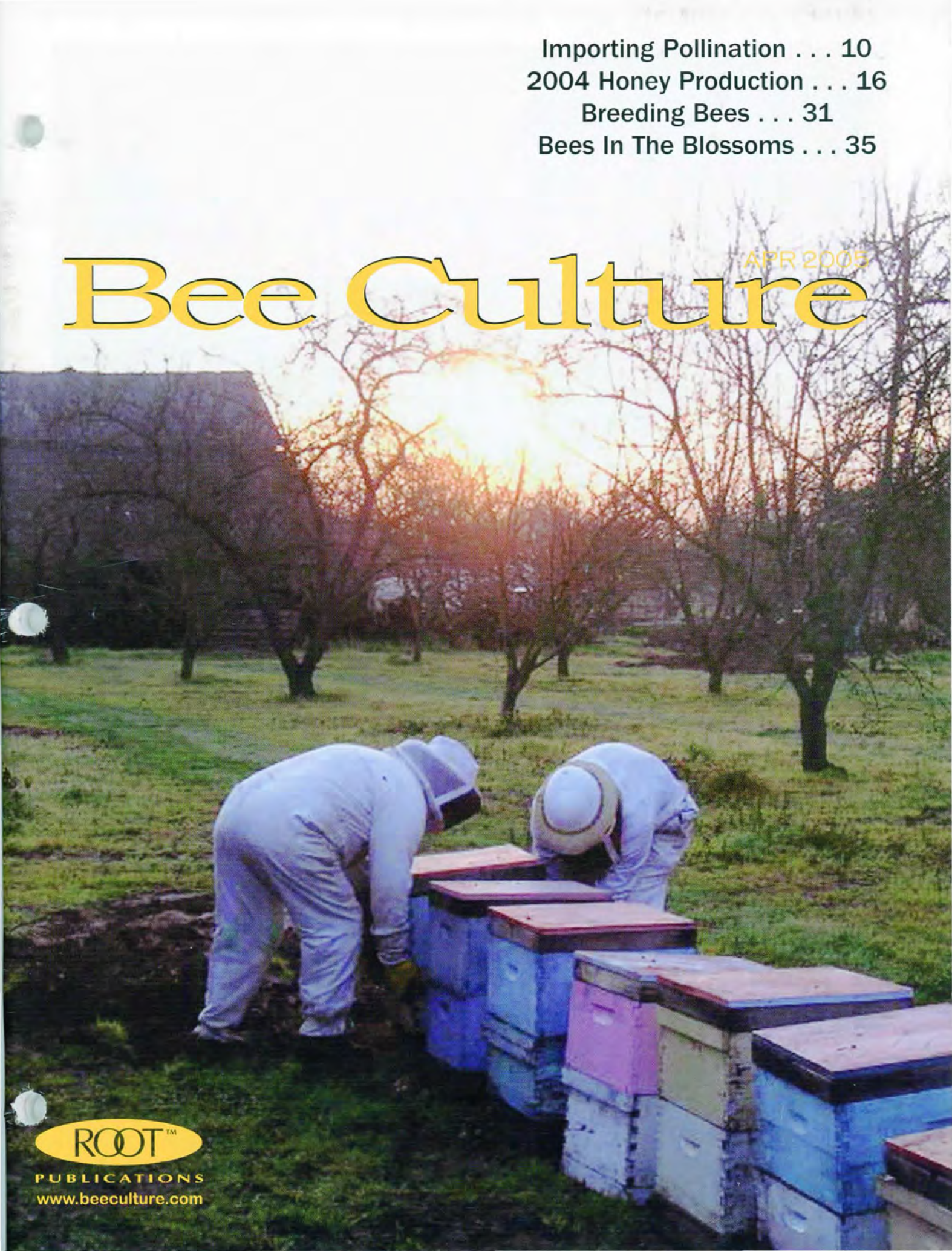
Bee Culture

APR 2005



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Not everybody has big trucks and forklifts to use in the Almond Orchards. Some of us still do things the old fashioned way. See our feature about 'Bees In The (Almond) Blossoms' on page 35.

photo by John Jacob

800.289.7668 • www.BeeCulture.com

Publisher – John Root

Editor – Kim Flottum, Ext. 3214, Kim@BeeCulture.com

Production Coordinator – Kathy Summers, Ext. 3215, Kathy@BeeCulture.com

Circulation & Advertising – Dawn Feagan, Ext. 3220, Dawn@BeeCulture.com

Contributors

Clarence Collison James E. Tew • Ann Harman

Mark Winston Malcolm T. Sanford

Steve Sheppard • Larry Connor • Connie Krochmal

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For information on advertising contact Dawn Feagan at 800.289.7668. Ext. 3220

Contact Information

V800.289.7668 V330.725.6677 F330.725.5624 www.BeeCulture.com

email: info@BeeCulture.com

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

APRIL 2005 VOLUME 133 NUMBER 4

FEATURES

DEPARTMENTS & COLUMNS

MAILBOX

KEEP IN TOUCH

Write: Editor, 623 W. Liberty St., Medina, OH 44256
FAX: 330-725-5624
EMAIL: KIM@BEECULTURE.COM

Sumac Smoke

Do you know of any research facility doing research to discover the effective ingredient in sumac smoke for a commercial mite control?

It works. We had Apistan in our hive needing treatment. After the initial big drop and steady decline, between the fourth and fifth week they increased to near pre-treatment levels. (Resistant mites?) So I smoked them. First day drop was twice the biggest day average. Four days later, all hives were below 20 mites/day. Now, warm day checks, seven to 10 days, show 10 mites or less at all hives.

In our area, June – August, sumac is a major source of nectar Recall the yew trees of the Northwest areas when it was discovered their bark suppressed breast cancer

Rachel Kinkennon,
Edwards, MO

A Big Thank You

A couple of years ago your magazine ran an article recommending that beekeepers always carry an epi-pen, even if they are not allergic to bee stings. I followed your advice and just kept it near me when working in the hives. This last June, while pulling weeds around the hives I didn't bother to have my suit on and one little sting put me in a full-fledged anaphylactic reaction. Thankfully, I had the epi-pen right there and had time to get an ambulance to come to my aid.

Actually, I am told that the way I reacted to previous sting – large, itching welts that took days to go away – should have been a warning.

I'm currently getting "desensitized" by an allergist and he says I should be ready to go back in the hives by Spring! (With an epi-pen of course!)

Thanks so much, *Bee Culture!*

P.S. If you have non-English speaking hired hands on your property, I recommend you make sure they understand what "Dial 911" means – ours didn't and it could have been disastrous!)

Erna Lampman
Columbia County, NY

Checking For Mites

Thank you for the warning that mites had returned with a new vigor. That motivated me to check my 65 colonies as soon as possible. We had some really warm and beautiful days this past week, so since I am retired I could use these days to get to my beeyards.

The first check I did was with the powdered sugar test. I put about two inches of bees in a quart jar, and the test resulted in about 25 mites. The first wave of mites hit South Dakota in the Winter of 1995. I went from over 200 colonies down to 25. I used Apistan strips for about two years, but then decided to recover by making splits from the colonies that survived. About two Summers ago the colonies looked healthier than ever since 1995. I thought we had turned the corner. I was also using Mite Solution from Tuttle Apiary, using the soaked paper towel strip method for insertion. Recovery has been difficult. I have increased to 75 to 90 colonies at times, but then will slip back to 45 to 60 colonies after Winter

Here are the results of another test. Because the Apistan strips I had on hand were about six years old, I didn't know if they were still effective. So I used a sticky board method, after inserting an Apistan strip into one of the better colonies. After 24 hours, there were around 1,000 mites.

Yes, the mites are back and causing heavier losses. So far I have lost 25%. Last Summer, about the only check I did for *Varroa* mites was to look for them on the drone brood, especially on those that were built between the brood boxes. I rarely saw one all Summer. So how did the mites come back with such a vengeance?

Even though I am not one of your reporters, I thought you might want to hear about my experiences.

Again, thanks for the warning that your magazine gave.

Robert Kornely
Valentine, NE

Tanning With Beeswax

I'm trying to find out if beeswax has a natural spf (sun protection factor). Do any of your readers know?

Victoria McIntyre
Dundee, MI

FDA Registration

After reading your response to Craig Brock's question reference registering with the FDA to comply with the bioterrorism act, I registered my home business which is just like Mr. Brock's. We also sell at a Farmer's Market and sell jams, jellies, baked items too. In that respect, the registration is probably necessary. Unless you consider owning an extractor or processing food, I see no reason for a beekeeper to register who sells from his house or a Farmer's Market. Honey is not mentioned anywhere in the registration process. You can register on line but don't let the lawyer's ads fool you. It is free.

Richard L. Largen
Bethalto, IL

How Much?

I just heard of a beekeeper in Bakersfield, CA getting $140/hive for almonds. I signed early and am getting $65. Most are $75 to $85. I do know of some late signers getting $90 to $100 and even at

Continued on Next Page

MAILBOX

that there is still a shortage. The growers keep planting more trees so will need even more hives in the future.

In one of the stores I deliver to they recently dropped Miller's Cut Comb Honey (I do not do comb) and replaced it with round section comb honey that came from or is only labeled in The Midwest but is a product of China. Comb honey from China! Nice label, looks just like any we produce in this country except in small print "product of China." Sells in the store for $1.99. How can they produce, ship from China to the Midwest to label and back to California and sell to the store for less than $1.50 a section? Millers Cut Comb that has been on the shelf for over 10 years is now gone.

I also noticed another new honey item recently – Honey Monkeys. Looks like a square bear but is a tall thin, 8 oz. Honey Monkey imported from Vietnam. They were all crystallized hard as a rock. Sad to say at $1.99 people were buying them. My 12 oz. bear sells at the same store for $2.99. The same price per pound ($3.98) mine is premium white liquid clover honey from Montana. What is wrong with these people? Are they that stupid?

Gary McClaughry
Grass Valley, CA

More On Hand Trucks

James Tew's excellent article on hand trucks, page 48, February 2005 issue of *Bee Culture*, left out one feature available on hand trucks – runner on the back of the hand truck so it will slide up or down steps easily.

