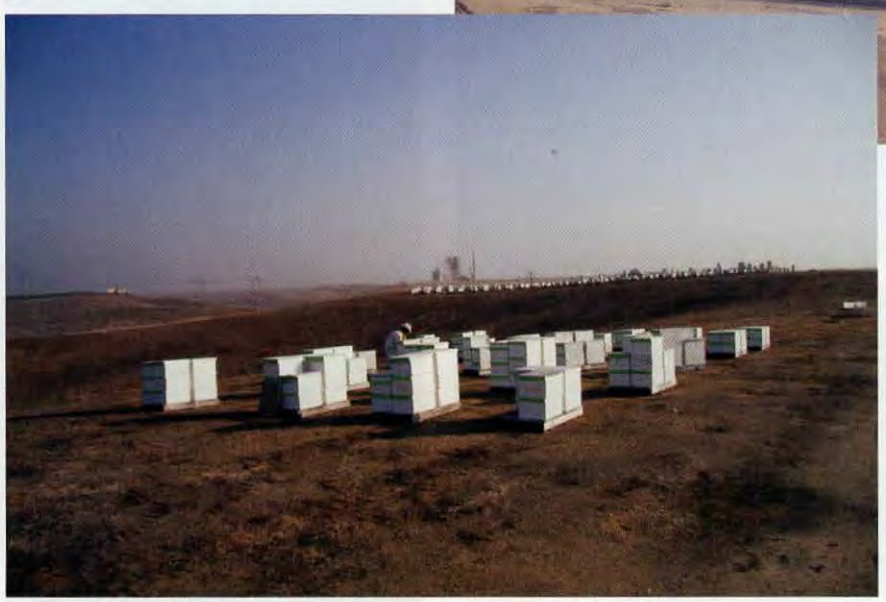
Those are new grape planting in the triangle shaped plot. Notice the three stages of bloom in the three almond orchards behind and to the right of

the grapes.

In the foreground in the photo above are almonds. On the other side of the road are row crop vegetables, and if you look close you can see workers in the field and two portapotties on the access road. On the other side of the access road are two fields of alfalfa, and the color difference I'm told is due to fertilizer application differences in the chemigation. Behind the alfalfa are more row crops, and behind them an empty field – a somewhat rare occurrence in this part of the world – and then almonds to the horizon.

There's been lots of discussion lately on available food for bees. In other forums (**blog.beeculture.com**, The Dilemma Of Holding Yards) we've discussed this exact problem – colonies brought to California in the late Fall to escape the Winters of the Midwest only to sit on a moon-like terrain depending on man-made carbohydrates and man-made protein for weeks and months at a time. Coupled with this is the challenge of putting bees in a situation where a monoculture diet is the only diet there is. Whether almond blossoms or corn tassels, apple blossoms or soybeans, when any of these are mixed with other carbs and proteins the diet is mostly OK, but when it's the only food there is, it isn't so great. There are lots of people trying to get private and government agencies motivated to initiate plantings to help with this, to get farmers to plant vacant land with bee-friendly forage, to get highway departments to plant pollinator-friendly forage along roadsides, and to get regular folks to not kill blooming plants in their yards and land.

But the holding yard issue, and the mono-culture issue aren't the only problems bees and beekeepers face when it comes to enough good food to eat. Only one kind of food or only food substitutes is one thing – but no food at all is at the bottom of this barrel – and at the top of the pile of things that are going wrong with bees lately – poor nutrition is one of the keys in honey bees not being able to handle all the other problems going on.



Development...whether commercial - think big box stores and parking lots and access roads, expanding cities (see **http://home.ezezine.com/1636/1636-2012.03.29.09.02.archive.html**,

about urban areas of the world expanding in the next couple of decades to cover an area the size of France, Germany and Spain), government (think more roads, parks, parking lots, airports), or more and more and more homes – takes land too. These photos show the future of what this land will be, and it won't be almonds, alfalfa or conservation land filled with flowers and forage. The agriculture land that borders these development plots is doomed...we all know it. So no matter where we put bees – good, bad or ugly – they are going to be challenged for where to find their next good meal. By the way, can you count the swimming pools in the new housing development to the right?

Jeff Anderson and Darrin Cox examine one of the many crashing colonies we found.

Now, add to this the most recent discussions on keeping honey bees out of conservation areas – perhaps out of CRP land, national forests, BLM land – almost anywhere there's anything left that's safe to eat, where there's enough to eat – where a honey bee can be free – which is exactly what this is – the pollinator garden at UC Davis – a honey bee haven.

Coming up in the next few months we'll be looking at some of the research projects going on during almond bloom using alternative pollinators, keeping up with several beekeeping operations and how they make this all work, watching the Inspectors...the folks who make sure the bees are what the beekeeper says they are, and visits with Randy Oliver, John Miller, Joe Traynor, Gordy Wardell, The California Almond Board, Blue Diamond, Dan Cummings, and Olivarez Honey Farms, and we'll watch as Jeff Anderson, from Minnesota and Darrin Cox, from Utah (above) take apart several collapsing colonies. Stay Tuned. The Odyssey Continues. BC

The Many Types And Variations Of Beekeepers

There's Something For Everyone!

James E. **Tew**

For those of you new to beekeeping, my following comments probably won't make much sense – in fact, my comments may not even make much sense to those of you who have been keeping bees for many years. Even so, after you've kept bees for several years – say five to 10 years – something happens . . . as though beekeeping becomes a part of you. I suppose it could be said that you grow your own memories.

Each of us who are still keeping bees can name several people who used to keep them, but are now out of the business. The reasons for their departure are myriad. The fact is some people stay and some people go, not just in beekeeping but in everything. I don't know why, and I don't know how you tell who will go and who will stay? But I have seen the following reasons time and again.

Common Reasons for Leaving Beekeeping

1. ***It became boring***. For some of us, doing the same things over and over again becomes tiring – sooner or later. After a while, you've produced honey (even comb honey), collected pollen, taken a colony from the wall of a house, raised some queens, and tried plastic equipment – ad infinitum. Been there, done that. Not much that anyone can do to prevent it.
2. ***It became discouraging***. This usually happens fairly early in someone's beekeeping career. *Varroa killed all my bees. I have to use too many chemicals. They died in the Winter. No one wants to buy my honey. My neighbors complained.* There's no shortage of reasons here.
3. ***I had a job change***. *I have to travel more now. I have to work second shift. I can work overtime hours.* For most of us, beekeeping is not a serious income-generating endeavor. We do it because we enjoy it. Once it becomes a burden, we move on to something else.
4. ***I had a family change***. A divorce can disrupt a beekeeping endeavor. A kid, who provided labor energy for the bee project, went away to college or got married. Marrying (or remarrying) can bring about a change in energy allocations for beekeeping.
5. ***I had a health change.*** All kinds of health reasons can result in a change in beekeeping interest. Some are justified physically while others are justified mentally. It's a loss to me when a beekeeper dies and I am forced to remove the deceased's name from my mail list. It seems so final.

Common Reasons for Staying in Beekeeping

The reasons for staying in beekeeping can't be listed quite as succinctly as reasons for getting out of beekeeping. For instance, take one to five above and reverse them. The reverse of getting out is staying in. *"Beekeeping is exciting. I learn so much!" "Those Varroa won't drive me out. I'll figure out something!" "Now that I'm working first shift, I have more time." "All my kids have moved out so I have more time at home." "My job is so stressful that I need some reason to unwind at home."* There are other more practical reasons such as pollination needs or income generation. Then there are some personal reasons . . . such as respect and reputation. (A statement made to you in the local grocery . . ." *Aren't you the bee man?"* It's rewarding to be famous.) For whatever reason, some of us stay in beekeeping while some of us leave. For those of us who stay, what happens? What's our future?

Some Generalized Levels of Beekeeping

1. ***The Curious Individual.*** We must all start somewhere. Very few of us are born into full-scale beekeeping operations. The label *curious individual* may

A quiet day in the beeyard during early Summer.

very well have a double meaning. It could be taken to mean that as beekeepers we are all a bit eccentric or it can mean that as individuals we have a good sense of curiosity. Regardless, at some point each of us had to ask, *"What's with all this bee stuff?"* for the very first time.

2. ***The Beginner.*** The true beginner knows nothing about beekeeping except they want to know more. Though some may learn more quickly than others, it's a phase that we must all go through. *"How can a brood box be a super?" "Is this foulbrood?"* As beginners, our questions come fast and furious. Nothing seems to make much sense.
3. ***The Experienced Beginner.*** The experienced beginner has settled into beekeeping. The terminology of beekeeping has been learned, a few colonies have already died, but some have survived. The energy level of the *Experienced Beekeeper* is still hot. Colony numbers are still growing.
4. ***The Intermediate Beekeeper.*** The intermediate beekeeper is established and confident. They have given a few talks at schools and meetings and their friends are well aware of the beekeeping commitment. They probably already have too many hives for their own good. They've had some good years and some bad years. They've moved a few hives to pollination and they have served as officers in various beekeeping groups. They no longer chase swarms all over the state.
5. ***The Accomplished Beekeeper.*** This stage of beekeeper is very near the zenith of beekeeping. They have taken classes in subjects like queen production and have produced comb honey. They travel to distant meetings and are frequently involved politically for the good of beekeeping. They have been officers in bee clubs several times and are well known to the club membership. They have dependable markets for selling their honey and their equipment frequently needs painting. These people are solid beekeepers.
6. ***The Advanced Beekeeper.*** The Advanced Beekeeper has pretty much done it all and has done it all for many years. They have explored all major aspects of beekeeping. As it were, they are the Eagle Scouts of beekeeping. They have collections of back issues of bee magazines and a good bee book library. They have various pieces of beekeeping equipment sitting in their garage that are no longer produced by bee supply companies. They are devoted to beekeeping, but not devoted to working themselves to death to keep bees. If a swarm gets away or if a colony is slightly undersupered, so be it. There's always next year. Their colonies frequently are not kept in absolutely great shape, as the intermediate and the accomplished beekeeper would have done, but the bee population is maintained with an air of experience and confidence. The burning need to do all the extra hive tasks has passed. Both the bees and the beekeepers seem comfortable with the relationship. Except for declining personal health or death, the advanced beekeeper rarely ever completely quits beekeeping.

A pleasant beeyard late in the day.

Master Beekeeper Certification Programs

State and regional certification programs are currently popular. There have always been a few such programs in various clubs and beekeeping organizations, but now most states have some type of program for acknowledging the educational achievements and contributions that various members have made. These programs normally have different levels of acknowledgement.

I have intentionally omitted the *"Master Beekeeper"* type of designation along with related terms like *"Journeyman"* or *"apprentice"* in my list of beekeeper descriptors. Anyone could move through one to six above and not participate in a certification program. Alternatively, at some level in the various master beekeeper programs, I suspect that anyone in levels two to six could participate in appropriate components of these programs.

Advancing through the levels (or not)

No one is required to move through any of the hypothetical levels presented above. An individual may appreciate what bees do for us and offer support for those activities but never actually keep colonies. An individual may become a beekeeper, but never do anything more than the very basics of beecrafting. They don't usually go to bee meetings, don't read and are not updated on current issues in beekeeping. It is possible for some of us to get to a particular level and not feel a need to climb any more.

Alternatively, I am surprised at times, by people who have a driven personality and can actually pass through levels much faster than what would be considered to be typical. If an eager beginning beekeeper did nothing but read and experiment with all his/her spare time, they would surely move more rapidly than another beekeeper who had distractions or obligations. It would not be impossible for one to be in the upper levels of beekeeper advancement and only have kept bees for five – six years.