They are not in the way and save bump, bumping, where there is no ramp.

Richard Brewster
Potter Place, NH

8 Framers The Best!

About 20 years ago I became interested in the eight-frame hive. It had been a popular size in the 1930s and 40s but after that time most suppliers had gone to the more popular 10-frame size. For this reason, I went to my workshop and made equipment for three eight-frame colonies. (Incidentally, several catalogs now offer eight-frame supplies.)

Three years ago I completed the change from 10-frame to all eight-frame colonies – not one 10-frame colony left.

Currently, all of my eight-frame hive bodies are being changed to medium (6 5/8") depth. Using all supers of the same size makes beekeeping better and easier. For example, when you want to cull old or damaged frames from brood supers, it is easy to replace them with newly extracted frames from the previous year.

Here in northern PA we have a challenging problem with cold weather in the Winter Occasionally we have extended freezing temperatures that last for three or four weeks without any days for the bees to break cluster. This condition restricts bees from moving to either side of the cluster Usually they move upwards to the cover. They starve there because they never reach the ample honey that is stored two or three frames away to the side of the cluster With the above in mind, it makes sense that a given amout of honey, stored vertically, would be more accessible than if it were stored laterally. For example, feral colonies in trees or sidewalls of buildings do quite well with combs that are vertical. The eight-frame colony has this advantage over the 10-frame.

The eight-frame size, using medium depth frames meets the recommendation of the orthopedic surgeon who replaced my hip seven years ago. He said that for the sake of my spine I should not lift over 50 pounds. This size super can make beekeeping easier for children or anyone else who should be careful not to strain his or her back. This includes me, at age 85. An eight-frame super packed full of honey weighs approximately 45 pounds.

Jerald Ely
Montrose, PA

Editor's Note: *In 1985, Jerald Ely became Pennsylvania's first certified Master Beekeeper under the EAS Master Beekeeper Program. He has been keeping bees as a hobbyist and side-liner since 1946. He was awarded "Pennsylvania Beekeeper of the Year" for 2004.*

Does Apistan Kill Queens?

In the February issue of *Bee Culture,* Mark Winston is talking about a study done with Apistan on page 18. After two years half of the 10 hives were dead because of queen loss not Apistan. It was my understanding that many beekeepers are questioning whether Apistan is suspect for queen loss itself. Perhaps this factor should be factored against Apistan also? Thanks.

Thanks also for publishing Walt Wright's articles. Having visited Walt and seen for myself his observations first hand, I am convinced that his keen observations are accurate.

Colleen Howe
Friday Harbor, WA

Response from Dr. Winston: Good point . but Apistan isn't necessarily implicated. Some studies have shown more than 50% queen loss naturally over a two-year period. Still, the possibility of pesticide harm to queens is a serious issue, and one that deserves more attention.

Mite Away II/Formic

The article on page 15 of the February issue titled, "Cautionary Tale of Formic Acid" should have been, "Mite Away II Does Not Work in Florida."

The research noted in this article was done in 2003 and the product used was "Mite Away II." Formic acid works, it is the bad method products and reporting that gives formic acid a run down.

Bill Ruzicka
Kelowna, BC, Canada

TM For Foulbrood

For years I've used a standard Terramycin mix (TM-25) mixed with powdered sugar on the top

MAILBOX

frames of each hive as Winter approached – and have been blessed for the last 15-20 years with "zero" foulbrood in the Spring – and each Spring put on a little more just before the dandelions started to bloom. My hives are in the Latrobe area of Western PA, just on the 40th parallel.

Last year it was suggested that I use TM-50 mixed with powdered sugar in similar proportions, which I did for Fall application. This Spring, I'm hearing that TM-100 is being recommended for Spring application @ 200mg per colony. In checking at the local Agway, I noted that TM-100 was the only concentration offered for sale – and that the standard package by weight (9.55 oz., or 270.5 gr) would, therefore, treat approximately 1,350 hives. Since most amateur beekeepers, like myself, may not be able to accommodate weighing metric quantities, can you:

1. Help by advising what volumetric quantities one would need per hive, per 10 hives, or per 100 hives. It sounds to me that one teaspoon may treat about 20-30 hives.
2. Do your researchers know how the bees, themselves, react to these increasing numbers? Are the dosages really increasing, or do they represent merely the same intensity strength of active oxy, but mixed with ¼ of ½ as much bulk inert ingredient.

John L. Wandrisco
Latrobe, PA

Editor's Note: *I can't imagine who would make these recommendations. Use* only *TM with a label for honey bees. Anything else is a violation of the law. Get back to TM-25, or theother products with the correct label. Any of the premixed products work well. Please, be careful with antibiotics.*

Way To Go Mann Lake!

We were so pleased to receive the News Release from Mann Lake regarding Cargill's "Likewise" honey! It's about time someone stands up for what is right! Maybe if more of our politicians and legislators would do the same, American beekeepers could actually make a living doing what we love.

Most of the time nobody listens when individuals like us speak up so we always kind of give up and just take it on the chin. It's nice to have companies like you saying the things that need to be said. When big volume customers like yourselves tell the "Cargills" of the world what you believe in, they listen.

We have always enjoyed doing business with Mann Lake and had a rare opportunity to visit your store in Hackensack last Fall. We were very impressed. Mann Lake has always been courteous and helpful and we are always surprised how fast we receive our orders. Now we have one more reason to do business with Mann Lake.

Keep up the good work and thanks again for standing up for us "little guys."

Dan, Caralyn & Tyler Seidler
Burke, SD

Healing Honey

About two years ago, my hand was operated on for Dupuytren's Disease.

The disease causes your fingers to curl down into a claw. It is genetic and if any of your ancestors was a Viking, you have a good chance of getting it. It is often mistaken for arthritis.

The operation cuts the fascia of the palm leaving a long deep wound that takes a while to heal and leaves quite a bit of scar tissue. In addition, cuts are made in the offending fingers as well as other parts of the palm. I had four areas of surgery with two to four cuts in each area.

I tried to convince my Doctor to let me use honey to heal the wound and gave him quite a bit of data from the New Zealand work with honey and wounds. He refused, but three weeks after the operation, normal methods were going nowhere, so he let me use it. The results were spectacular.

Even after the delay, my hand healed faster and I got movement back sooner than normal.

So when I went in for my other hand, last December, my Doctor was not only a convert, he had enlisted other doctors into looking at honey for healing wounds after surgery. I was going to be the poster child. The results are even better than the first time, since he let me start using it five days after the operation. Yesterday I went in for my visit and have full movement in my hand and little scar tissue. I do not have to go back again. The Doctor and physical therapist are definite converts.

He has a load of pictures and intends to give a presentation to his peers on using honey after hand surgery.

Today, less than three months after the surgery, My hand is slightly swollen but the wounds are nearly invisible from three feet or so. The areas around the wounds are soft, which continues to amaze mt physical therapist. She wants to make a separate presentation.

I am not sure where this may go, since the main drawback to its use is the patient. I was the one who applied it, but that is the case with all who go through this operation. It is a bit messy and can get on your clothes as well as bedding, but it washes out easily. The main benefit is quick healing and you get full use of your hand back much sooner In fact, many who have the operation will still have curling because of scar tissue, while I have none.

Honey is amazing stuff.

Bill Truesdell
Bath, ME

Mite Control Survey

We are conducting a nationwide survey of beekeepers on their *Varroa* control practices. We would appreciate your help. Please visit www.honeybeesurvey.com for our online survey. Thank you.

Seon-Ae Kim
Louisiana State University
Baton Rouge, LA

INNER COVER

It's been an interesting time since last we spoke. Have you been basking in the media attention due to the stories coming out of California? Not enough bees to pollinate that most valuable almond crop, screamed the headlines. We've been saying for years that if 'they' don't do something all the bees will be dead and 'no bees = no food.' The threat of that actually matured this Spring. And it got pretty much everybody's attention. Reporters were worried. Almond growers were worried, if they hadn't contracted early. Beekeepers were worried that promises made a while ago would be hard or impossible to keep due to dead bees and empty boxes. It was an anxious time.

But we got through it. We rose to the occasion. We saved the day. How? Creatively, that's for certain.

Beekeepers who probably would have never put a colony on a truck saw the need, and the income, and did as they were bid – 'Go west, beekeeper, go west.' That helped fill the void, and moved the price of almonds up a tad this year

But as Herculean an effort as that was, it wasn't enough. More was needed. And more came.

However, let me digress just a bit first.

Several years ago when the amount of inexpensive honey from offshore was flooding the U.S. market the beekeeping community could only fight back with anti-dumping legislation, and high minded, though short sighted sermons about how the U.S. could import that junk, and only importers and packers of questionable reputation would do so, *but*, we went on, the U.S. *couldn't* import pollination. This was our life-saving, bullet-proof vest. I was one of those sermonizers. It sounded good at the time.

Never under estimate the capabilities of a profit-driven capitalistic market, however

Indeed. People smarter than us figured out that if it cost too much to grow things here, they could be grown somewhere else for less. So South America, Central America, the Caribbean, even countries in Asia, especially China, the country the most honey is coming from, are now growing our salads, our garden seeds (the beauty of that irony defies description) and our fruit. If you can't import pollination, import what's pollinated – and we are, at an increasing rate annually. Ask the apple people. Or pepper growers. Or any number of out-of-work vine crop growers. They'll tell you.

But wait. This year, we found out that, by gosh, we *can* import pollination. This is important only if it's because it's the first time. A decade from now no one will remember. But this year, it's a big deal.

Well, actually, I suppose it's not. Or shouldn't be anyway, because we knew it was coming. Import pollination? Yes sir Here's how.

Because the beekeeper's price on colony rentals late in the season was in the $100 plus range, it became feasible, and financially possible to bring in packages from Australia to be put in boxes, then sent into almonds. Summer bees, grown down under, were put on drawn comb up here, and seemed to do the trick. Their foraging efforts were satisfactory (so far it seems – nut set will tell in the long term).

The timing of this is certainly worthy of a second look. Significant losses of U.S. bees this Winter, WTO regulations put into effect at about the same time allowing honey bees from Australia and New Zealand into the U.S. with little scrutiny, and increased almond acres coming on line – it's that perfect storm thing we keep hearing about.