Keeping bees for money

Beginning with the intermediate beekeeper, a person may decide to consciously make as much money as possible keeping bees. From that point on, beekeeping is not a hobby but a job. Though the biology of beekeeping is the same, the beekeeper's attitude changes – and it's not a bad change. Commercial beekeepers must always consider the bottom line while hobby beekeepers – even advanced hobby beekeepers – can work bees for enjoyment only. That's a big difference. However, a disclaimer

is in order at this point – just deciding to become a commercial beekeeper or even being a commercial beekeeper does not necessarily make one a good beekeeper. Just having a large number of colonies is not an indication of being a good beekeeper.

How to sit on a bench and keep bees

As you progress in beekeeping, you have assembled, painted, installed packages, mowed grass, fought skunks, supered, extracted, reversed brood chambers, requeened, wintered, and hived swarms. Simply put, you have worked a lot. Is this still enjoyable?

Though it's later in the season for you, it's Spring for me right now. Yesterday, I visited one of my yards where the bees were flying and searching for food. I sat in the open door of my truck for a bit to organize my plans for the hour or so I had. The grass needed cutting. Due to the heat and the real possibility that the bees would eat me alive for cutting grass right now, I decided to put it off. Some of the colonies could use another super but I don't have any with me. I'll get to that soon when it is not so hot. Some the hives could stand a coat of paint, but that's a job for next Fall. I never did mulch around the hives last Spring, but that's no big loss. Hmmm, what to do with my time?

As I sat there, I easily talked myself into doing nothing – nothing but sitting in the beeyard on a hot Spring day, enjoying the blue skies and smelling the smells of the apiary. What is it about beekeeping anyway? Why was my hour in the beeyard so pleasant? I did no physical labor. I'm not lazy.

To me, it's all my homogenized bee memories – the good and the bad, the big and the little, beekeepers present, beekeepers past, big swarms, large honey crops, the old and the recent, and plans for the future. All these memories amalgamate into one big, pleasant, vague memory as I sat in the open door of the truck.

Dealing with Guilt in the beeyard

I initially thought about feeling guilty about only sitting, enjoying and reflecting – but I fought the feeling off. Yes, I will do all the tasks that I listed earlier and I will get them done in a timely way, but I'm not going to beat myself up for not working in the bee yard all the time. And importantly, if I don't get them done, life will go on.

As conscientious beekeepers, we feel a great need to always keep *ALL* hives in perfect shape, disease free, with a high population. When we don't come up to standards, we feel guilty. Clearly, it's impossible to keep all hives in great shape all the time. Hives have good days and bad days just as they have good seasons and bad seasons. We can control a few things, but we can't control most things in the yard. Too often energetic beekeepers, in an effort to help, tinker with hives too much in an effort to address *ALL* problems. At some point, a weak hive is just not worth it. Combine it. It's true. There is a degree of satisfaction to being able to bring a colony back from the brink, but it's a lot of work.

So, what is it about beekeeping?

In a perfect bee world, beekeeping should be enjoyable for all of us. There are those who will always fret over the bees and work to keep their colonies in tip-top shape. That's right for them. However there are those of us who – for whatever reason – don't keep our colonies in perfect shape. Are they failures as beekeepers? Nope. That's right for them.

Grow in beekeeping. Squelch the guilt and always enjoy the bees. When it's no longer enjoyable, take up another diversion, but always remember the good bee times. BC

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The DANGEROUS Side OF BEEKEEPING

Jennifer **Berry**

While in grad school, and still a very inexperienced beekeeper, our lab was investigating the effects of certain IPM strategies (hygienic queens, bottom screens and isolated apiaries) on *Varroa* mite levels. The colonies used in the study were located in the Georgia Mountains, about two hours north of the bee lab. It was July and time to test the colonies for hygienic behavior. Once the truck was packed with all the essential items, I began the trek northward. Usually, several lab folks were available to help in the data collection but, that particular day, I was flying solo.

The colonies scheduled for testing were situated on the side of a mountain, smack-dab in the middle of a cow field. I was truly heading into the backwoods of North Georgia and what a chore it was to get there. After turning off the major highway, I traveled onto one dirt road after another, traversing around a mountain, over a creek, across a cattle guard, through a field, and finally, up a hill. Plus this was in the day when cell phones were still a rarity and not the norm. I know crazy!

After several hours of negotiating the back-roads, I finally arrived at the locale. However, my sense of relief quickly faded when I saw the condition of the access road leading to the colonies. The two inches of rain which fell the night before, made the road practically impassable. Plus, the intervening yard was home to some 30 or so cows, which were all standing behind the gate looking at me. No way was this truck going up that mountain. This is a fine time to realize that I should've packed lighter!

While reorganizing for the long haul up the mountain, I kept hearing the strangest noises. One sounded like something scratching on metal while another was a weird swooshing sound. As I scanned the area around me, I could not detect the source of the sound. The cows were still to my left, staring at me (kinda creepy), and, on the other side of the road there was a field with a herd of goats. These were not your average, run of the mill, plain white goats either, but an array of all sorts. There were big ones, small ones, and even smaller ones. Some had straight horns, while others had curly horns. There were solid colored, multi-colored, short haired and long haired goats. They seemed just as curious of my presence as the cows since they too were lined along their fence just staring at me (kinda creepy). Other than the cows and goats, there was an old barn, some trees scattered about, the deserted dirt road, and the UGA state truck; I saw nothing moving. "Hello," I called out several times, but there was no response, only those noises.

Getting nervous, I hastily lit the ⇨

smoker, finished stuffing my backpack, grabbed the canister of liquid nitrogen (part of the experiment) and headed for the gate. As I came around the truck, a sudden eruption of sound and movement shook me! Hundreds of turkey vultures (Ok. "Hundreds" might be a slight exaggeration.) took flight from their perch atop the old barn and tree. The bedlam made me stop dead in my tracks. A horde of turkey vultures is not what you want to see while standing on an isolated dirt road, in the middle of nowhere, all by yourself, without a cell phone. Plus these birds are huge with bright red heads and six-foot wingspans. To see that many, all together, flying by my head and looking at me was more than just creepy, it was frightening. The noises that I had heard earlier were their sharp claws scraping the tin roof of the old barn and their wings flapping to maintain balance.

I slowly turned my back on the scene of pending doom and headed for the gate. Carefully I pushed aside the cows and entered the field. The cows immediately encircled me, nudged me with their noses, and gazed relentlessly. I tried shooing them away and even yelled, "What do you want? I am not a bale of hay. Go away!!!!" But they stayed with me like white on rice.

Farther along my way to the colonies, I didn't notice the huge mud pit until I began to sink. Both feet quickly became stuck. Putting down all of my equipment and bending to wrench myself loose was not an option given my apprehension with all the annoying livestock surrounding me. Finally, I was able to pull free, but lost a shoe in the process.

By the time I had lugged my semi-shoeless self and my equipment to the apiary, I began to feel the heat and humidity of that July day. Fortunately, the colonies were behind an electric fence so at least I could escape wet bovine noses, but, unfortunately, they were in the full sun. Once behind the skinny metal wires, data needed to be collected on 24 colonies and the day was wasting away, so to beekeeping I went. The bees were not particularly happy since the nectar flow had ceased leaving the older field bees with nothing to do, except defend their hard-earned stores from intruders like myself. As the day wore on, the heat was becoming unbearable. I became more frustrated working with just one shoe. Plus, I had only brought one bottle of water, which had been quickly consumed before 10 AM. I was unwilling to entertain the idea of trekking back to the truck, through the cows, the mud, and vultures to drive the 20 miles back into town for a drink since it would cause an additional trip the next day.

Despite my best intentions, I soon noticed that I was having difficulty seeing eggs, and my eyes weren't focusing. Shortly thereafter, I could feel my heart beat starting to race and pounding in my temples. My hands were also noticeably shaking. Thinking it had to do with being hungry, I kept going. Then, it hit me. Little stars started from the periphery of my vision and moved slowly towards the center of my line of site. The next thing I knew I was on the ground and the sun was blazing down on me. Moments later when I collected my thoughts, I realized that shade had to be found. Looking around, I saw that the only shade available was a small patch at the top corner of the field. The cows, which also needed shade, had already inhabited the entire space. I didn't care. I crawled under the electric fence and across the field to join the cud-chewers lounging in a shade-covered mud pit. Luckily, they didn't care either.

Here I was, in the throes of heat exhaustion, all alone, with a bunch of cows and ominous turkey vultures, without water, cell phone or a complete set of shoes. How did it all come to this? I could just see the headlines now, "Mud-Covered Body of UGA Grad Student Found Splayed in North Georgia Cow Field . . . Full story found on page 11."

After resting for some time, I knew water was next on the list of "had to haves." So, down the hill I went, through the mud, out the gate, by the vultures, past the goats, across the field, down this dirt road, then another,

around the mountain, then another, until I found a convenience store.

Footware-challenged, covered in mud and smelling like cows, I proudly limped into the store and bought a dozen or so bottles of ice-cold water and Gatorade. Standing before the store clerk with disheveled clothes and "Don King" hair, she wouldn't even look me in the eye; she was probably afraid that I was about to freak out at any moment. After drinking several bottles, I began to rejoin the living. The lesson of the day was the next time I was to go into the field I would be better prepared, and so should you.

What may be best for the bees may not be best for us. There has been limited research on the effects of apiary location on *Varroa* mites and small hive beetles. In 2004, Dr. Rinderer compared colonies with commercial Russian stock to those colonies with Italian stock, as well as the effects of direct sun exposure and shade, on the growth of *Varroa destructor* populations, worker bee populations and honey production. He concluded that colonies in the sun had significantly fewer mites than colonies in the shade. Research conducted on Small Hive Beetles (SHBs) has shown that soil moisture plays a significant role in the success rate of beetle pupation; beetle populations are unable to reach damaging levels in more arid (i.e., sunny) locations.

However, if you have worked colonies in the full sun, during the summer months, then you understand how brutal it can be. In the perfect world, we would all have apiaries with morning sun and late afternoon shade, cool breezes, and a refreshing minty mist from the nearby crystal-clear waterfall, which keeps temperatures in the mid-seventies. Actually, several of my spots are perfect, minus the waterfall and minty-fresh breeze. The sun hits the entrances at first light, which gets the bees warmed up and raring for action. As they say, "the early bird gets the worm," or, in our case, "The early bees get the nectar." But, I have a few apiaries that are the reverse: morning shade and afternoon sun.

Working bees is hard enough, plus your health is in potential danger. Not only are you exerting yourself (i.e., back issues, muscle strain), but you are exposing yourself to two very serious conditions when working outside: heat exhaustion and heat stroke. Both occur when your body experiences hyperthermia, where the body heat rises dramatically.

Heat exhaustion is the lesser form of the two heat-related illnesses. It occurs when the temperature of the body gets too high and can't cool down properly. It can range in severity from mild to severe, can show up days after exposure or lead to the more serious, life-threatening, heat-related syndrome: heat stroke. There are numerous warning signs that heat exhaustion has a grip on you. They don't come in any particular order and may appear in different ways. You may experience heavy sweating, muscle cramps, weakness, headache, muscle spasms, nausea, and vomiting. If these symptoms are left untreated because you continue working and ignore what your body is trying to communicate, it may progress to heat stroke which is a medical emergency and is often fatal if not treated promptly and properly. So always pay attention to what your body is telling you, especially while working in high heat and humidity.

Heat stroke, also referred to as sun-stroke, occurs when the body experiences extreme hyperthermia which occurs when your temperature rises to 106°F or higher. Symptoms include those of heat exhaustion plus feeling faint, clammy, tired, dizzy, lethargic, and confused. Having a seizure may also occur.

Our bodies create heat and will dissipate it through the skin. As we sweat, air circulates over our body and, as the moisture on our skin begins to evaporate, it actually cools us down through a process called evaporative cooling. Bees even take advantage of this principle as well. During hot weather, bees regurgitate droplets of water, hold them in their mouths, position themselves throughout the hive, and fan their wings. The air passing over the water cools the interior of the hive.

Another cause of either heat stroke or exhaustion is being dehydrated. When the body runs out of water, and sweating doesn't occur, the effective dissipation of heat fails and, hence, internal temperatures rise.

There are steps that can be taken to minimize becoming ill, embarrassing yourself or worse! First, always wear loose fitting, lightweight, light colored clothes. Not only does dark clothing absorb heat, but it may also cause your bees to sting. If you wear a beesuit, then have minimal, lightweight clothing on underneath (shorts, t-shirt or bikini works well). Make sure that both the suit and your clothes are not too tight and preferably made out of a breathable fabic (ie..cotton). Sweating is actually a good thing, but, if your clothes are too tight, evaporative cooling can't occur. Drink lots and lots of water. Think in terms of gallons. It is recommended to drink a cup of water every 15 minutes while working in the heat. I'm lucky if I drink a cup every hour, which is something I need to improve. It seems as though I am always on a tight schedule, and taking a minute to drink some water or rest just doesn't occur to me.

Working in the morning hours when temperatures are cooler helps as well. If you begin to feel the slightest problem, stop what you are doing, seek out a shady spot, sit down, and drink water. Over the years I've learned to bring a cooler with plenty of ice water. When I start feeling lightheaded, I take a bandana, soak it in ice cold water and lay the cloth on the back of my neck or forehead. I feel better almost instantly.

Beekeeping is a wonderful hobby or job, but there are risks involved. As researchers and beekeepers, we focus so much energy on taking care of the bees. We put the bees in the best locations possible. We check on the bees. We feed the bees. We treat the bees for infections, infestations and disorders when necessary. But, while working the bees, we need to be concerned with taking care of ourselves as well. It's easy to get caught up in the work and forget how important that is. So, be careful out there. Dress appropriately. Drink plenty of fluids. Take breaks, take your time, and stay healthy.

See Ya! BC

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

Glass Jar Beekeeping

Creating Edible Art

Morris **Ostrofsky**

Bees have always perfectly packaged honey in wax comb. Before the advent of modern bee hives, the bees built honey comb in straw skeps. Around the middle of the 18th century glass jar beekeeping was introduced. This novel technique involved placing a glass bell jar on top of a flat topped straw skep. The idea was for the bees to gain extra storage space and to produce honey comb in a showy form. When new methods of producing honey, such as removable frames were introduced, glass jar beekeeping lost popularity. Today the concern with adulterated and antibiotic contaminated honey has prompted renewed interest in local sources of honey including honey comb.

This article describes how to work with the bees to create a modern twist to bell jar beekeeping. Building comb in a jar versus a standard frame is not the bees' first choice and represents a departure from standard beekeeping. The ability to successfully manage this behavior goes beyond the basics. This project is for experienced beekeepers ready for a new challenge.

The directions for this process are based upon the assumption that an established hive with a first year queen is being used. In addition to producing an edible piece of art, it is just plain fun watching the bees build honey comb in glass jars.

Preparing The Glass Jars For The Honey Flow

Building honey comb in a jar rather than on frames is not the bees' first preference. You need to set the stage by creating a strong, well- populated hive that is looking for any place to store honey. The amount of brood space the bees should have is the equivalent of one full depth brood box plus one western (medium). If you prefer using all westerns, then use three westerns for your brood area. A young, first year queen is necessary to achieve these over crowded conditions because she builds a strong population quickly. She is also less likely to swarm.

Here is a list of the materials that you will need for this project.

- 11 one pint wide mouth Mason or comparable jars with metal rings
- 11 wide mouth plastic storage lids
- 1 migratory cover without cleats or an inner cover
- 1 propane torch
- 1 large sponge
- 1 pint feeder jar
- 1 western (6 ¾")
- shade cover (not needed if hive is protected from the sun)
- Strips of foundation or empty comb
- Safety goggles
- 2 fire or other non flammable bricks

If the bees are to build honey comb in a jar, you must provide jars that have been prepped for this purpose. Just like building a home the bees need a foundation upon which they can build their comb. Strips of drawn comb or foundation attached to the side of the jar provide them with a place to start building. Preparation of the glass jars involves a number of steps. They may seem daunting at first. However, after the first few jars, you will not be intimidated.

1. Drill 12 holes using a 2-5/8th inch hole saw (usually used to drill holes for door handles) in the migratory or inner cover. Position the holes as shown. If the holes are placed too close to the edge of the cover, there will not be enough room for the empty western and jars that will be placed on top of it.

2. Cut each strip of foundation or comb approximately ½ inch wide and a length that extends about ½ inch beyond the mouth of the glass jar. This provides an easy way for you to hold on to the wax while it solidifies, and provides the bees with a bridge as they move up into the jars.

3. Prop up the jar on non flammable material. I use fire bricks. Since you are working with glass and a torch, protect your eyes with safety goggles before beginning. Place a roughly pea-size or smaller piece of wax foundation on the side of the jar to be heated. Direct the torch under the glass where the wax is located. When the wax just starts to melt, this tells you that the glass is at the right temperature to proceed. Remember beeswax is flammable; do not heat it beyond the point where it just starts to melt.

4. Take the heated jar and place it on a wet sponge. The wet sponge will start cooling off the jar. Immediately take the strip of foundation or comb and hold it on the heated side of the jar. Use the extra ½ inch strip as a handle. Hold it in place until the melted wax solidifies. The wet sponge will prevent the wax strip from completely melting. It is not necessary to have the entire strip attached to the jar; only a few points of contact are necessary. Repeat this process until you have three strips equally spaced inside the jar.

Prepared glass jar

5. Screw the metal ring finger tight onto the mouth of each prepared Mason jar. The ring keeps excess propolis from being deposited on the mouths of the jar. Because the opening in the ring is slightly smaller than that of the Mason jar, you may need to trim the bridge comb a little for a proper fit. Invert the jars and place them over the holes in the modified (migratory/inner) cover. The empty hole in the middle row of the modified cover is used for an inverted jar feeder. I use one part sugar and one part water sugar syrup for feed. Keep the modified cover level when moving the assembly.

6. Place the modified cover, including the jar of sugar syrup, on top of the upper brood box. Protect this assembly with an empty (no frames) western or any other comparable sized box and cover it with a standard migratory cover. The western allows the bees to work in complete darkness. Do not use a queen excluder. It creates an unnecessary barrier for the workers. Also, since the glass jars are a lower temperature than the brood area, the queen will not move up into the jars to lay eggs.

7. Continue to feed the bees sugar syrup until the honey flow starts. This is done to stimulate their wax glands and to speed up comb building. Feed them just long enough for the bees to draw out comb. You DO NOT want them storing sugar syrup in the jars; this is NOT honey. Leave the **empty** feeder jar in place after you stop feeding. This prevents the bees from coming up into the western and getting travel stain on the jars.

The honey flow: the artistry begins

Now comes the fun part. The bees do not usually get an opportunity to demonstrate their artistic side without the influence of foundation; normally foundation and the spacing of foundation (bee space) is their only palate. Now with starter strips and their innate artistry, they create edible art.

As the honey flow progresses, so does the artistry. Depending upon conditions, within a couple weeks the bees advance from starting to build comb to nearly filling it. Their progress can be followed by simply lifting the migratory cover and looking. Surprisingly unlike opening a hive and checking frames this does not seem to bother the bees.

The Harvest: almost too beautiful to eat

When the bees finish capping over the honey comb, it is time to harvest. The process of removing bees from the jars is similar to using a bee escape to remove bees from a standard western honey super. Smoke is not needed nor is it desirable. Using smoke runs the risk of getting small particles of ash in the jars.

Remove the empty western with its cover. Lift the modified cover with the attached jar assembly and set it aside. Place the bee escape over the upper most brood box and reposition the modified cover with its jars over it. Finally replace the empty western and cover. Keep in mind without bees in the jars there is no temperature control. Therefore, if it is not protected from the sun, provide a shade cover for the hive. Within a day the bees will have left the jars. At this time remove the assembly and replace it with a honey super. The bees can use the remaining honey flow to fill the super with Winter stores.

To separate the finished jars from the modified cover take a knife and pass it between the ring and the cover. Remove the metal ring and clean up any unneeded wax or propolis by scrapping it off with a knife.

Before filling the jars with bulk honey, they need to be stored in the freezer to prevent wax moth larva from hatching out. Screw the plastic storage lids LOOSELY in place on the jars and store them in a well sealed card board box in the freezer for at least three days.

When it is time to fill the jars with bulk honey, take the box out of the freezer and allow the box with the jars to come to room temperature BEFORE opening the box. This takes about a day. The reason this is so important is if cold jars and comb are exposed to air, water will condense on them. Your last step is to fill the spaces between the honey comb with bulk honey and cover the jars with plastic storage lids.

Glass jar beekeeping combines one of nature's most unique packages with one of its most unique foods. It gives the bees the opportunity to display their artistic skills while giving you the opportunity to watch your artists at work.

I could find very little information about glass jar beekeeping. Much of what is described comes from the three years I have spent learning how to do glass jar beekeeping. As I have worked with the bees to build these

edible creations, they have taught me some important lessons. Probably the most important is that a young queen must lead the hive. I also learned that the glass jars need to be the only place the bees have to store surplus honey. The final lesson is that the hive must be strong and healthy.

Like any beekeeping technique glass jar beekeeping can be modified or improved. With that in mind I have couple of ideas I will try this year. One is to use a thin line of bees wax painted on the inside of the jars instead of using strips of foundation. The other idea is to utilize a freshly caught swarm to quickly build the comb in the foundationless jars.

I would appreciate feedback about what you learn from your bees while working with glass jar beekeeping. BC

A retired biology instructor, Morris has been a beekeeper for 43 years. He can be contacted at **Ostrofsky@pacinfo.com**.

Suggestions For Beginners

Ross **Conrad**

Spring is the time when most folks start their beekeeping adventures with their first hive of bees. Most of us go through a similar process . . . we learn some things about beekeeping, we begin to feel confident, we get our bees and quickly become overwhelmed and intimidated within the year (or sometimes within the month). While I have only been keeping bees for 20 years, I have made a few observations that I would like to share that I think may be of value to the beginner.

The initial learning curve in beekeeping is fairly steep so it is wise to begin learning about bees and the role that a beekeeper can play way ahead of time. To begin reading beekeeping books and journals, and taking beekeeping classes and workshops a year ahead of time would not be overdoing it. In fact it is more desirable since our busy modern lifestyles often get in our way and if we wait to begin learning how to take care of bees until just a couple months before the girls arrive we are likely to be unprepared for their arrival and simply go through the year in a haphazard way without having the kind of experience and results we really want and hope for.

Another recommendation I offer the would-be beekeeper is to start with two hives instead of one. Two hives are only a little more work, and not a whole lot more money than one hive, and yet the benefits are substantial. Two hives help greatly with the steep learning curve all beekeepers must go through since comparisons between the hives can be made and your experience level is doubled. The importance of the number of hives in building experience was brought home to me during my second year working for one of the largest commercial beekeepers in Vermont. At that time I felt very much like the new kid on the block, not very sure in my knowledge of the bees and my role as a beekeeper. Yet, I found myself at a meeting of the Vermont State Beekeepers Association discussing with a fellow beekeeper what I had seen and experienced with the bees I had worked with and the various issues, like *Varroa* mites, that I had dealt with over the course of the year. Imagine my surprise when I soon had a small cluster of beekeepers sitting around listening to what I had to say. I was even more perplexed due to the fact that some of these beekeepers were real old-timers who had been keeping bees for 30 to 40 years or so. In reflecting upon this experience afterward I realized that since the majority of the beekeepers in the Association kept fewer than five hives, after 40 years they would have only seen about 200 hives (5 hives X 40 years) go through an entire season. Due to the limited number of hives, they simply did not have the opportunity to encounter the range of experiences that I had run into in a single year helping to care for a thousand hives. By starting with two hives instead of one, the novice beekeeper has the chance to increase their experience level 100 percent in the first year without the danger of becoming overwhelmed. That said, I can tell you from experience that the best way to learn beekeeping is to work for a commercial outfit if possible, and get paid to learn!