So 3,000 Aussie packages arrive just in the nick of time to *disprove* the old adage 'You can't import Pollination!'

But it's all global now. And if you can't, or won't get that you're going to get run over Honey is. Fruits and vegetables are. Bees are. Some plastic beekeeping equipment is.

This is no different than bringing honey in to fill the gap between what we use and what we produce. Millions of pounds from off shore are brought in because U.S. beekeepers can't afford to compete at world prices.

Well, now we can't afford to compete at world pollination prices. It's cheaper and easier (apparently) and just as good to bring in southern hemisphere packages and put them in boxes

Continued on Page 49

Yes, Virginia, We Can Import Pollination. Spring!

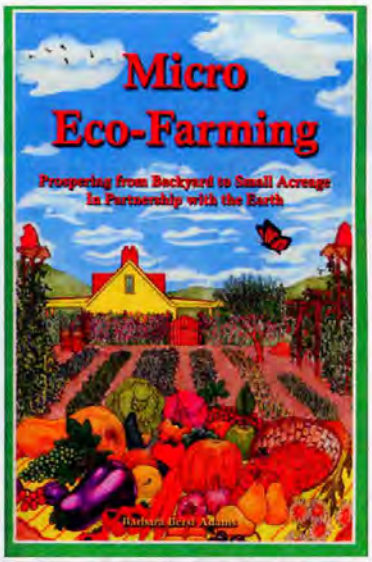
NEW FOR YOU

For beekeepers who aren't familiar with singer-songwriter Tori Amos, her latest release, *The Beekeeper*, may disappoint you. An initial listen of the album left me thinking, "now what, exactly, does all of this have to with beekeeping?" Granted, I'm not a beekeeper, but I have been around bees for most of my life (check the last name!) and I found it difficult at first to reconcile the songs to the actual act of keeping bees. There are some obvious references to beekeeping, such as the honeycomb images superimposed on the cover of the CD, the title track and "Sweet The Sting," not to mention *The Beekeeper Mix*, a packet of bee -friendly seeds included in the packaging. There is the fact that the songs on the album are seperated into six different "gardens" (*Desert Garden, Rock Garden, Roses And Thorns, The Greenhouse, The Orchard and Elixirs And Herbs*), each corresponding to the side of a hexagon. The iconic Beekeeper appears to be the caretaker of the gardens, charged with keeping them pollinated and disease-free, as well as the propolis that binds them together *The Beekeeper* also appears on the title track as "Death" and as a "Bee Shaman" and healer on "Sweet The Sting."

The rest of the album, however, travels a different path. Songs such as "The Power Of Orange Knickers," "General Joy" and "Mother Revolution" explore Amos' feelings about war and how fear clouds our vision of others. "Marys Of The Sea" and "Original Sinsuality" reflect Amos' longtime interest in the feminine aspect of Christianity. There is also a large art quotient within the album- "Parasol" is an interpretation of *Seated Woman With a Parasol* by Georges-Pierre Seurat and "Garlands" is a story-within-a-song mostly made up of the names of Chagall paintings.

Tori Amos is an accomplished singer-songwriter and pianist with years of classical (and not-so-classical) training behind her The addition of two Hammond organs to this particular album infuses her always-rich compositions with a new complexity. Beekeepers may not understand or even like her music, but the bottom line here is that she has provided the beekeeping industry with some valuable PR with this album. Buy it, listen to it once, plant the seeds and harvest the honey from Tori Amos' *The Beekeeper*.

– *Jessica Flottum*



Micro Eco-Farming. Barbara Berst Adams. 175 pages 6"x 9", soft. B&W ISBN 0963281437 New World Publishing www.nwpub.net. $16.95

We should all be doing this. A half acre, the right place and outlook, and you're in business – for yourself producing honest food for people who appreciate the effort.

'Local' is the mantra, just like we've been saying here for years. Organic is good if you can, local is best anyway.

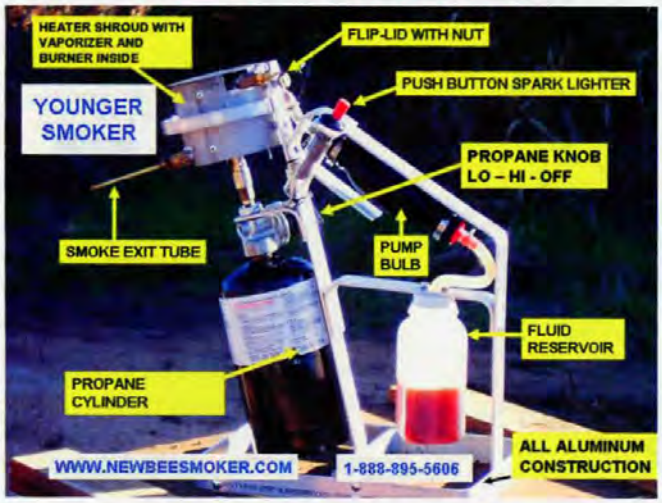
Herb farms. Flower farms. Goats and chickens. Peppers and pumpkins, apples and cheese – all possible on tiny plots of land.

Ms. Adams covers it all – animals, fertility, diversity how to begin, children in the picture, resources, networking, selling, buying, and lots of just plain how-to.

If you've read this far you probably own one of the many editions of 'Living on 5 Acres.' This is the next step. If you think being your own boss, getting dirty on your own land, and having people really want what you make – this is for you.

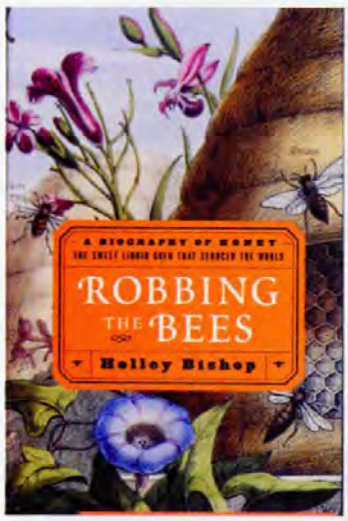
Full color, 27"w x 19"h, heavy duty educational posters. Mount on foam board and you've got a talk waiting to happen. *Honey Poster* shows flowers, honey comb, extracting and bottles of honey. *Honey Bees* (shown) shows wild comb, old and modern hives, orchards and the three types of bees. *Propolis Poster* shows bees gathering propolis from plants, how they use it in the hive and collecting it for human use. *Royal Jelly* shows natural queen cells, a large queen cell with jelly in it, grafting larvae to collect and actual collection. *Pollen Poster* shows returning foragers with full baskets, pollen in cells, a pollen trap, collected pollen pellets. Each poster describes the photos with lots of information. Excellent for schools or demos at fairs. All available from *Bee Culture* Book store at $16.00 each, postpaid in the U.S.

NEW SMOKER



The Younger Smoker (a fluid/vapor propane-powered bee smoker) was invented by Paul Younger, a beekeeper living in Queen Creek, Arizona. In 2000 he discovered a new concept that could be applied to smokers, and began to fabricate the first prototype models. Century Tool joined the project, and they have become the sole manufacturer of The Younge Smoker Mite-control features have also been added to the smoke.

The photo shows the unit and how it works. Fuel, a food grade natural, is safe and easy to use, costs $79/gallon. Use is about 12 oz. for 150 hives, three quarts for 500. It cost about 35¢/hour to operate. Price is $150, which includes shipping and a quart of fuel. For more information visit www.newbeesmoker.com or call 888.895.5606.



Robbing The Bees. A Biography of Honey. Holley Bishop. 324 pages. 6" x 9" Hard cover, b&w ISBN 0743250214. Available from *Bee Culture* Book Store (www beeculture.com) or call or write. $25 includes postage in the U.S.

Robbing The Bees begins each chapter with the apiary business at hand, and then explores all the lively historical material that accompanies each step of the process and each stage in the life of the bees and their honey. Readers meet the main beekeeper at work and follow him through the mesmerizing process of managing his bees and "robbing" them of their honey. Woven throughout are the author's beekeeping experiences, plus the historical, cultural, and gastronomical world of honey, the myriad varieties of honey (as distinct as varieties of wine), as well as recipes, illustrations, and historical quotes. By the end of the book, readers won't look at bees on flowers or a honey bear on the shelf in the same way ever again.

Donald Smiley, a 700 hive commercial beekeeper in Florida is what makes this book work for the beekeeper in us. The author pays innumerable visits to this Florida operation studying the man and the many complicated aspects of keeping bees, selling honey, and meeting others involved in his life. I'd like to know him even better.

Quirky turns will surprise you, like the 2003 New York City black out, and eating a made-up honey dish, naked in the dark.

You'll learn from Smiley's beekeeping, and you'll enjoy the rest. This is worth the money. – *Kim Flottum*

Honey Straw Machine

This is a manual system and is very easy to operate. It is designed to fill 200 to 500 straws per hour (eight at a time). The straws cost around three cents each to make. It makes three sizes – two inch straws (samples), seven inch straws (standard and extra long 10 inch straws. This machine can be used for other liquids, such as maple syrup and it makes batches as small as one quart.

The system is made of stainless steel, brass, CPVC and food-grade nylon components. Virtually no assembly required. Easy and inexpensive to operate, maintain and repair.

The cost is $569 and your purchase includes the complete system, thermometer, 1,000 straws, spare parts (three extra electric elements, three strips of Teflon cloth, one silicon strip for sealer), proven recipes and hints for popular flavors, owner's manual and instructions, ongoing technical support and also includes shipping.

For information contact Tony, evenings at 785.842.9268 or visit www.anthonyskansashoney.com.

Enjoy!

APRIL– REGIONAL HONEY PRICE REPORT

Where is honey sold? We've got two years of data now and the results are worth noting. Look at those categories that require direct-to-customer retail sales. Farm Markets the exception here as the number of them has increased across the country. Large and small packer sales increased, probably due to higher prices and less crop. Health/Organic stores – more people, but less honey sold. Same with bakeries. Fluctuating prices and short crops last year changed things. This year will be interesting to see – where honey is sold.