Due to the high demand and short supply of bees, it is a good idea to for beekeepers to get their package or nucleus colony orders in early to ensure that the bees they want will be available when they want them. Since the advent of Colony Collapse Disorder many beekeepers are finding that placing orders for bees in January for spring delivery is not too early. On some occasions waiting until January may actually be too late, as some suppliers become sold out well ahead of time and the best they can do is put you on a waiting list for late season delivery if possible, or even next year. Whenever your bees are ordered, please be sure to have all your equipment assembled and ready to go *before* your bees arrive. To keep bees that are stressed from the experience of being shipped a long distance or are overly crowded in a small nuc box, contained for several more days or weeks while the hive equipment is being ordered, assembled, and painted is not a good situation. By the way, it is far easier to start with a nucleus colony, if you can get one, than to start with a package.

It is very helpful if you can find a local beekeeper who is willing to act as a mentor. Having a beekeeper with some experience to help answer your questions, guide you through the transfer of your bees into new equipment and assist you with your first hive visits can be a huge asset. When working with a mentor it is good to acknowledge and appreciate the time and experience that is shared with you and not abuse the relationship. A mentor is there to help answer your questions and act as a guide during your adventures with the bees, not do everything for you. However, there is more than one way to keep bees and do so well. Therefore, do not be afraid to listen politely to your mentor's advice, smile, thank them, and then follow your own instincts regarding how to care for your bees. For example, if your mentor tells you that you must use a certain antibiotic or toxic chemical in order to keep your bees alive and this is not something you are comfortable doing, knowing that there are natural

and organic alternatives that you can follow on your own, then follow your instincts. Once you have a comfortable grasp of honey bee biology, as well as the biology of the various bee pathogens and pests, you will naturally get to the point where you can follow your intuition, but please be sure to wait until you have a clear understanding of what bees require in order to thrive before you turn to intuitive beekeeping.

With regards to the type of hive one should start with, I recommend beginning with a Langstroth-style hive and experimenting with other style such as the Top Bar hive or Warré hive only after you have gotten a couple year's experience under your belt. There is a lot more information available on the use of the Langstroth hive in beekeeping than for using top bar hives or Warré hives and there are far fewer beekeepers with any experience with the latter two options should you have questions.

The final piece of advice that I like to offer first-year beekeepers is to not be afraid of going through their hives on a regular basis. There are people out there who teach beekeepers to leave their hives alone and to keep colony inspections to a minimum. Back in the old days before mites, small hive beetles, and a host of diseases that have surfaced on the North American continent in the past 30 years this advice would have been appropriate. Today however, the environment that bees have to navigate and the interior of the hive cavity have been so manipulated and changed by humans that in most of the country, to leave hives alone is more likely to lead to colony death than to aid in its ability to thrive. I normally check my bees every seven to 10 days, while at the same time I try to keep the disturbance of the hives under my care to a minimum. However, during their first year I encourage new beekeepers to open hives, remove frames, inspect the brood area, look for eggs, try to find the queen, and observe the levels of pollen and honey within the hive every one to two weeks. That's right, every week if possible!

This is because there is only so much you can learn about beekeeping from classes, workshops, articles, videos, and books. In the end, you have to actually open hives and handle frames of brood and bees in order to get the experience that is needed. After the first year of handling the bees regularly, you should not have to go through hives and disturb the bees with such regularity and instead be able to get a good sense of whether the hive is doing well and is developing normally or not by simply observing bees at the hive entrance and taking a quick look under the inner cover. Your goal is to be a bee*keeper* by working in partnership with the colony, not to abandon the hive to it's own devices and perhaps allow it to starve or die from disease in the process. The ancient craft of beekeeping can be incredibly fulfilling and enjoyable as long as you are committed to following through, overcoming the various frustrations that may be encountered and not becoming overwhelmed and intimidated in the process. BC

BEE SPACE

Don't Make These Common Mistakes

Jerry **Freeman**

Bee space is commonly described as the distance bees keep between the combs and the between the combs and the hive body (or tree trunk). Honey bees seem to be satisfied traveling through spaces between 1/4" and 3/8". If a space is less than 1/4" the bees tend to fill it in with propolis. If a space is more than 3/8", they tend to fill it with burr comb. When building or assembling equipment I measure all the spaces to be 5/16" which is the center of the bee space allowance. If I'm off a 1/16" either way, the bees are still happy – usually. Unfortunately, bee equipment is not standardized between manufacturers. Mixing hive bodies from different suppliers can result in different spaces between top bars of a bottom box and the bottom bars of the frames int he box above.

Even experienced beekeepers get caught violating bee space. The picture shows what happened when a friend forgot to remove the spacer added for an Apiguard container. The bees filled the extra space with comb!

It's surprising how many ways a hive can get 'messed up' because the bees insist upon keeping the 'proper' bee space. The picture shows what happens if we leave a few frames out.

Another place we see bee space in action is on plastic foundation. Regardless of what the manufacturers say, they don't put nearly enough wax on the foundation to make it attractive to bees. They will sometimes attach a comb to the top bar and leave the bee space between the plastic foundation and the new comb. I use plastic foundation because it can be scraped, power washed and otherwise cleaned up for re-use. I brush another coat of wax on the foundation of new frames and the bees work it just like wax. Plastic frames work OK without additional was if there's a good honey flow on.

Incorrect bee space is why we see so much burr comb between our hive bodies. In the homemade hive body below, the frames are set too deep. This can happen even with 'store bought' equipment if we mix hive bodies from different suppliers. Equipment is more standardized today than in years past, but it's still not all exactly the same. If you're getting an excessive amount of burr comb between your hive bodies, check the space between top bars that have the burr comb and the bottom bars above it. If there's more than 3/8" you may be able to trim one of the hive bodies to make the space correct.

The same bee space principles apply to the inner and outer covers. It's embarrassing, but I made this mistake when designing a screened inner cover. I had my mind on making it strong and creating ventilation for the hive. I just ran the groove for the screen in the center of edge boards. This made the space between the screen and the top bars about half an inch – too much. You can see what the bees did to the screen. Fortunately, I only made the one prototype and the bees promptly reminded me about bee space.

Keeping the proper bee space will make working your hives much easier. BC

Jerry Freeman ***www.freeman-beetletrap.com***

CAUTION: Check all your hive bodies before trimming any of them. You may have just one odd sized hive body, so don't trim a good one!

The Brothers Drake Meadery & Bar

Ben **Slay**

I have a penchant for mead and Mazers. As a hobby beekeeper for over 30 years I have supplied and bartered with a few of my local home brewers, vintners and mead makers with my honey or help as a beekeeper.

There was Pamela Spence from Ostrander, Ohio. She won a $10,000 grant to start a meadery in Ostrander, Ohio. For whatever reasons the meadery didn't materialize as a commercial operation, but she did produce mead on a small scale and the book *Mad About Mead! Nectar of the Gods.*

Another was Dan Chatfield. Since 1983 he has been the Vintner of Chatfield Wine Cellars in Orient, Ohio, where, in 1989, he was making award winning Chateau Chatfield Mead. He made his wonderful Chateau Chatfield Mead Spumante in 1990. The sparkling wine won first prize at the 1990 Ohio State Fair. It was rewarding to know that my honey shared in those ribbons that Dan earned and to drink the results of his labor. Chateau Chatfield was my hope for a meadery in my local area. That did not materialize either, for whatever reasons.

I can't remember exactly when I met brothers Woody and Eric Drake. At the time I happened to be an Officer in the Ohio State Beekeepers Association (OSBA), and one of the interests OSBA catered to at our state beekeeper meetings was Mead Making. So we employed Pamela and Dan to give some workshops on mead making. When Pamela or Dan weren't not able to provide a workshop we'd enlist the Drake brother's help in giving presentations on the subject.

When I saw that the Drake brothers had finally "arrived," by reestablishing their urban meadery I knew I had to beat a path to their new door and see firsthand the magic they had worked. So I invited my friend and home brewer/vintner/mead maker and professional photographer, A.J. Zanyk, to join me when I made the trip to see the new Brothers Drake Meadery and Bar.

The Drake brothers started their partnership in mead-making in the early 1990s. They worked diligently with Betty Fisher in Sales & Marketing, and Ben Hansen in Production to get their meadery up and running. Then the inception of Brothers Drake, LTD occurred in May 2004. Several years later they decided to expand their brewing capacity and locate in a place where more people could access their mead. The Drake brothers established their first brew house/meadery and bar at 206 Oak Street in Worthington, Ohio in 2007.

In 2007, when they initiated a search for funding they found Oron Benary, who brought his industrial paint plant experience and wisdom to the Brothers Drake Team. Oron joined the Team while living in California but in April 2010 he and his fiancée Sarah Jones moved to Ohio to join the Drake brothers and work on transitioning the meadery from the Oak Street location to a new space. The current Brothers Drake Team now consists of Sarah Jones, Marketing and Sales Oron Benary, Co-Owner; Woody Drake, Founder, Co-Owner and Master Mazer; and Eric Allen, General Manager.

In February last year The Brothers Drake reopened in a posh new location at 26 E. 5th Avenue in the Weinland Park area, a revitalized neighborhood in the University and Short North Arts Districts. it is the only commercial meadery in the Central Ohio area, with 3,000 square feet of space. They share a building with the micro-distillery Middle West Spirits, run by Brady Konya and Ryan Lang, Distillers.

Oron informs me ". . . the relationship is non-competitive and we have a great relationship. Local good will is important. I know my outside and inside customers by name."

That attitude won The Brothers Drake the 2011 SBB Business of the Year-Small Business Bean Stalk Award, as Columbus' first, finest and only urban commercial meadery.

The Brothers Drake make their award-winning mead using local honey and the best locally sourced ingredients whenever possible. They get their honey from Brad McClincy of Marysville, Ohio. Brad lives in Champaign County, is an Ohio Apiary Inspector, and a life-long bee-lover who produces some of the most exquisite pure Ohio Wildflower honey in the state. They also use local berries from Champaign Berry Farm, owned by the Pullins family, just outside of Mutual, Ohio. They obtain dark sweet pitted cherries grown in Michigan and distributed locally at Twin City Frozen Foods in Baltimore, Ohio. other fruit comes from Hugus Farms of Rushville Ohio.

Today, the Brothers Drake produce **Varietals/Traditionals** – mead made from single-floral-source honey; **Melomels** – mead made with the addition of fruit; **Metheglins** – mead made with the addition of spices; and **Cysers** – mead made with the addition of apple cider or juice.

They produce about 1,000 gallons of choice mead a year, which is about 800 cases of mead, which takes from six to nine months to cure.

These bodacious meads come with names like Apple Pie (my favorite!), Testa Rosa, Pillow Talk, Bergamot Blue, VO, Wild Ohio, Honey Oak, Hopped Traditional and Scarlet Solstice.

Orlan Clasen, the Production and Quality Assurance Manager, is very fastidious about his work. Quality assurance (pH, specific gravity, etc.) is constantly being monitored. And, by manipulating the ingredient and yeast process, Orlan ensures that the brew is successful by insuring proper yeast propagation, certainly one key to producing great mead.

Berries go from whole to a juicy puree, and manual labor is used to filter out the seeds. This greatly reduces the tannins in the puree, which detract from the uncompromising berry flavor. The Fruit is juiced and properly processed to prevent any bacteria or wild yeast that may be on the fruit from entering the recipe. These steps allow them to provide gourmet, sulfite-free mead.

Other touches include using the best available spices purchased locally whenever possible; filtered water a constant 65°F in the fermenting room. Plus, the mead is subjected to sterile filtration before being bottled, and a ZORK STL is used to stopper the bottles.

Conclusion:

To me, the Drake brothers and the Brothers Drake Team are to mead what the Keebler Elves are to cookies. They make the world a whole lot sweeter. But I think Woody is the only one that lives in a tree.

If ever you are in Columbus, Ohio, visit the Brothers Drake Meadery and Bar in the University and Short North Arts Districts. Their mead is mighty tasty. You won't be disappointed. BC

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No Vacuum? Use This Swarm Bucket

David **Middleton**

Last year I recieved a call about a swarm of bees in my parents strawberry patch. I immediately grabbed my equipment along with a five gallon bucket and raced to their house. While watching me scoop handfuls of bees along with strawberry plants and mulch into my bucket my Dad shared an idea of his for a swarm bucket which he had came up with in the seventies. He had kept bees back then when I was just a kid but had quit before he was able to see his idea come to life.

A couple of days later found us in the shop building our first set of buckets. After a few minor design changes, two swarm seasons, and three captured swarms we have decided to share this design with everyone.

PARTS

- Two plastic buckets (With handles and lids) two-five gallon in size need to be matching buckets
- One piece of window screen which is larger than the bottom of your bucket
- One piece of ¾ inch plywood which is larger than bottom of your bucket
- Eight ¾ inch wood screws
- One roll duct tape

STEP 1

Place plywood on a flat surface, place bucket on top of plywood and trace a circle onto the plywood.

STEP 2

Using a scroll saw cut out circle staying to the inside of the line. I've found that the bottom of most buckets has a lip along the edge to keep bucket off the ground. Plywood circle should fit easily inside this lip for ease of assembly.

STEP 3

Now you will cut a six inch circle from the center of your wood circle. I used a bowl as my template doesn't have to be exactly six inches nor centered exactly just eyeball it. Drill a small hole near line that is large enough for scroll saw blade to fit into and cut out circle. You now are left with a wood donut.

STEP 4

Turn bucket upside down, place wood donut on bottom of bucket and trace cut-out circle onto bucket bottom. Drill a hole in bottom of bucket for scroll saw and then saw out the circle. Repeat this step with your other bucket.

STEP 5

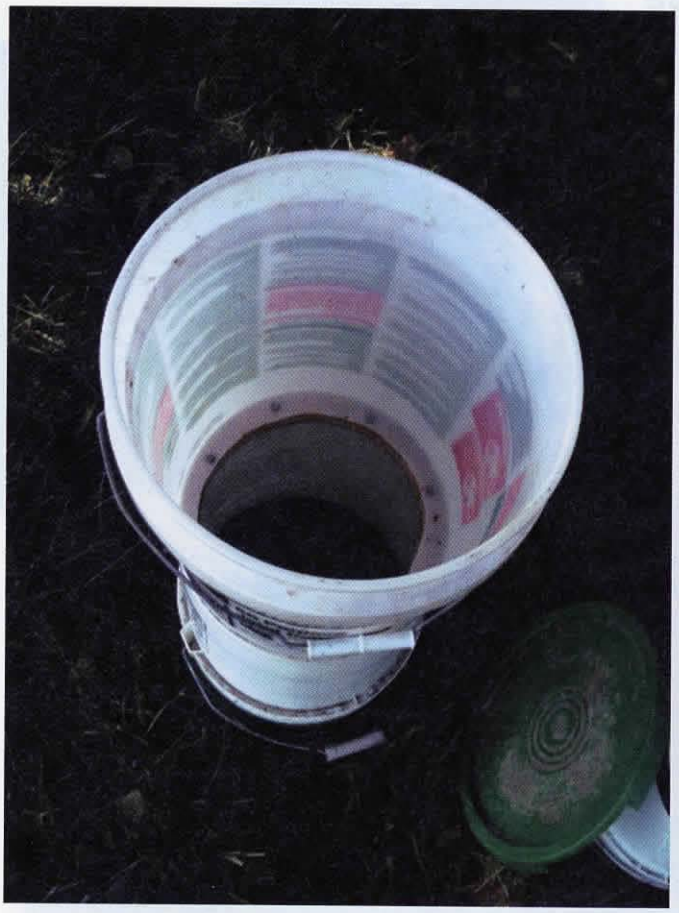
Turn one bucket upside down and place window screen on the bottom of bucket. Now place wood donut on top of window screen. Next place other bucket bottom side down on top of wood donut. Reach inside top bucket and screw in four of the wood screws into bottom of bucket. Space the srews an estimated equal distance apart. Now flip the entire stack over and screw the other four screws into the bottom of the other bucket. Try to space them so that they don't line up with screws in other bucket.

STEP 6

With a sharp knife trim off excess window screen on the outside of buckets and then wrap a layer of duct tape around the seam.

STEP 7

Using a 1/8 inch drill bit, drill several dozen holes in both lids for air holes.



TIPS

I carry extra lids. One solid with no air holes and one with screen and wood donut like used on bottom of bucket. I use a two gallon set of buckets and a five gallon set depending on circumstances. If the swarm is in a tree I will brush the cluster into one bucket and cover with solid lid. I then invert bucket and remove opposite lid and hang by handle and a piece of wire near the remaining cluster of bees. If you captured queen on first try all remaining bees will soon enter open bucket and cluster on window screen at the bottom of your buckets. If they don't the queen is most likely still loose. Allow them to recluster and try again. When I close second bucket I use lid with window screen during warm weather and lid with small air holes during cold weather. These buckets can serve other purposes. I recently removed a wild swarm from a tree which had been blown down into a wet weather spring during a wind storm. Always have your swarm gear prepared. This past Spring heavy flooding forced a truck driver for an apiary delivering packages to release his load into the wild. This occured well before swarm season and unfortunately during very poor weather conditions. Hopefully a few survived and will mix with our Ozark feral bees. We are blessed with a large healthy population here in southern Missouri. Good luck swarm hunting and if use our bucket design please just Bee sure to leave no Bee Beehind. BC

Field Day!

Thoughts on holding a Field Day for your group this Summer . . .

Ann **Harman**

Every beekeeper agrees that opening up a beehive and seeing the bees at work is more fun than anything else. Now that Spring has arrived, flowers are blooming and bees are busy, it's a wonderful time for a local bee association to have a field day, an open-hive day. Now this is not a family picnic time. This is a day for beekeepers, including newbees.

Scheduling a field day can be a challenge at this time of year since you want sun and warm weather – a perfect Bee Day. Depending on your location in the U.S., you may wish to schedule your field day in June or July or even later in the bee year. There is no need to disturb the bees during your main nectar flow. Besides nobody wants to lift off several supers heavy with honey at every hive. So perhaps now is a good time to plan your field day and when best to actually have it.

How many beekeepers do you think will come? Good – practically the whole club. Now you need to think whose beeyard will be suitable for the number expected. Only so many can crowd around a hive. It would be nice to be able to divide up the whole group into smaller ones so everyone has a chance to see. It also would be nice to have the newbees, those in their first year, to be in their own group with an experienced mentor. They then would be more apt to ask questions and not feel intimidated by the expertise of experienced beekeepers. Next year they will feel much more confident.

It would be nice if several experienced beekeepers would volunteer to do the actual opening of the hive and removing frames. The groups of beekeepers could be rotated from one hive to another. If something quite unusual is found in one hive, using groups insures that everyone will get a chance to see and learn something.

At this point a very important announcement must be given to all who plan to attend. Veils **must** be worn when in the beeyard. Emphasize that point. "No veil? Go home!" Please do not allow someone to participate who declares: "I never wear a veil." And refuses to wear one. Not only is that dangerous but it also sets a poor example, especially for the newbees who do respect experienced beekeepers. Remind the club members that they need to bring their own veils and other beekeeping clothing.

You may wish to request that hive tools, leather gloves and smokers be left at home. Many beekeepers worry about contamination from diseases carried by equipment. However, you need to have enough smokers and hive tools so that the leader of each group is equipped. Perhaps the group leaders can clean up and bring their own hive tool and smoker.

Gloves are a problem. A box of protective gloves can be bought at hardware stores. Then everyone can be given one or two pair to wear as protection. Be sure to announce that such gloves will be available for anyone who wishes to wear gloves.

The beeyard has been chosen. Well, almost. A few other factors need to be taken into consideration. Where will all the cars and pickups be parked? Wet muddy areas can be isolated with some surveyor's tape, as can other

areas that are off limits. If parking is a major problem then club members need to be strongly encouraged to carpool.

Keep in mind that someone attending the field day may have to leave early. Asking for such a request beforehand will make parking much easier. A select place can be reserved to prevent awkward moving around of several cars on the day itself. If the parking place is some distance away from the hives, perhaps someone who has difficulty walking can have a select spot. Consideration of both these situations makes the day more pleasant for all.

If the field day is going to be in a suburban or somewhat urban setting it is essential that the close neighbors be considered. A field day is like having a big barbecue party with the addition of honey bees. It would be unwise to have the field day on the same day a neighbor is having a picnic or pool party. Although it would be polite to invite some neighbors you need to explain that the field day is only for beekeepers this time but there will be other opportunities for the neighbors to see the inner workings of hives.

What about a rooftop field day in the middle of a city? Actually such a venue is really more isolated than an urban location. The only drawbacks may be access to the rooftop and the space available for the number of people who wish to come. Will there be enough hives for the number of beekeepers? Only the rooftop beekeeper can give all that information.

Although the club can select a day for the open-hive work, you have to remember Mother Nature and her love of providing rain and thunderstorms for outdoor activities. So select a day and a rain date. Crabby weather produces crabby bees. If endless weekends seem to be unsuitable the field day may have to be postponed a few months until seasonal dry weather is the norm. Both safety and pleasure need to be considered.

Does food have to be served? No. Containers of water are, however, essential, especially if the weather is hot. But if the beekeepers would like to sit down after the open-hive work is finished and have a cool drink and a snack, then use some of the club funds to provide them or perhaps donate them. Goodies made with honey or drinks sweetened with honey will attract bees. Perhaps such treats can be for another event. Bees do not appreciate being eaten and not even a beekeeper appreciates being stung in the mouth.

Oh – sit down afterwards. Chairs? Don't overlook these. Just ask everyone who will attend to bring a chair. Make a list of the necessary details so that the field day will be a total success. A simple flyer can be given to club members outlining what to wear, what to bring (and not bring) and what will be provided.

Someone is certain to ask if children can come. Remember that this is a day for beekeepers. Club picnics for members and family are for another day. If older children are indeed beekeeping and have proper beekeeping attire, then they are welcome. It is definitely not a day for a small child enveloped in an adult veil and held up by a parent in order to see.

The field day does not have to fit into a set program. Let the members give suggestions on activities. However, any suggestions need to be checked with the host to make certain they are practical in the host's beeyard and for the host's bees.

Beekeepers are usually in a rush to enter the hive, see what is going on and close it up. Have each group take a few minutes to observe the entrance before it is smoked. What do they see? What are the bees doing? Nobody is in a rush today. Observing the activities at the entrance can indicate much about the colony inside.

Fun and games can certainly be a part of a field day. Many beekeepers, including experienced ones, may wish to learn how to mark queens. The color for 2012 is yellow. A yellow paint pen can be bought at a hobby shop. The equipment suppliers have the sets of all five colors. These certainly can be used since only drones will be marked and the drones don't care what the year's color is. If drones are actively flying on the field day it can be interesting to see if any marked drones drift into other hives. If no drifting is noticed it is possible that in a week or so the host will see marked drones in other hives and can report about drifting at the next club meeting.