% of Sellers		% of Their Honey Sales at these locations		
04	05	04	05	
68	78	40	35	Home (inside or roadside stand)
17	14	23	41	Local community sponsored farm market (i.e. Saturday & Sunday sales)
24	21	23	14	Local Farm Market business that's seasonal (Fall only, for instance)
19	18	32	34	Local Farm Market business that's year-round
5	6	6	23	Flea Market
28	41	28	14	Health Food/Organic store
15	17	23	9	Gift Store
8	11	9	11	Specialty Outlet (salons, tourist outlets, airports)
23	29	22	16	Bakeries/Food Establishments
14	11	18	23	Local High-End Retail Outlets (gourmet stores)
26	25	24	18	Local, Small 'Mom & Pop' Retail Outlets (grocery & gas)
4	6	22	12	Local, Small, Franchise Outlets (7-11, Dairy Mart, Stop & Go)
15	25	40	31	Local Small Packer or Producer/Packer
6	10	66	68	Huge Packer, they pick up
17	25	40	35	Wholesale only to medium retail outlets (small chains) you deliver
4	6	44	29	Wholesale only to larger stores, you deliver to warehouse
3	10	5	3	Breweries/Beer or Mead makers
8	11	31	12	Internet, direct retail, mail order
17	11	19	6	Work, direct retail
5	6	27	33	Local/State Fair, with club

*Total percentage of sales does not come out to 100% because of multiple outlets.

	Reporting Regions												Summary		History	
	1	2	3	4	5	6	7	8	9	10	11	12			Last	Last
Extracted honey sold bulk to Packers or Processors													**Range**	**Avg.**	**Month**	**Yr.**
Wholesale Bulk																
55 gal. Light	1.00	1.20	0.89	1.25	0.60	1.20	1.25	1.51	1.88	1.07	1.60	1.20	0.60-1.78	0.99	1.08	1.47
55 gal. Amber	0.90	0.80	0.80	1.05	0.57	1.10	1.13	1.10	1.11	0.85	1.40	0.94	0.57-1.60	0.93	0.89	1.28
60# Light (retail)	97.00	116.70	95.85	96.00	82.00	110.00	93.22	100.00	125.00	95.85	110.00	111.50	80.00-125.00	102.76	105.49	106.97
60# Amber (retail)	93.00	106.65	70.00	94.40	69.63	100.00	94.71	105.00	125.00	100.63	100.00	75.00	65.00-125.00	94.50	103.41	102.53
Wholesale Case Lots																
1/2# 24's	39.40	50.38	48.00	36.85	72.00	49.30	40.89	49.30	50.40	35.76	42.00	52.80	35.76-72.00	47.26	37.90	46.68
1# 24's	57.14	57.50	64.80	53.84	58.85	56.00	57.41	62.40	48.00	71.84	94.80	69.60	48.00-94.80	62.68	59.06	61.90
2# 12's	56.17	62.23	72.60	50.27	58.20	62.62	52.68	66.00	45.88	55.92	35.00	60.90	35.00-72.60	56.54	52.81	54.86
12 oz. Plas. 24's	51.84	55.72	54.00	43.69	39.00	48.00	47.85	50.00	42.60	47.76	70.80	52.80	39.00-70.80	50.34	51.26	50.72
5# 6's	55.81	63.89	60.00	53.83	62.29	60.00	58.89	50.00	37.68	56.43	46.00	72.00	37.68-72.00	56.40	57.86	60.36
Quarts 12's	82.29	105.18	82.20	70.43	66.00	74.00	82.74	76.00	56.00	99.00	89.40	96.00	56.00-105.18	81.60	83.31	81.14
Pints 12's	56.45	54.98	54.60	44.83	34.80	50.00	59.00	44.00	56.45	60.00	46.00	54.00	34.80-60.00	51.26	49.94	47.24
Retail Honey Prices																
1/2#	2.25	2.60	2.48	2.43	2.48	2.48	2.40	1.89	2.48	2.54	1.89	2.50	1.89-2.60	2.37	2.45	2.50
12 oz. Plastic	2.98	3.26	3.65	3.01	3.48	3.00	3.15	3.54	3.45	3.33	3.13	3.03	2.98-3.65	3.25	3.23	3.23
1 lb. Glass	3.56	4.11	4.22	3.86	3.51	3.50	3.72	4.07	4.13	4.12	4.08	4.08	3.50-4.22	3.91	3.85	3.99
2 lb. Glass	6.63	6.31	6.24	5.68	5.95	6.58	6.63	7.50	6.00	6.92	5.45	6.50	5.45-7.50	6.36	6.24	6.22
Pint	4.50	6.75	5.95	5.08	4.95	5.25	7.40	5.38	6.00	7.50	5.15	5.50	4.50-7.50	5.78	5.72	5.31
Quart	8.00	9.70	9.50	7.60	7.95	8.25	8.70	8.59	10.00	14.33	8.10	10.00	7.60-14.33	9.23	8.85	9.36
5 lb. Glass	12.80	13.56	13.84	12.95	14.00	13.00	13.75	16.94	12.59	14.06	12.87	13.84	12.59-16.94	13.68	12.93	13.01
1# Cream	5.00	5.19	4.79	4.73	4.79	4.00	4.59	4.94	4.79	5.29	5.00	4.00	4.00-5.29	4.76	4.53	4.57
1# Comb	4.83	4.44	4.95	5.52	6.64	4.50	5.89	4.99	6.64	6.37	8.00	7.33	4.44-8.00	5.84	5.23	5.13
Ross Round	4.50	3.90	3.60	5.43	4.99	4.00	6.20	4.99	4.99	5.63	6.00	4.99	3.60-6.20	4.93	4.41	4.89
Wax (Light)	2.81	2.75	3.00	1.53	1.38	2.00	1.99	2.63	1.65	3.12	1.45	2.92	1.38-3.12	2.27	2.22	1.84
Wax (Dark)	2.55	2.93	2.75	1.35	1.15	2.00	1.09	2.50	1.00	2.73	1.85	2.15	1.00-2.93	2.00	1.97	1.47
Poll. Fee/Col.	50.00	43.33	40.00	35.00	37.50	45.00	44.50	60.00	80.00	54.60	28.00	53.50	28.00-80.00	47.62	46.27	40.62

HONEY PRODUCTION – 2004

Honey production in 2004 from producers with five or more colonies totaled 184 million pounds, up one percent from 2003. There were 2.56 million colonies producing honey in 2004, down two percent from 2003.

Yield per colony averaged 71.8 pounds, up three percent from the 69.9 pounds in 2003. Colonies which produced honey in more than one State were counted in each State where the honey was produced, therefore yields per colony may be understated. Colonies were not included if honey was not harvested. Producer honey stocks were 61.2 million pounds on December 15, 2004, up 50 percent from a year earlier. Stocks held by producers exclude stocks held under the commodity loan program.

Honey prices decreased during 2004 to 108.5 cents, down 22 percent from 138.7 cents in 2003. Prices are based on retail sales by producers and sales to private processors and cooperatives. State level honey prices reflect the portions of honey sold through retail, co-op and private channels. U.S. honey prices for each color class are derived by weighing quantities sold for each marketing channel at the U.S. level.

Honey prices for 2004 were lower than the previous year for all color classes except the All Other Honey, Area Specialties class. Honey prices for 2003 crop honey reflect honey sold in 2003 and 2004.

As usual, there's more here than meets the eye, and there's been some shuffling this year that bears mention.

First, California certainly seems to have had a hard year. Tied for first with North Dakota in number of colonies at 390 million, Golden State beekeepers only took home an average of 45 lbs/colony in 2004, producing 17.6 million pounds of honey, its smallest crop in at least 10 years, and 12 million lbs. below its average.

California is an interesting study, especially now, because of the pollination attention that has been focused there. The 10 year chart – 1995-2004 (page 49) – for

Honey: Number of Colonies, Yield, Production, Stocks, Price, and Value by State and United States, 2004 1/

State	Honey Producing Colonies	Yield per Colony	Production	Stocks Dec 15 2/	Average Price per Pound 3/	Value of Production
	x 1,000	Pounds	x 1,000	Pounds	Cents	1,000 Dollars
AL	13	82	1,066	43	124	1,322
AZ	35	72	2,520	983	134	3,377
AR	40	75	3,000	810	126	3,780
CA	480	67	32,160	6,432	139	44,702
CO	24	86	2,064	722	140	2,890
FL	210	71	14,910	1,491	132	19,681
GA	52	65	3,380	270	128	4,326
HI	7	114	798	43	145	1,157
ID	100	46	4,600	1,380	133	6,118
IL	7	60	420	252	183	769
IN	5	56	280	78	166	465
IA	32	59	1,888	868	142	2,681
KS	16	57	912	447	141	1,286
KY	5	48	240	14	167	401
LA	34	90	3,060	275	124	3,794
ME	8	33	264	145	141	372
MD	2	42	84	21	193	162
MI	65	74	4,810	1,732	141	6,782
MN	120	83	9,960	1,892	144	14,342
MS	21	69	1,449	246	129	1,869
MO	17	53	901	189	141	1,270
MT	145	66	9,570	1,914	144	13,781
NE	45	74	3,330	1,299	138	4,595
NV	6	64	384	46	204	783
NJ	10	19	190	101	160	304
NM	6	41	246	108	120	295
NY	67	72	4,824	1,640	136	6,561
NC	10	44	440	79	192	845
ND	340	87	29,580	6,803	136	40,229
OH	15	50	750	278	140	1,050
OK	3	47	141	69	184	259
OR	42	51	2,142	964	127	2,720
PA	27	50	1,350	419	144	1,944
SC	4	70	280	8	189	529
SD	215	70	15,050	2,709	143	21,522
TN	6	40	240	46	152	365
TX	140	67	9,380	1,126	140	13,132
UT	25	57	1,425	157	128	1,824
VT	7	83	581	163	196	1,139
VA	6	37	222	69	168	373
WA	58	56	3,248	942	146	4,742
WV	8	47	376	194	189	711
WI	74	77	5,698	2,678	147	8,376
WY	39	81	3,159	474	141	4,454
Oth Sts 4/ 5/	8	44	355	166	289	1,027
US 5/ 6/	2,599	70	181,727	40,785	138.7	253,106

1/ For producers with 5 or more colonies. Colonies which produced honey in more than one State were counted in each State.
2/ Stocks held by producers.
3/ Prices weighted by sales.
4/ CT, DE, MA, NH, and RI not published separately to avoid disclosing data for individual operations.
5/ Total colonies multiplied by total yield may not exactly equal production.
6/ U.S. value of production is U.S. production multiplied by U.S. price per pound.

number of colonies, average yield/colony, carry-over stocks and total production tells part of the colony shortage crisis story that played so well in the press this year

Almond acres have increased steadily for the past dozen years or so, (500,000 in 2000 up to 550,000 in 2004, a 10% increase) yet resident colonies in California have decreased from a high of 505,000 in 1999, to 390,000 in 2004, a 23% drop. Yield/colony has been only a hair above, and mostly below the 10 year average since 1999 too. Though the increase in demand for almond colonies has, and continues to grow, their supply of colonies is becoming more and more national and even international, as California beekeepers struggle with a host of obstacles.