It would be nice to have a colony that is not doing very well. Pass out small pieces of paper and have the observers write down what they think is the main problem of that hive. Ask for just one answer. Then at the end, during refreshment time, have everyone read out his or her answer. Although there will be some different answers, there may be enough identical ones to diagnose the problem. With the number of beekeepers present you can be sure of a number of solutions to the problem. Remember, these bees belong to the host and only the host can make the decision on solving the problem.

The newbees can have a simple contest – who first spotted the queen? The experienced beekeeper who is with the hive for the newbees can ask questions and lead discussion of the answers. The newbees came to learn. So some questions will come from them. Keep reminding the newbees that there are no "dumb questions." If the newbee mentor does not know the answer, then admit it. Then call on the other club members for answers.

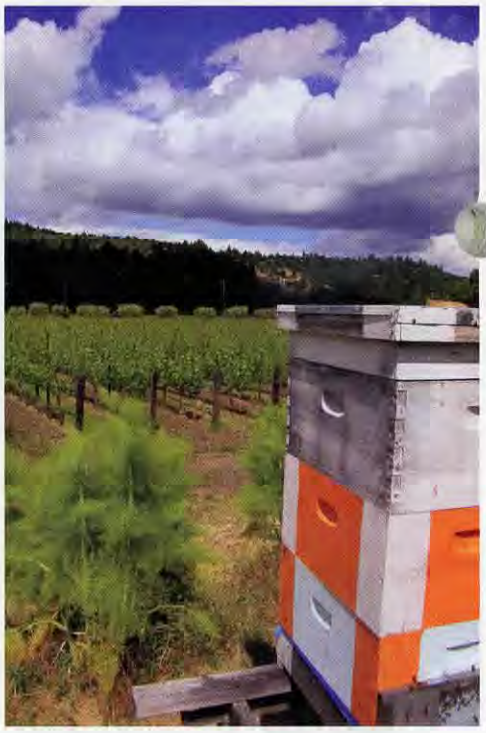
Beekeepers love gadgets. If the field day host has some clever gadgets that are helpful to beekeeping then these could be put on display or demonstrated. If the host has a honey house I am sure the beekeepers would appreciate a tour. Perhaps the host could have a jar of honey available for tasting. Plastic coffee stirrers or those tiny spoons can be obtained from party supply stores.

The field day has come to the end. The beekeepers who have enjoyed the day and the efforts of the host are ready to leave. However, everyone should participate in clean up. Trash and recycling need to be taken care of. Everyone! Look around and see what you can do. You want the club to be welcome again next year. Thank the host. Oh yes – don't forget to take your chair and veil home. BC

Ann Harman keeps her bees and teaches new beekeepers how to keep bees from her home in Flint Hill, Virgnia.

Grape Vines As Bee Plants

Connie **Krochmal**



Among the most widely cultivated fruits in the world, grapes are suitable for bee gardens. These yield nectar as well as a good quantity of pollen.

Worldwide, there are around 60 species of grapes. Many are native to the New World. Over 8000 varieties are in cultivation.

Major Species of Grapes

There are three main species of grapes in cultivation. Most cultivated grapes around the world are the European types, which are hybrids of *Vitis vinifera.* Many of these originated from European vines crossed with American species. In general the European grapes are less hardy.

There are also two popular indigenous American grapes and their varieties. The fox grapes (*Vitis labrusca*) became the basis for many Eastern vineyards because they can withstand high humidity, diseases, and cold Winters. They're adapted to about three-fourths of the states, including the East and Washington. The third species is the muscadine and scupponong (*Vitis rotundifolia),* which are grown in the South and Southeast.

Description

These woody vines have climbing tendrils. The alternate, deciduous foliage with palmate veins is often lobed. Normally two buds arise from the axil of each leaf. One will usually remain short and drop off during the Fall.

The small, inconspicuous yellow-green or white blossoms are often unisexual. Opening in cone-like panicles, they have five fused petals, which eventually fall. These form a disk that is separate from the ovary. Although the flowers are adapted to insect pollination, apparently European grapes can sometimes be partially wind pollinated.

The fruit is technically a berry. It is covered with a waxy film containing the yeast cells that turn the fruit sugars of grapes into alcohol. The fruit color varies widely according to the species or variety. They come in yellow, gold, almost black, purple, red, pink, or green. The shape varies as well. The fruits are borne mostly near the base of the leafy branches or shoots on the current and one year old wood. Shoots emerging from the older wood are unproductive. They should be removed during the annual pruning.

Status as a Bee Plant

Each flower has five nectaries that yield nectar during warm weather. They bloom for 10 days or more. The bees also collect honeydew from grape leaves.

When facing a dire nectar shortage, bees sometimes suck juice from cracked grapes. The resulting honey can ferment and cause bees to develop dysentery, which can become a problem in cold climates if they can't take cleansing flights during the Winter.

Grapes can provide a good honey crop, which is valuable for brood rearing. Bees also collect pollen from grape blossoms.

Growing Conditions for Grapes

These thrive in various kinds of soils, including light ones, gravelly clay loam, and loam. They prefer a deep, fertile, well drained soil. Alkaline conditions are unsuitable.

Grapes require some cold in the Winter for two to three months in order to break dormancy. However, temperatures below 0°F are often too severe for European grapes.

Hardiness varies from one variety to another. In cold climates some marginally hardy grape vines can be protected over the winter by bending them to the ground and covering them with soil. Protect the plants from strong winds.

The European grape is well suited to semi-arid areas assuming there is irrigation. Grape vines are prone to damage from late Spring frosts. These harm the flowers, developing shoots, and immature fruits.

Long, hot, dry Summers are best for many varieties, particularly for the European grapes. This allows the fruits to produce lots of sugar. Excessive rainfall from flowering time to harvest can affect the fruit quality and fruit set.

The minimum temperature during the growing season should be around 65°F in order for the plants to produce good growth. These need a growing season of around 160 days.

Insect and Disease Problems of Grapes

With the exception of disease resistant American varieties, most grapes experience several common diseases, which are generally caused by fungi. These include powdery and downy mildew. Black rot can harm the fruits.

On the whole, grapes have few insect pests. The exception for the European grapes is a serious pest known as the root louse or Phylloxera. This insect is native to the East, but can't harm American grapes,

which are resistant. The root louse became established in Europe and by the end of the 19th century had devastated perhaps 90% of European vineyards. The eventual solution was to graft European varieties onto resistant American rootstocks.

Birds can ravage the ripening fruits. Cover the plants with netting. To deter raccoons, possums, and other mammals, install an electric fence if necessary.

Choosing Grape Varieties

First, determine the intended use for the grapes – whether they're table grapes, all-purpose grapes, raisins, or wine. Next, choose the best disease resistant varieties that are hardy in the region. The following varieties are highly recommended for bee gardens.

Bluebell Grape

Released in 1944 by the University of Minnesota, this fox grape variety is very hardy – to zone three. Bluebell is a disease resistant plant that produces large crops. These table grapes are also used for juice and jelly. Ready fairly early, these can be harvested in early September several weeks before the Concord.

Canadice Seedless Grape

Released in 1977 by the New York Agricultural Experiment Station in Geneva, this is hardy to zone five. It has the same disease resistance as the Concord. The fairly vigorous plants begin bearing at a young age. These tend to overbear, and will need pruning to prevent this. Ripening early to mid-season, they're ready from about mid-August to September. These ripen well in cool climates. The all-purpose grapes are recommended for raisins, juice, jellies, wine, and table grapes.

Concord Grape

The Concord is hardy to zone four. It needs no introduction for it has been around since 1849. It is the standard fox grape hybrid by which all other American grapes are judged. Easy to grow, this is still considered the best blue grape by far. Very disease resistant, it is vigorous and bears lots of fruit. This does well in the East, Midwest, Northwest, and Central states. It ripens mid to late season usually in September. The Concord was grown from seeds of a wild grape.

There is also a fairly new seedless type Concord called the Concord Seedless. The plant has similar qualities as the original Concord. The seedless fruits are just slightly smaller and taste somewhat sweeter than the Concord. These are used just like the Concord.

Interlaken Seedless Grape

Hardy to zone five, this reliable variety was released by the New York Agricultural Experiment Station in Geneva. Resistant to most diseases, it bears huge crops of grapes that ripen in August and September. Besides being a great table grape these are used for fresh salads and juice. The color can vary, depending on the climate and growing conditions. These can be gold, green, amber, or green-yellow.

Mars Grape

Released by the University of Arkansas, this table grape is hardy to zone four. It does well in areas with hot Summers. Late Spring frosts aren't a problem as this buds out late. The most disease resistant of the seedless grapes, it even resists black rot.

The vigorous plants begin bearing at a young age and produce large crops. These blue grapes ripen in August or September several weeks before the Concord. They store well.

Reliance Grape

A very vigorous, premium quality, red seedless table grape, this is hardy to zone three. Released in 1982, it is well adapted to all regions, including the Midwest. It has superior disease resistance although it can experience some black rot. These grapes are great for fruit salads, table grapes, juice, and jelly. The plants bear large crops of fruits that start ripening very early. This is usually ready in August before the Concord. These can be stored for one to three months. They're either red or reddish-pink. This is a fox grape hybrid.

Planting Grapes

Spacing depends on several factors. Shorter varieties require less space. In cool areas the plants can be planted closer together. In general a spacing of eight feet between plants and eight to 10 feet between rows is adequate.

Grapes should be planted in the late Winter or early Spring. Generally, one year old rooted or grafted plants are used.

Training Grapes

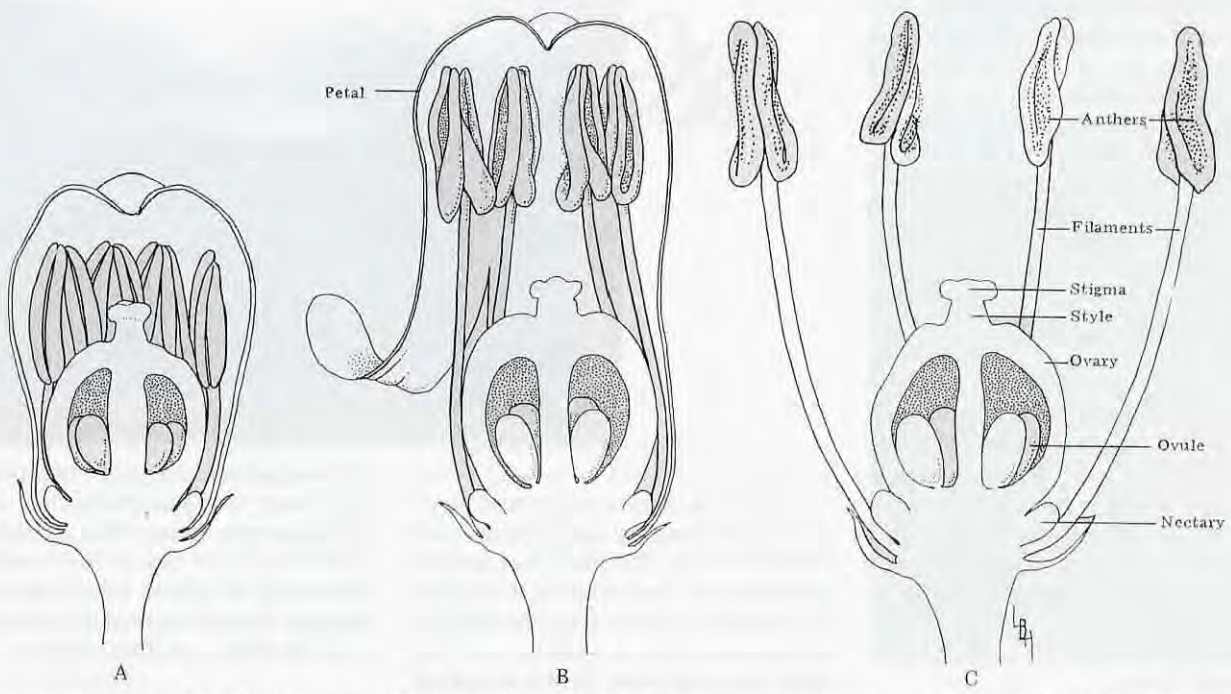
Grapevines need training on a proper support. This allows the maximum sunlight to reach the foliage. The support assures that the vine can withstand the weight of heavy fruit crops.

The training system should be installed as soon as the vines are planted. Various types of supports are used, including arbors, stakes, wide-top trellises, and vertical trellises. Most people use a permanent trellis. The easiest support to install is a sturdy wire attached to posts. Arbors can be labor intensive and higher maintenance than other support systems.

Pruning and Thinning Grapes

Grape vines require regular pruning. The flowers and fruits are only on the newer wood. The old unproductive stems need to be pruned on a regular basis.

Prune to keep the plant low enough to make harvest and plant



Longitudinal section of the 'Robin' grape, x20. A, Petals, or hood, intact, stamens not lengthened; B, petals beginning to loosen, stamens lengthened; C, petals fallen, stamens free. (From McGregor's Pollination book)

maintenance efficient. This should be done annually. The goal is to get a good crop of fruit. Don't leave more buds than the plant can support.

Fruits need thinning in order to maintain quality. All abnormal ones should be removed. Thinning allows the remaining fruits to reach their maximum size.

Harvesting Grapes

Some varieties ripen early, while others are ready later in the season. Taste some to see whether they're ripe. These fruits won't finish ripening once they're removed from the vine. Handle grapes by the stems. Avoid damaging the waxy bloom on the fruits.

Old World Grape History

The European grape was originally native to the Black Sea Coast and along the Caspian Sea to Afghanistan. Dating from prehistoric times, these were among the earliest fruits used by humans. Grape seeds found in Swiss lake dwellings date to the Bronze Age (around 2800-2300 B.C.).

In the Near East wine making was around by 5000 B.C. The Egyptians grew grapes about that time. European grapes were cultivated in the Holy Land by the ancient Hebrews, and are mentioned in the Old Testament numerous times.

The Phoenicians distributed vines to Rome, France, and the Mediterranean between 1000-600 B.C. Greek and Roman writings from early times indicate this was used for food and wine, while the fruit syrup served as a sweetener.

Numerous Roman writers wrote about grapes and wine making. These included Virgil, Cato, both the Elder and Younger Pliny, and Columella. Bacchus, the Roman god of vines and wine, was also known as Dionysius. According to legend, he devoted his life to spreading grape culture.

Grape History in the New World

Some Norse settlers arrived to North America around 990 A.D. They mentioned the many native grapes that they saw. This led them to call the area Vinland.

Columbus took European grape plants to the West Indies. They were introduced to the American colonies very early. Lord Delaware promoted European grapes in the colonies. Beginning in 1616, the Colonial Assembly ordered the colonists to grow them. They were planted from Georgia to New England. However, European grapes failed to thrive mainly because of insect and disease problems and hardiness issues. After these attempts, most colonists switched to native grapes. Beginning around 1800, many new American grape varieties were developed, such as Catawba. These were resistant to disease and quite adapted to the area.

The European varieties succeeded mainly in California and the West. The Spanish brought vines to the area. They were introduced around 1769 to the California missions. By the end of the 18th century there were vineyards from Sonoma to San Diego. This original variety was known as Mission.

California vineyards became less common from 1820 to1850 as a result of the Mexican Revolt. Later, grape culture was encouraged by the California state government. The table grape industry developed in California once the early table varieties were available to grape growers. BC

Connie Krochmal is an award winning garden writer and a beekeeper in Black Mountain, North Carolina.

GLEANINGS

MAY, 2012 • ALL THE NEWS THAT FITS

I DARE YOU!

Being a honey bee scout is dangerous business requiring bold behavior and now researchers have discovered why some bees head for high adventure and others stay at home.

It's all in the genes.

Zhengzheng Liang of the University of IL and colleagues at Wellesley College in Wellesley, MA and Cornell University in Ithaca, NY, have identified specific differences in gene expression the brains of honey bees with specific behaviors.

They found only some honey bees participate in the scouting efforts. Some bees leave their nests in search of new food sources, others leave to look for a new home, and some bees hardly ever leave their nests at all.

The researchers report in the journal Science they then rearranged the honeybees' food sources in a large, screened outdoor area and kept an eye on the bees that were bold enough to leave their nests and go searching for new food sources.

Liang and colleagues then collected the adventurous honey bees and used a technique known as whole-genome microarray analysis to compare the gene expression in their brains to that in the brains of bees that stayed closer to the hive.

The research team says the honey bees that were out looking for new food sources and new places to live had dramatically different signaling levels in their brains than the other, homebody bees.

By treating bees with octopamine and glutamate, the researchers found they could increase scouting behavior. On the other hand, when the bees were treated with a dopamine blocker they seemed to decrease scouting.

Liang and the researchers suggest that these genetic mechanisms of scouting in honeybees are very similar to those associated with novelty-seeking behavior in vertebrate species, including humans. Future studies might help researchers to understand exactly how such behavior evolved across various species and lineages.

The researchers could even adjust this brain-gene expression in the bees with certain chemicals, which caused the bees to either scout more or stay closer to home.

The genes that cause these honey bees to leave home and scout for new items are very similar to the genes associated with novelty-seeking behavior in higher organisms, including humans.

Liang and the researchers suggest that their findings may eventually help researchers to understand exactly how such behavior evolved in different species over time.

– Alan Harman

HONEY BEE TEACHERS

Bumblebees can use cues from their rivals the honey bees to learn where the best food resources are located.

Researchers from Queen Mary, University of London, say they trained a colony of bumblebees (*Bombus terrestris*) to use cues provided by a different species, the honeybee (*Apis mellifera*), as well as cues provided by fellow bumblebees to locate food resources on artificial flowers.

The team from Queen Mary's School of Biological and Chemical Sciences report in the journal PLoS ONE that they found the bumblebees were able to learn the information from the honey bees just as efficiently as when the information came from their own species, demonstrating that social learning is not a unique process limited members of the same species.

"Most social learning research has focused on learning between members of the same species," PhD student Erika Dawson says,

"But in the same way that human engineers can pick up useful tricks from animals (such as using bird aerodynamics to design planes), animals might learn from different species where the best food is, where predation looms or where the best place to nest can be found."

Dawson says the team wanted to determine whether animals can use any social cue to enhance their environment, even if they come from another species that share their habitat, resources or predators."

The results show that information learnt from other species can be just as valuable to an animal such as the bumblebee as information from their own species.

Bees would have opportunities to learn cues from their own species and other species to an equal degree in the wild, as they often share the same flower species as a source of food.

This is particularly true for large flowers such as sunflowers, which are often fed from by multiple pollinators simultaneously.

The results also show that competition between the two species may be much more severe than previously assumed.

"If bumblebees use individual exploration and copying of their fellow bumblebees to identify rewarding plants, but also use the information provided by a rival species (i.e. honey bees), this could have important ecological implications for community structure and formation, and may help us better understand the impact of competition within natural pollinator communities," Dawson says. *– Alan Harman*

HONEY COMPANY FOR SALE?

Capilano Honey Co., Australia's biggest honey operation, is in the crosshairs of an investment company and all the indications are the target isn't sweet on the deal.

Mariner Corp. Ltd. says it wants to raise its stake in Capilano to 20% from a recently purchased 12.7%.

Capilano, established in 1953 in Brisbane, has become one of the world's largest honey operations. It processes more than 45,000 tonnes a year and exports to 33 countries.

Mariner, which is also involved in the cattle leasing activities and has investments in an egg supply company and a peanut marketer, is offering Capilano shareholders A$1.50 a share.

"Mariner believes that Capilano Honey represents good value at $1.50 per share, and that Mariner will achieve upside from its investment when Capilano Honey moves from the BSX (Bendigo Stock Exchange) to the ASX," the company says in a statement.

Capilano reported a A$4.47-million profit in the 2010-11 financial year after a A$5.98-million loss in the previous year. It posted a net profit of A$1.23 million for the six months to Dec. 31.

It paid a 15-Australian-cents-a-share dividend last financial year and recently paid a 10-cents-a-share interim dividend for the current financial year.

Capilano says in a statement its shareholders should know that Mariner acquired its 17.5% holding by paying A$1.63 a share and its offering now is at a price well below what they were previously prepared to pay. *– Alan Harman*

CITRUS GREENING FOUND IN CALIFORNIA

The CA Department of Food and Agriculture (CDFA) and the USDA announced they had found the state's first detection of the citrus disease known as Huanglongbing (HLB), or citrus greening. The disease was detected in an Asian citrus psyllid sample and plant material taken from a lemon/pummelo tree in a residential neighborhood in the Hacienda Heights area of Los Angeles County.

HLB is a bacterial disease that attacks the vascular system of plants. The Asian citrus psyllid can spread the bacteria as the pest feeds on citrus trees and other plants. Once a tree is infected, there is no cure; it typically declines and dies within a few years.

"Citrus is not just a part of California's agricultural economy; it's a cherished part of our landscape and our shared history," said CDFA Secretary Karen Ross. "CDFA is moving swiftly to protect the state's citrus growers as well as our residential trees and the many prized citrus plantings in our parks and other public lands. We have been planning and preparing for this scenario with our growers and our colleagues at the federal and local levels since before the Asian citrus psyllid was first detected here in 2008."

In fact, just three weeks ago CDFA's acting director for Plant Health and Pest Prevention Services, Robert Leavitt, announced at the annual meeting of California Citrus Mutual (CCM) that the state was instituting a policy of zero tolerance regarding HLB. Any infected tree would be removed and the area sprayed with pesticides if HLB was found in any citrus tree, whether in a commercial grove or residential setting. "CDFA is committed to working with the industry to fight HLB tree by tree, state by state, and grove by grove," Leavitt told the many growers and others affiliated with the industry at the CCM meeting.

CDFA officials are making arrangements to remove and dispose of the infected tree found in LA and conduct treatment of citrus trees within 800 meters of the find site. By taking these steps, a critical reservoir of disease and its vectors will be removed, which officials say is essential. Treatment for HLB will be conducted with the oversight of the California Environmental Protection Agency (Cal-EPA). Officials emphasized the treatment will be conducted safely, with advance and follow-up notices provided to residents in the treatment area.

An intensive survey of local citrus trees and psyllids is under way to determine the source and extent of the HLB infestation. Planning has begun for a quarantine of the infested area to limit the spread of the disease by restricting the movement of citrus trees, citrus plant parts, green waste, and all citrus fruit except what is commercially cleaned and packed. As part of the quarantine, citrus and closely related plants at nurseries in the area will be placed on hold.

Residents of quarantine areas are urged not to remove or share citrus fruit, trees, clippings/grafts or related plant material. Citrus fruit may be harvested and consumed on-site.

CDFA, in partnership with the USDA, local agricultural commissioners and the citrus industry, continues to pursue a strategy of controlling the spread of Asian citrus psyllids while researchers work to find a cure for the disease.

HLB is known to be present in Mexico and in parts of the southern U.S. Florida first detected the pest in 1998 and the disease in 2005, and the two have now been detected in all 30 citrus-producing counties in that state. The University of Florida estimates the disease has tallied more than 6,600 lost jobs, $1.3 billion in lost revenue to growers and $3.6 billion in lost economic activity. The pest and the disease are also present in Texas, Louisiana, Georgia and South Carolina. The states of Arizona, Mississippi and Alabama have detected the pest but not the disease.