Meanwhile, 2004 production leader North Dakota continues to fluctuate in its annual up, down, up cycle, and South Dakota, number two this year, continues its slow rise from 2002.

U.S. beekeepers produced 184 million pounds of honey last year, but they only sold 108.9 million pounds – the rest went into the warehouse where it still sits, or under loan (and then into the warehouse where it still sits). That amounts to 40.1% of U.S. honey that didn't get used last year Yet we imported 178.8 million pounds, and used about 85% of that (152 million pounds). The amount put under loan (16 million pounds, up from 5.9 million last year) has only a nine month warehouse life, so it'll have to move sooner rather than later, and, one can imagine eager packers waiting to offer almost nothing so the loan can be handled. Or, it can be forfeited to the feds and sold by them at fire-sale prices later Honey simply held can continue to be simply held, until cash flow or debt calls a beekeeper's hand.

Imports were actually down 27

Per Capita Consumption

Plusses	Mil. Lbs.
Production	183.6
Stocks In	40.7
Loans	16.0
Imports	178.8
Total	**419.1**

Minuses	Mil. Lbs.
Stocks Left	61.2
Exports	7.1
Import Stocks left (Est. at 15% of imports)	26.8
Total	**95.1**

To Calculate Per Capita Consumption

Consumption	Mil. Lbs.
Production	419.1
- Removed	95.1
= Consumed	324.0
+ Population	293.7
Per Capita	**1.1 lbs/person**

Per capita is 1.1 lbs., which is 17.6 ounces. In 2001 it was 18.9 ounces and in 2003 it was 19.7.

Top Ten Producing States

	1999		2000		2001		2002		2003		2004		
State	x1000 Col.	x1000 Prod lbs	x1000 Col	x1000 Prod lbs	x1000 Col	x1000 Prod lbs	x1000 Col	x1000 Prod lbs	x1000 Col	x1000 Prod lbs	State	X1000 Col.	X1000 Prod lbs
CA	505	30.3	440	30.8	425	27.6	470	23.5	480	32.1	ND	390	30.4
ND	255	26.8	300	34.5	280	26.9	320	24.0	340	29.6	SD	215	22.6
FL	228	23.3	232	24.4	220	22.0	220	20.4	210	14.9	FL	205	20.1
SD	224	23.3	235	28.4	235	15.3	225	11.5	215	14.0	CA	390	17.6
MN	145	11.9	150	13.5	135	10.9	117	8.5	120	10.0	MT	140	10.8
MT	122	8.5	124	10.9	136	13.9	134	8.4	145	9.6	MN	135	10.1
TX	108	8.7	105	8.3	97	7.7	114	7.6	140	9.4	TX	116	8.8
WI	80	6.0	84	7.6	67	5.4	70	6.7	74	5.7	ID	100	6.3
NY	69	4.8	58	4.6	53	3.7	60	5.8	67	4.8	WI	68	5.8
MI	73	6.2	72	5.4	76	4.6	72	5.5	65	4.8	MI	65	4.3
Total	**1809**	**149.8**	**1800**	**168.4**	**1724**	**138.9**	**1802**	**121.9**	**1856**	**134.7**		**1824**	**136.8**
All States	**2688**	**205.2**	**2620**	**220.3**	**2506**	**185.5**	**2574**	**171.7**	**2590**	**181.1**		**2599**	**181.7**
% of Total	**67%**	**73%**	**69%**	**76%**	**69%**	**75%**	**70%**	**71%**	**72%**	**74%**		**71%**	**75%**

Honey Prices 1993-2004

Cents/lb.	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
All Honey	53.9	52.8	68.5	87.8	75.7	65.5	60.1	59.7	70.4	132.7	138.7	108.5
Retail Shelf	81.3	89.1	100.0	117.3	125.7	114.7	126.6	130.4	142.2	152.5	188.5	188.7
%Difference	151%	169%	146%	134%	166%	175%	211%	218%	202%	115%	136%	174%

*Percent difference reflects retail mark up price over bulk honey price.

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RESEARCH REVIEWED

Explaining • Defining • Using

Steve Sheppard

"Larceny in honey bees and a reason to be careful with fungicides."

Beekeepers often promote the honey bee as a hard-working insect that deserves the admiration of all of us who derive nourishment from pollinated plants or animals fed such crops. For the most part, this is a well-deserved accolade, especially pertinent from my vantage point here in the apple growing kingdom of Washington State. However, like many of us, honey bees are not averse to taking a free meal when it is offered. A recent paper by two researchers from the University of Georgia examined in some detail a case whereby honey bees derive a greater reward for "taking the easy road," rather than working for the benefit of the plant (Dedej and Delaplane, 2005). The authors introduce the story by telling us how carpenter bees act as "nectar thieves" when they make a hole in the side of the flower of rabbiteye blueberries to obtain nectar without effecting pollination. Honey bees normally make "legitimate" visits to undamaged rabbiteye blueberry flowers and can effect pollination. However, after carpenter bees have perforated the flowers, honey bees learn to visit the holes and therefore become "secondary nectar thieves." In the current research report, the authors addressed the question of what might be responsible for the transition in behavior from legitimate flower visiting to nectar "larceny" by honey bees. The hypothesis they proposed to test was that honey bees receive an energetic advantage in making the move from legitimacy to larceny.

To investigate the energetics of the two foraging strategies, the researchers measured the "standing nectar crop" in intact and perforated flowers, the time honey bees spent flying between flowers and the time bees spent handling the flowers (perching or walking). Measurements were made over a period of six days. The authors reported that intact flowers typically contained higher amounts of nectar (and overall sugar) than perforated flowers. Perhaps due to the ease of access, foragers tended to remove a greater percentage of the nectar from perforated flowers than from undamaged flowers on a single visit. The total amount of sugar gathered by a forager from either an intact or perforated flower on a single visit was not different. However, the researchers found that there was a significant reduction in the time spent "handling" flowers by bees involved in nectar larceny compared to legitimate visits. Thus, the overall flower visitation rate (number of flowers visited per unit of time) and estimated energetic reward was higher for robbers. In the discussion, the authors pointed out that on a strictly "per flower" basis, the energetic reward was higher for intact flowers and would seem to favor longer visits by legitimate foragers. However, by considering the "foraging cost" (more energy was required per flower to handle intact flowers), "the advantage goes to robbers who extract available resources more efficiently..." While honey bees may still deserve the title "angels of agriculture," the work of Dedej and Deleplane show that foraging behavior remains flexible enough that when the opportunity arises, they are quite happy to steal a little nectar on the side.

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A consistently vexing problem for beekeepers in some agricultural production areas is the danger to honey bee colony health posed by the suite of chemicals used in crop production. In addition to outright bee poisoning from insecticides that may have been improperly applied to blooming crops or drifted from nearby fields, non-insecticidal chemicals also can have negative effects on colonies. Fungicides are one such group of chemicals commonly applied to plants to prevent diseases. Some fungicides are used during the bloom period of the crop, thereby increasing the likelihood that honey bee foragers will contact the fungicide and return to the colony with contaminated pollen or nectar In the introduction of their research paper, a group of investigators from the University of California noted that "beekeepers still continue to observe aberrancies in brood rearing after use of various fungicides in almond orchards" (Mussen et al., 2004). Mussen and colleagues then went on to report the results of laboratory evaluations of eight fungicides used or proposed for use on blooming almonds relative to their potential to damage honey bee brood. In the experimental setup, the researchers reared larvae in incubated individual wells and fed them on a suitable diet (with or without fungicide added) from the age of one day until pupation. For each fungicide group and the control group (no fungicide) the researchers used 96 larvae. The dosages of fungicide that were fed to the larvae were estimated to be

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the amount that would be carried back to the hive by a worker returning from single foraging trip at a given field application of fungicide. The dose was then divided and fed to the larvae over a six day period. Mortality was monitored daily during larval and pupal development. Results of the tests showed that diets incorporating three of the fungicides (Captan, Ziram and Rovral) led to complete mortality (100% died in either the larval or pupal stage). Rorval also caused abnormal morphological development in honey bee pupae. The mortalities associated with the other five fungicides did not differ from the mortality of the control group. In discussing their findings, the authors concluded that "even very small amounts" of certain fungicides can "interfere with larval and pupal development" if transported to the hive by foragers and fed to larvae. They suggest that field studies to more accurately estimate the toxicity of the fungicides, combined with data on the contamination level of forager pollen loads, larval food and nurse bees would assist in verifying their laboratory results. The research was supported, in part, by the Almond Board of California and the California State Beekeepers Association. Clearly both of these groups have strong interests in maintaining healthy and strong pollinator populations and, to the benefit of beekeepers and growers alike, were willing to support research on the interaction between fungicides and honey bees. BC

Dr. W. Steve Sheppard, Thurber Chair, Dept of Ent. WA State University, Pullman, WA 99164-6382, shepp@mail.su.edu; apis.wsu.edu.

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Mark Winston

These Are A Few Of My Favorite Things . . . Experiments

"My favorite experiments may not have had much impact on the world but changed my way of looking at things."

I had an interesting e-mail from a British beekeeper, Graham Law, the other day. I had met Graham during a lecturing trip I took to the United Kingdom. He had presented a talk on the observation hive that he and his wife Annie kept in the living room of their home, located at the edge of the Charnwood Forest area in Leicestershire, England, close to Robin Hood country.

His presentation was delightful and amusing, full of wry and dry humor and the self-deprecating perspectives that emerge when you share your house with a few tens of thousands of bees. His e-mail message was intriguing, asking my input on a new talk he was developing about great scientific experiments using bees. Naturally, my own "blast from the past" experiments immediately popped to mind, not because they were so great but more because they were familiar, and thus easy to access from the slowly decaying memory bank.

I don't know what makes a great experiment, although I could pontificate with platitudes about elegant design, resolving important issues in science, and contributing to the good of humankind. I do have my personal favorites, though, experiments that may not have had much impact on the world but changed my way of looking at things.

The first experiment had nothing to do with bees, and was conducted in a laboratory fitted out for cell biology rather than in the beeyard. I was an undergraduate student at Boston University, long-haired and drifting through college without any particular goal in mind. I did, however, want to eat and pay rent on my slum apartment, and so had enough motivation to look for a Summer job.

I managed to land a research position in the laboratory of Lynn Margulis, a highly renowned evolutionary biologist who was viewed as a scientific rebel for her then-radical but now mainstream textbook theories about how complex cells had evolved from simpler bacteria. She hired me for a number of reasons, none of which had to do with any normal criteria, but rather on my overall-wearing style and my total disdain for conventional education.

She set me to work on an experiment in which we shed the mouthparts of one-celled organisms, and then observed their regrowth over a 24 hour period. Yes, even one-celled organisms have to eat, and have mouthparts, in this case a hole surrounded by cilia (hairs) that could be shocked into shedding and then regrowing.

The study compared normal regeneration of these hairs to regeneration when treated with various experimental drugs that might interfere with the growth of cancer cells. My job was to determine which drugs slowed or stopped the growth of the hairs, the rationale being that such drugs might also retard cancer

The methods were simple. Shed the mouthparts, then look through the microscope every two hours and record the stages of mouthpart regeneration. Logistically, this meant starting an experiment in the morning, and staying up for 24 hours until it was done, returning to the laboratory at regular intervals.

Fortunately I had friends living nearby who partied hearty every night, and so I spent my evenings imbibing various substances, returning to the lab every two hours in an increasingly happy mood to record the data.

Night after night I did this, sleeping little and imbibing much. Gradually, data emerged, and to my amazement the data were robust, emerging to fit perfectly into a straight line that demonstrated that these potential pharmaceuticals could, indeed, retard the growth of cancerous cells.

One morning, I finally crossed the line from confusion to clarity, and had an almost religious experience in which I realized that the disordered and confusing world around us might, just might, yield some of its secrets when nature was queried through rigorous science.

I'm sure my revelation that our chaotic world could be understood through research was influenced by too little sleep, too much partying, and some personal stress caused by having a grandfather who at that moment was dying of cancer Still, that one experiment, not particularly profound or important in the great scheme of science, did change my life, creating a love of experiments and an almost-physical need for data that still rules my psyche.

My second favorite experiment also was revealing about how the world was ordered, but in a different way. This one was conducted in Venezuela immediately after my honeymoon, and was a collaboration between my new bride and myself that revealed the meaning of "marriage" in more ways than one.

Our honeymoon had been a bit rocky, as most honeymoons seem to be. With the best of intentions, I had planned a newlywed trip to Costa Rica, figuring that my bride would share my infatuation with that beautiful country Unfortunately, we ran into friends of mine and fellow biologists everywhere we went, and what was supposed to be a private romantic experience turned out to be anything but.

In a sour mood, we proceeded to a research station in Venezuela

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"My second favorite experiment was conducted in Venezuela immediately after my honeymoon, and was a collaboration between my new bride and myself that revealed the meaning of "marriage" in more ways than one."

that the government had put together for the killer bee team. It had every convenience imaginable for American visitors, including air conditioning and even a waffle iron, but lacked electricity for much of our visit. Still, the experiment beckoned, and we went off every morning into the savannas to probe nature.

My wife also was a biologist, and had experience with cross-fostering techniques in which you take organisms and switch their environments as a tool to dissect out the relative importance of nature and nurture. This is one of the key and most basic questions pursued by scientists: how much of our behavior is determined by our genes, and how much by our environment.

We took newly emerged Africanized and European bees and put them in their own colonies and those of the other type. Then, we observed the ages at which they started foraging, and discovered a remarkable pattern. Africanized bees always foraged young, whether in Africanized or European colonies, while European bees foraged at older ages in their own colonies and at younger ages when fostered in colonies of Africanized bees. Thus, both environment and genetics were important, but genetics had a stronger role for Africanized bees.

Again, nature emerged through this experiment as a discernible and dissectible phenomenon, revealed in its complexity by using a simple experimental design to answer a clear and direct question. But that's not all that emerged for me.

Also revealed through the rigor of science and the focus of collecting data was another truth, that family had come to take an equal role with science in my life, and the two were not only compatible but synergistic.

I could be a scientist and have a life, too. In fact, I would be a better scientist if I also had a life outside of work. While marriage and family don't necessarily yield the same straight-line outcomes, they share with science the ability to reveal deep truths, and have the best outcomes when approached with persistence, curiousity, and exhilaration when new layers of understanding are revealed.

A third, transformative experiment took place in Stonybrook, New York, the product of a collaboration between biologists and chemists. My student Ken Naumann was in charge of this one, and I was mostly along for the ride. Our premise was, again, simple. Tom Seeley had published a paper suggesting that worker bees act as messengers to carry pheromone from the queen to other bees. All the behaviors fit, but no one had been able to follow pheromone through the hive to confirm the hypothesis.

Glenn Prestwich, a chemist at Stonybrook, had figured out a way to link a radioactive label to the pheromone blend that my colleague Keith Slessor had recently identified. So, Ken and I went off to New York to see if we could follow the labeled pheromone through the nest.

We started by putting a bee in a dish with a lure containing pheromone, letting her contact it, then putting her in a second dish with a fresh bee to see whether pheromone on the first bee would be transferred to the second. We then devised increasingly complex experiments to see how many bees would maintain a line of transfer, and to determine what happened to the pheromone once a bee had come into contact with it.

Every evening we went back to Glenn's house, had a nice dinner and some wine, and then sat down at what then was a new device, a personal computer, to analyze the data and put it into graphs. What would have taken weeks to do in my younger science days now could be accomplished in less than an hour, and the results of each day's work jumped out at us each evening.

The results did confirm that worker bees surrounding the queen do indeed pass her pheromones on to other bees, and that pheromone was eliminated from this system within 15 to 30 minutes of removing a queen, consistent with the time it takes queenless bees to become nervous.

Many other interesting things emerged from this project, but for me its most profound lesson was in the benefits of collaboration. None of us alone could have conducted this project. It took Slessor to identify the blend, Naumann to design these elegant experiments and conduct them with skill and patience, and Prestwich to provide the method to follow pheromone through a nest using radioactive label.

Of course, the day-to-day conduct of these three studies was murkier than it appears in hindsight, and the truths revealed when looking backwards are more apparent than they were at the time.

They are, however, basic. Good science comes through simple experiments that ask clear questions, collaboration is the driver of innovation, and crisp data honestly collected can indeed reveal insights into the wondrous natural world

And whatever those great truths may be, they are infinitely richer when shared with the loved ones around us. BC

Mark Winston is a Professor at Simon Fraser University, Burnaby, B.C., Canada.

Ma co m T Sanford

The American Beekeeping Federation In Reno: International Connections

"*Varroa* Resistance in France, AHB in Brazil, and Australian bees in the U.S."

I was gratified to see a more international flavor at the Reno Convention of the American Beekeeping Federation than in the recent past. This bodes well for U.S. beekeepers, who are often insulated from events in other nations that can materially affect them. Those involved included managers of German honey laboratories as reported in an earlier article summarizing issues surrounding the international honey trade, along with officials from the Honey International Packers Assocation (HIPA). Two others, who brought different perspectives on breeding and managing honey bees in specific environments, deserve mention. Finally, there was an invitation to the world congress this year in Dublin, Ireland.

Dr. John Kefuss is involved in queen rearing operations in both the Old (France) and New (Chile) World. He is a student of two apicultural research giants, Dr. Walter Rothenbuhler father of hygienic behavior (see *Bee Culture*, March 2003) and Dr Fredrich Ruttner of Germany, considered the contemporary authority on classifying honey bee races.

Dr Kefuss is bringing his considerable knowledge about queen genetics and breeding to bear on the issue of the day, tolerance (resistance) to *Varroa* mites. In both France and Chile, he is employing a strategy that is similar to that used by Brother Adam in his successful attempt to produce tracheal-mite-resistant queens. The overriding consideration is selection for certain measurable traits, with the ultimate test being survivability. This results in automatically selecting against susceptible drones. Thus, Dr Kefuss said that selection is really nothing more than a process of elimination. His breeding principles include 1) selecting bees that meet one's economic needs, and 2) employing simple tests with low labor input, and finally 3) eliminating all chemical treatments. Within this context, he concentrates on selecting for colonies that collect pollen, are "hygienic," have limited numbers of *Varroa* mites, and finally, are "survivors."

As an example of meeting economic needs, Dr Kefuss has eliminated all chemical treatments from colonies in France that are used as breeder colonies and honey producers, but still finds he must treat colonies in Chile because they are necessary for commercial pollinating activities. Pollen collection is easily measured through trapping. Hygienic behavior is tested using the standard technique of determining the amount of killed brood removed by colonies over a discrete period of time. *Varroa* counts on adults and brood provide an estimate of tolerance, with susceptible colonies left to handle infestations on their own. This all takes time, according to Dr. Kefuss, but the end product is worth it; some of the results are being advertised on the Pacific Queens web site through his Chilean partner, Francisco Rey [1] Much of what Dr. Kefuss discussed has also been published elsewhere on the World Wide Web, albeit in the French language[2] (and will be published in this Journal next month).