The Asian citrus psyllid was first detected in California in 2008, and quarantines are now in place in Ventura, San Diego, Imperial, Orange, Los Angeles, Santa Barbara, San Bernardino and Riverside counties. CCM officials say it is vital to keep the psyllid - and the deadly HLB it spreads - out of the San Joaquin Valley, the home of the state's famed "Citrus Belt." If Californians believe they have seen evidence of HLB in local citrus trees, they are asked to please call CDFA's toll-free pest hotline at 1-800-491-1899.

For more information on the Asian citrus psyllid and HLB visit: **http://www.cdfa.ca.gov/phpps/acp/**.

TAKE MORE PROPOLIS AND CALL ME IN THE MORNING

Research from North Carolina State University shows that honey bees "self-medicate" when their colony is infected with a harmful fungus, bringing in increased amounts of antifungal plant resins to ward off the pathogen.

"The colony is willing to expend the energy and effort of its worker bees to collect these resins," says Dr. Michael Simone-Finstrom, a postdoctoral research scholar in NC State's Department of Entomology and lead author of a paper describing the research. "So, clearly this behavior has evolved because the benefit to the colony exceeds the cost."

Wild honey bees normally line their hives with propolis, a mixture of plant resins and wax that has antifungal and antibacterial properties. Domesticated honey bees also use propolis, to fill in cracks in their hives. However, researchers found that, when faced with a fungal threat, bees bring in significantly more propolis – 45 percent more, on average. The bees also physically removed infected larvae that had been parasitized by the fungus and were being used to create fungal spores.

Researchers know propolis is an effective antifungal agent because they lined some hives with a propolis extract and found that the extract significantly reduced the rate of infection.

And apparently bees can sometimes distinguish harmful fungi from harmless ones, since colonies did not bring in increased amounts of propolis when infected with harmless fungal species. Instead, the colonies relied on physically removing the spores.

However, the self-medicating behavior does have limits. Honey bee colonies infected with pathogenic bacteria did not bring in significantly more propolis – despite the fact that the propolis also has antibacterial properties. "There was a slight increase, but it was not statistically significant," Simone-Finstrom says. "That is something we plan to follow up on."

There may be a lesson here for domestic beekeepers. "Historically, U.S. beekeepers preferred colonies that used less of this resin, because it is sticky and can be difficult to work with," Simone-Finstrom says. "Now we know that this is a characteristic worth promoting, because it seems to offer the bees some natural defense."

The paper, "Increased resin collection after parasite challenge: a case of self-medication in honey bees?," was co-authored by Dr. Marla Spivak of the University of Minnesota and published March 29 in PLoS ONE. The research was funded by the National Science Foundation.

FREE WEBINARS FROM OH STATE

Beekeepers in Ohio and other states are invited to attend a free, monthly educational webinar series taught by OH State Univ. experts, starting April 18.

Offered by Ohio State's Bee Lab, the webinar series will use the Adobe Connect format. Those interested in participating will need a computer with Internet connection; iPad and iPhone users can also join using these devices, but they need to download the Adobe Connect app.

All participants first need to join the Bee Lab contact list by visiting **http://go.osu.edu/beelablist**. Webinar log-in instructions will be provided.

"These beekeeping webinars were designed for beekeepers and others interested in bees to learn current information about honey bee hive management through the season," said Denise Ellsworth, Ohio State's honey bee and native pollinator education coordinator.

"Participants can view the presentation and submit live questions. Additionally, all webinars will be archived on the Bee Lab website (**http://beelab.osu.edu**) the next day, so beekeepers don't have to participate in the live session to benefit from the information shared."

The schedule includes:

May 16, Pesticides In and Around the Hive, Reed Johnson, assistant professor of apiculture, Ohio Agricultural Research and Development Center.

June 20, Mites and Honey Bees, Jim Tew, retired honey bee specialist, OSU Extension.

July 18, Planning Now for Winter Preparation, Bloetscher.

Aug. 15, Questions from the Hive, Johnson.

Sept. 19, Marketing Bee Products, Julie Fox, OSU South Centers, Piketon.

Oct. 17, Putting the Hive to Bed for Winter, Kim Flottum, Bee Culture.

For information, contact Ellsworth at ellsworth.2@osu.edu; 330-263-3723.

CITY LAND EXPANDING, FORAGE LAND NOT

Coming soon to an apiary near you – a city!

Researchers at the Planet Under Pressure conference in London predict cities around the world will expand by area equal to France, Germany and Spain combined in less than 20 years.

Unless development patterns change, by 2030 humanity's urban footprint will occupy an additional 1.5 million square kilometers.

That's because the present population trends indicates the equivalent of a city of one million people will be needed weekly given population growth trend

The question isn't whether to urbanise but how, says Michail Fragkias of Arizona State University.

Unfortunately, he adds, today's ongoing pattern of urban sprawl puts humanity at severe risk due to environmental problems. Cities are responsible for 70% of all CO2 emissions.

Fragkias says while urban areas cover less than 5% of Earth's land surface, the enlarged urban footprint forecast is far more significant proportionally when vast uninhabitable polar, desert and mountain regions, the world breadbasket plains and other prime agricultural land and protected areas are subtracted from the calculation.

Tokyo-based Global Carbon Project executive director Shobhakar Dhakal says reforms in existing cities and better planning of new ones offer disproportionately large environmental benefits compared with other options.

"Re-engineering cities is urgently needed for global sustainability," he says. "Our focus should be on enhancing the quality of urbanization – from urban space, infrastructure, form and function, to lifestyle, energy choices and efficiency."

Dhakal says care is needed to avoid unwelcome potential problems of dense urbanisation, including congestion, pollution, crime, the rapid spread of infectious disease and other societal problems.

Yale University Prof. Karen Seto says the way cities have grown since World War II is neither socially or environmentally sustainable and the environmental cost of ongoing urban sprawl is too great to continue.

Royal Swedish Academy of Sciences' International Geosphere-Biosphere Programme executive director Sybil Seitzinger says a truly sustainable planet will require cities to think beyond city limits.

"Everything being brought into the city from outside: food, water, products and energy need to be sourced sustainably," she says. "We need to rethink the resource flow to cities."

Conference cochairman Mark Stafford Smith says the more general theme of the conference is underlined by the urbanisation issue.

"Much of the planet's future is tied up in interconnected issues – climate change and city design, city resource demands and impacts on rural areas, rural food and water productivity and the ability of cities to continue functioning," he says.

"The deep intensity of interconnectedness of these issues requires an integrated approach, tackling challenges together rather than each individually, one at a time."

Alan Harman

TEXAS TAX CODE CHANGE HAS APIARISTS BUZZING

A code change in Texas qualifies beekeeping as an agricultural use enterprise in open-space land appraisals.

Texas AgriLife Extension Service entomologist Chris Sansone says the tax code was amended to include in the definition of agricultural use "the use of land to raise or keep bees for pollination or for the production of human food or other tangible products having a commercial value, provided that the land used is not less than five or more than 20 acres."

Sansone says the code requires the food or products to have commercial value, but does not require commercial production.

"While human food and products must be produced, the law does not require that they be sold commercially," he says.

"Commercial production of agricultural products, such as livestock or crops, is not required for land to qualify for open-space land appraisal under current law. The other option requires that the land be used for raising or keeping bees for pollination."

Sansone says the Texas Comptroller's office recommends that each appraisal district consult their local AgriLife Extension office concerning the number of acres and hives needed to fulfill the requirement.

"A beeyard or apiary can be run on a pretty small scale," he says. "Bees forage over a large area, sometimes well over a mile depending on available resources. Central Texas is not the optimum for beekeeping because of the lack of a consistent pollen and nectar source compared to the Houston/College Station areas."

Sansone says there may be some differences in how the different county appraisal districts apply the regulation, and he suspects some burden may be on the property owner to justify the use of land for bee pollination and to show how the bees are an agricultural enterprise.

"Property owners should think about a landscape plan of the property that shows how different plants and plantings would contribute to the bees' foraging," he says.

"Property owners may also be required to provide a basic marketing plan on how honey, and related products such as beeswax candles, soaps, etc. could be sold. They may also discuss renting the hives for pollination services."

Sansone says local appraisal districts will determine the number of hives that are required on a per-acre basis and other requirements for beekeeping as an agricultural enterprise. – *Alan Harman*

Display Advertisers

I had my *Varroa* mites under control last fall. Honest, I did. I sugar-rolled every hive, with a treatment threshold of greater than one percent. The one-third of my hives that flunked the test got twin 25 mg. treatments of Apiguard. Subsequent testing confirmed that I had extremely low mite numbers going into Winter.

This Spring I tested four hives at the home yard. I wasn't expecting trouble. But the numbers for a 300-bee sample were one mite, one mite, then six (Uh-oh!) and finally 20! Because two thirds of the mites are in the capped brood, this translates to infestation rates of one, one, six and 20 percent.

I'd seen enough. I work a full time job on the ski hill in Aspen during the Winter, and time is not my friend. So I quit testing and decided to thymol-treat the whole yard with Apiguard, pronto. I've had good luck with that stuff. I wanted to try something else, to avoid the mites developing resistance, but when you're in a pinch, sometimes you're better to go with what you know.

The only problem was that I was out of Apiguard. It was late on a Friday. I called my supplier in California. He said no problem. He could ship on Monday. Fine, I said, but my days off are Thursday and Friday, and I needed to treat on Thursday, because I was hauling bees to Palisade to pollinate apricots on Friday. (You see what I mean about being busy?!)

My supplier said he could ship second-day air. That would guarantee delivery on Wednesday, which would be perfect, but pricey. I said why don't we ship one tub second-day and the other regular UPS?

At sundown on Wednesday there was no sign of the the UPS truck, but sometimes he rolls in after dark with special shipping. Not this time, however. I called Paul. He's bailed me out more than once. To my surprise, he had some Apiguard lying around, and not much need for it. "Derrick's been checking my bees, and he can't find a mite!" he said. Some guys have all the luck! So Paul loaned me a tub. Crisis averted.

But where was my Apiguard? On Thursday morning I called my supplier. He confirmed shipment on Monday and gave me a tracking number. Next stop: UPS.

When I gave UPS the tracking number, the girl said, "You'll have to call the hazmat center. Hazmat? This was just Apiguard. They ship it all the time. She gave me a number, and I thought I was calling the government.

I was not calling the government. This was the UPS Hazmat Support Center. An officious woman informed me that I'd have to call customer service. I said customer service had just given me the hazmat number. Finally she said, "Do you have a tracking number?"

When she looked up my tracking number, she informed me that my shipment was being held up because it was marked ORM-D. I said, "What's that?"

"It's hazardous material," she said. "UPS won't ship it by air."

"I needed that package yesterday," I said. "Now what? I paid extra for second-day air. Can you ship it to me ground?"

"It has to go back to the sender," she said.

Of course.

When I called my supplier, you could just about hear his palm hitting his forehead when he realized his blunder. "I'll ship you another tub today," he said.

That same day a tub of Apiguard arrived – the one that got shipped on Monday by regular UPS. Then a few days later, UPS

left a message that the Apiguard that got held up was being sent on to me by ground UPS. This was the shipment that they'd previously told me was going back to my supplier. So I'd order two tubs, but a total of three had arrived or were on the way. I called my supplier. He said, "Don't worry. Just refuse shipment on one, and they'll send it back."

I was lucky enough to be working the home bees when the UPS truck came down the driveway with my second Apiguard. I told my story to the affable driver, who assured me that when the third package arrived, he'd send it back.

The next day it was on my doorstep.

I gave all the bees in that yard an Apiguard treatment. I got bees to Palisade in time to pollinate the apricots. I got UPS to come back and pick up the third tub. Saturday morning I was in front of the time clock again, on time.

My boss said, "How'd it go on your days off with the bees?"

"The little darlings are just fine," I said. "Everything's under control."

Ed **Colby**

Fun Times With UPS

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