Dr Kefuss has seen survival increase in colonies since 1993 in France through use of his James Bond test, "live and let die." This is often not rapid enough to confer *Varroa* tolerance for his taste, and so he has also implemented the "Bond accelerated treatment" or BAT *Varroa*-infested brood is directly introduced into colonies to provide greater challenges. In many cases 90 percent of the colonies so infested are dead in less than six months, but the ones that survive are good candidates for further breeding efforts. To maintain tolerance (resistance) Dr Kefuss instrumentally inseminates daughters of resistant queens, and then spreads them out in different bee yards, where they are often naturally mated. In his own words, "Actually what we do is even more simple. Once we have selected breeder queens we produce virgins from them that are taken to out yards to mate. We also sometimes inseminate to produce breeder queens from our best stock. From these inseminated breeder queens we produce virgins that we mate naturally. So actually a beekeeper does not have to use insemination at all and should be able to get very good results."

The main problem of modern beekeeping according to Dr. Kefuss is chemical treatment. This does not allow the bee's evolutionary mechanisms to work. The success of his work in both parts of the world is the proof of the pudding he concluded. One of the practical results that he finds is that it is increasingly difficult to find *Varroa* that can be used in the selection process. Recently, he presented his observations on "Honey bee management in Europe: the new challenge" at the First EurBee Conference of Apidology in Udine (Italy) 19-23 September 2004.[3]

Dr. Kefuss occasionally visits his family in the U.S. His 90-year-old mother, Martha Pemberton continues to organize and inform beekeepers from her residence, 2122 23rd St., NE, Canton, OH 44705 <e-mail: plm@raex.com>, as she has done for decades. Finally, as will be described later, the new queen importation rules soon to go into ef-

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fect may well mean we could see Dr Kefuss' Pacific queens from Chile or those from his French operation in the U.S. in the near future.

The statement that "*Varroa* is not a problem and no treatment is necessary" cannot but turn the head of any beekeeper facing this introduced exotic pest in most of the rest of the world. It is even more bizarre coming on the heels of a presentation describing the time and effort it takes to maintain *Varroa* tolerance or resistance in selected honey bee stocks. But that is in fact the case in Brazil. Dr Lionel Gonçalves of the University of São Paulo provided those in attendance with a different perspective on the beekeeping craft, which is now increasing rapidly in the world's fifth-largest country by area.

It wasn't always this way. About four decades ago, Brazilian beekeeping was in a shambles after arrival of the African honey bee (*Apis mellifera scutellata*), which was actively hybridizing itself into what we now call the "Africanized" honey bee or AHB. This was the second of four phases of beekeeping in the country: 1) limited success with European bees (*Apis mellifera mellifera*) primarily used by hobbyists from 1830 to 1956, 2) chaos with the introduction of the over-defensive African honey bee as it produced hybrids in 1960s and 1970s, 3) the rebirth of a new kind of beekeeping using the polyhybrid European - African stock (Africanized bees) from 1970 to 1990, and 4) the current era of "professional" apiculture through increasing honey production of "organic" quality and marketing of a good many innovative items based on the many products of the hive.

Brazil is thus, according to Dr. Gonçalves, on the verge of becoming one of the world's great beekeeping centers due to a huge feral population of Africanized honey bees that is now perfectly adapted to the vegetational complex (*caatinga*) of the country's vast, sparsely populated northeast. The beekeeping there is much different than in other parts of the world; management is minimal as beekeepers have an almost unlimited supply of bees in the bush much like many parts of Africa, and the bees themselves have become tolerant to *Varroa*, such that no treatment is required. This also provides a perfect environment for producing "organic" honey.

Such a description was sure to stir up many questions about the role of Africanized honey bees elsewhere in the Americas, including the U.S.. And Dr Gonçalves was peppered with so many that special times were arranged for him to respond outside the formal schedule. His deliberate answers brought into focus the differences in bee management demanded by specific vegetation and climatic conditions. They revealed unequivocally how different are specific management techniques in a temperate land like the U.S., populated by European bees, which have been devastated by *Varroa* mites and chemically treated over the last two decades are from those employed by beekeepers who have access to large feral, tropical bee populations tolerant to *Varroa* in Northeast Brazil. Although much of what Dr Gonçalves said could not be applied to U.S. beekeeping circumstances, this in no way made his presentation less entertaining and meaningful.

No discussion of Africanized honey bees is complete without at least referencing the history and risk of purposeful introduction of honey bee stock. The Reno meeting was a turning point of sorts in this discussion. The Animal Plant Health Inspection Service (APHIS) announced the beginning of a program enabling queen importation from both Australia and New Zealand, in essence revisiting the rationale for the law that prohibited that practice since 1922. Dr Wayne Wehling of that organization described the beginnings of a protocol that is being developed based on certification from countries doing the shipping. A description of the risk assessment process is found on the World Wide Web.[4]

Dr. Wehling concluded that importation seems to be on a fast track, and he looks for some specific rules to be implemented soon. World Trade Organization (WTO) considerations appear to be driving this, and importantly they could end up superseding local regulations, affecting U.S. bee inspection. For a contrarian view of the import question, readers are referred to Jim Fisher's article, "Where are we going," in the January 2005 *Bee Culture*. See why he says, "...we can't continue to ignore this in hopes that it will all go away or somehow fix itself. We never get what we deserve, we only get what we negotiate." BC

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Dr. Sanford is a former Extension Specialist in apiculture at the University of Florida.

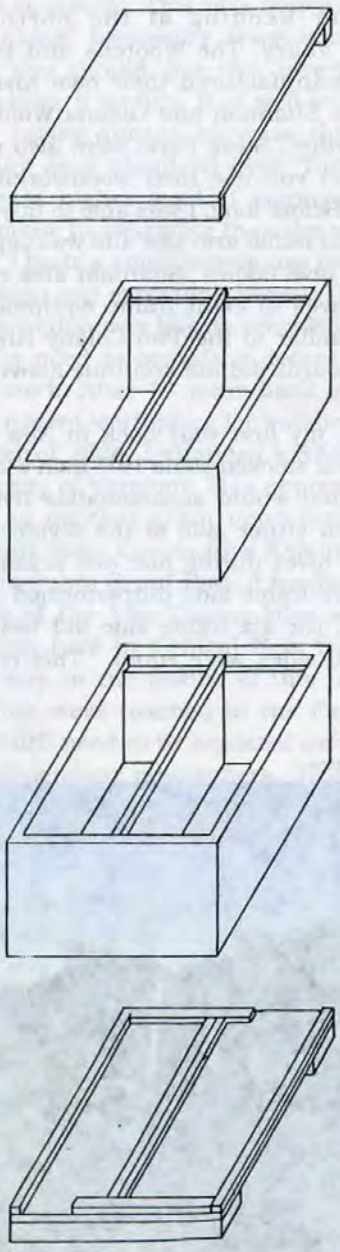
The Two Colony Hive Revisited

Michael Johnston

Two Colony Hives produce exceptionally well, but require exceptional management.

In the past four years I have been able to conduct some Productivity Trials on the Vertical Partition Two Colony Hive thanks to a USDA SARE (Sustainable Agriculture Research and Education) Grant out of the University of Vermont. I had done quite a bit of work on this hive during the 1980s but life took me in a different direction since then. In this article I hope to relate where I've been and where I am at now with working on this beehive.

In the early 1980s while working at Wenner Honey Farm near Chico California, I worked on developing two beehives that I thought had some advantages over our present system of beekeeping. I must have gotten caught up in the spirit of experimentation that pervaded Wenner's at the time. Clarence Wenner, a wizened beekeeper in his eighties, was quite an innovator He had already developed plastic rings that made package bee feeders refillable and developed the recipe for pollen supplement that is still used today. Clarence was in charge of queen cell production for this large package bee and queen production operation. At the time, he was using small square frames for his breeder queens that were just big enough for one day of egg laying. The Wenners did not mind if their employees stayed after hours and worked on their own projects. As a young single man with no TV living at the farm, building bee equipment and stocking it with bees was a pretty good form of entertainment. During this time I adapted standard hives so that five frames and four frames would be on either side of a ¾ inch divider board with the division continuing up into successive hive bodies. In '79 and '80, I ran three of these hives and in 1981 I ran seven of them. The five frame side always did better than the four frame side except on one occasion when the five frame side's queen was being superceded. I also began working on another hive with multiple compartments that had smaller frames placed at a right angle to the direction used in regular beehives. By the end of my third and final season at Wenners in 1981, I had pretty well settled on



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Two colony hives being nuked out May 2003.

the design of the two beehives and had begun applying for patents.

In 1982, I started working for Wooten's Golden Queens near Redding at the north end of the Sacremento Valley. The Wootens and their relatives, the Parks, manufactured their own hive bodies, lids and bottoms. Shannon and Glenda Wooten as well as Glenda's brother, Steve Park, were also very generous and would let you use their woodworking equipment after hours. Before long, I was able to buy a box jointer, table saw, and radial arm saw and was capable of building my own hive bodies. Shannon also ran 3,000 two sided nuc hives in eight frame equipment that were somewhat similar to the Two Colony Hive except that the divider boards did not continue above the first hive body.

In 1988, my first year back in New York State, I assembled and stocked some 19½ inch wide Two Colony equipment that would accommodate five frames and six frames on either side of the divider board. I ran five of these hives during just one season. In three of them, the five frame side outperformed the six frame side; in one, the six frame side did best; and in the fifth, the two sides were equal. This confirmed that

Two colony hives.

Looking in top of hive that eventually produced 370½ pounds.

the best configuration for the Two Colony Hive is with five frames on each side of the divider board.

In January, 1991 I received a patent on my other invention, the Combination Queen Rearing Nucleus and Comb Honey. Three years later the Patent Office sent me a bill to "maintain" the patent. This bill came in the winter months when I did not have a lot of funds so I let the patent go.

In 2000 I received a Sustainable Agriculture Research and Education Grant from USDA. This grant funded trials in which I compared productivity of Two Colony Hives vs. standard Langstroth beehives. Support was provided by the Wood Technology Department of Morrisville State College. I provided the lumber and some of the machinery and know-how and the college provided students willing to work in their wood shop. By Memorial Day of 2000, I was painting newly assembled equipment.

The productivity trials compared the Two Colony Hive and the Standard Hive in terms of overwintering, Spring income, and honey production. The Two Colony Hive performed well in all of these trials. Significant results were produced during 2001, 2002, 2003, and 2004. During three Winters when same age queens were compared, 51 Two Colony Hives brought 76 clus-

Two Colony Hives make more honey

Start of honey production trials early July, 2002.

ters through the Winter while 38 standard hives brought 27 clusters through the Winter On average, a Two Colony Hive overwintered 1.49 clusters while a standard hive overwintered 0.71 clusters. Spring income compared money earned by the Two Colony Hive selling nucs and brood vs. money earned by standard hives sent to apple pollination. Though the income from the Two Colony Hive was only 37% and 15% greater in 2001 and 2003, the Two Colony Hive earned more than three times as much money than the standard hive in 2002 when there was a mild Winter With honey production, Two Colony Hives that had been nuked out and requeened with queen cells produced a respectable amount of honey. In 2004, a pair of Two Colony Hives that had not been nuked out produced surpluses of 344 lb. and 370 ½ lb. These surpluses were produced at a very good beeyard but during a below average year The eight best standard hives in my operation averaged 151 lb. during 2004.

The Two Colony Hive is not meant to replace the standard 10 frame Langstroth hive. During the first three years of trials that I conducted, I used the Two Colony Hive to produce nucs for sale to other beekeepers who restocked hives that died over the previous Winter The Two Colony Hives were then requeened using queen cells and usually built up in time to produce surplus honey before the end of the season. Two Colony Hives managed in this manner always have young queens, overwinter well, and are less prone to swarming. This hive may not be the best for the "let alone" beekeeper since it can easily fill with honey. You should give this hive lots of honey supers and check it weekly. It is well suited to a beekeeper that raises queens because this hive takes twice as many as a standard hive. The Two Colony Hive requires a higher level of management and is much more prone to swarming than the standard hive.

In 2001, I built a small warehouse on my property for woodworking and extracting honey. The motivation for this construction was largely provided by the SARE grant and the need to provide a decent place for an employee to work. After 14 years back in New York, I finally had a decent work place for building equipment.

In October of 2004, I attended a SARE conference at the University of Vermont. This opportunity for networking led to another grant opportunity. Maryann Frazier of Penn State Cooperative Extension has submitted a Partnership Grant that, if funded, would continue testing of the Two Colony Hive at three locations including here in Central New York. This is a logical next step in the testing of this hive. Production levels that were reached in the Farmer/Grower grant from SARE need to be repeated under the observation of independent researchers. Testing at different locations could produce a whole new set of results the significance of which can only be guessed at.

If you would like to know more about two colony equipment or obtain an electronic copy of my final SARE report, you can contact me at Johnstonsbees@hotmail.com BC

Method used to measure honey production. Supers are weighed before and after extracting. The difference between these numbers is how much was extracted.

Breeding Bees

RESISTANT TO *Varroa*

John Kefuss[a,d], Steve Taber III[b], Jacques Vanpoucke[c], Francisco Rey[d]

WHY BREED FOR *VARROA* RESISTANCE?

For a number of years we have been breeding bees for general disease resistance on the European, African, North and South American continents. At the beginning when we had our first contacts with the *Varroa* mite we utilized all the existing chemical treatments. It quickly became clear that other more efficient non-chemical techniques would have to be found. We realized that chemical treatments were short term measures having serious disadvantages such as high costs and residue problems. To further complicate the situation, when mites become resistant to a new chemical, new treatments must be developed and so you must start again from zero. At this point you are on a "chemical treadmill" and you cannot advance. Some chemicals have negative effects on the health of queen bees (Haarmann et al. 2002). Also your own health can be affected. So there are a lot of good reasons why chemical treatments should be phased out.

At the beginning of the *Varroa* infestations we did not know if resistance to *Varroa* mites existed in the various races that we were breeding from. The reason was that we had been chemically treating our hives every year because we were too afraid of loosing all our hives. This kept the *Varroa* populations down but at the same time masked the occurrence of any *Varroa* resistant hives. In 1993 several of us participated in an experiment testing *Apis intermissa* in Southern France to see if they would show the same resistance to *Varroa* in France as they had in Tunisia under different climatic conditions in an area where *Varroa* mites kill hives. These bees and their interracial hybrids did show a resistance (Kefuss et al 2004). This indicated to us that *Varroa* mites could be genetically controlled. It was at that point we seriously started thinking about breeding for *Varroa* resistance.

A major goal of bee breeders at the present time is to develop a honey bee "resistant to the *Varroa* mite" Differing definitions for resistance exist (Kefuss et al. 2003, 2004). All definitions have their weak points and none are completely satisfactory. **So before going on, let us clarify what we mean by the terms *Varroa tolerance* and *Varroa resistance*.**

Common Sense Definition

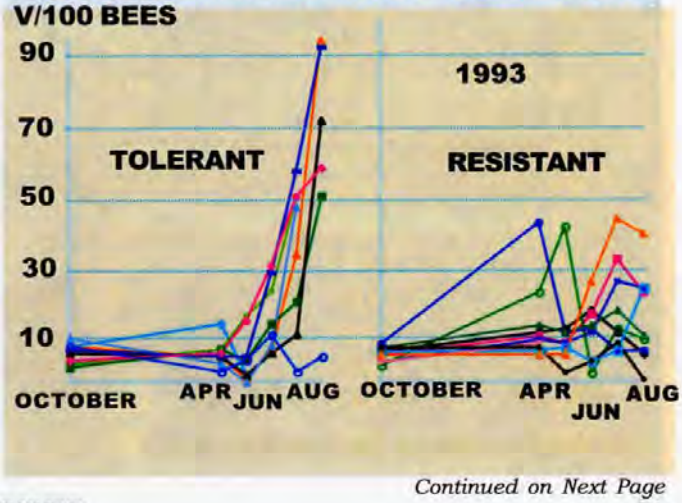
We define **tolerance** as the passive acceptance of *Varroa* reproduction in a colony up to a critical threshold. This critical threshold is colony death. **Resistance** occurs when a colony actively maintains it's *Varroa* population below the critical threshold (see the graph).

Veterinary Definition

The term "resistance" usually means that an organism cannot be infested at all. Resistance is the capacity not to permit the normal development of a parasite. It is the lower level of receptivity. Receptivity is the possibility of an animal to permit the presence of a parasite and the normal development of its life cycle. An animal *resistant* to a parasite "refuses" the parasite (zero receptivity). A honey bee resistant to *Varroa* does not permit *Varroa* to parasitize it. Tolerance is the capacity not to develop clinical symptoms when a parasite develops on or in an animal. It is the lower level of sensibility. Sensibility is the ability of an animal to exhibit the symptoms of a parasitic infestation. A tolerant animal is parasitized but not hindered by the parasite (zero sensibility). Thus a honey bee that is *Varroa* tolerant has parasites but is not bothered by them. Susceptible animals have both receptivity and high sensibility to parasites. Honey bee colonies that are susceptible to *Varroa* must be treated for them to survive.

Resistance is multifactoral and can take the form of **better hygienic behavior or lack of *Varroa* reproduction** in the brood for example (Harbo and Harris 1999). It can also be a **combination of diverse factors** which may or may not be expressed depending upon environmental conditions. Bees for example are more hygienic when food is coming in (Palmquist-Momot and Rothenbuhler 1971). This means that bees resistant under specific local conditions, may show varying

Varroa tolerant and *Varroa* resistant bees



a Le Rucher d'Oc, 49, rue Jonas, 31200 Toulouse, France
b 129 Grassmere Lane, Elgin, SC, 29045 U.S.
c IREM, 1R2, Université Paul Sabatier, 118, route de Narbonne, 31062 Toulouse, France
d Pacific Queens, Tarapaca 2, V Region, La Cruz, Chile

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resistance at that location and perhaps no resistance somewhere else. **Hygienic behavior is much more complicated** than most people think. In 1996 we put forward the hypothesis that hygienic behavior was controlled by at least 20 to 30 different genetic characters (Kefuss, Taber, Vanpoucke and Rey 1996) but we did not have any hard data to back it up. In 2002 Lapidge, Oldroyd and Spivak demonstrated that hygienic behavior is indeed more complex and pointed out that "many genes are likely to contribute to this behavior. They found seven quantitative trait loci (QTL) associated with hygienic behavior Jurgen Gadau a geneticist from Wurzburg Germany interprets their results as meaning that at least 70 different genes are involved in hygienic behavior So that gives us a lot of possibilities for selection (Gadau 2004).

HOW DO YOU SELECT FOR VARROA RESISTANCE?

Before you start selecting for *Varroa* resistance you need to determine what type of bee you need. What is your main source of income? Is it honey, pollination, queens, package bees, pollen, royal jelly, propolis or other bee products. It makes no sense to have a *Varroa* resistant bee if it is not economically viable for you. So the first thing to do is select bees that fit your economic needs. You need to develop simple tests that give clear results with low labor input. Selection is essentially a process of elimination.

Pollen production is fairly straight forward to select for because it has high heritability, can be easily measured and does not require any expensive testing equipment. The same is true for royal jelly production as evidenced by the work done in China (Shibi et al. 1993). Honey production is very difficult to select for because there are so many non-genetic variables involved which you cannot control. However you can select for a trait which is associated with honey production such as egg laying (Cale and Gowen 1956) or hoarding behavior (Kulincevic and Rothenbuhler 1973) **Once you have made the first basic selection for economic characteristics, then it is worthwhile to start selecting first for general disease resistance and then for *Varroa* resistance.**

Selecting breeder queens for pollen collection

BREEDER HIVE	Pollen Averages (in ml) BREEDER	DAUGHTERS
90	933	1138
67	865	851
41	827	838
104	1020	814
54	778	769
45	878	754
82	1140	753
43	923	741
40	1497	721
142	913	628
75	1008	595
109	885	425
74	843	424
150	738	366

When we select for general disease resistance, the first thing we do is make a hygienic test on the best production hives. We use the frozen brood method and not the pin test because the results are more conservative (Kefuss et al.). The pin test has been demonstrated to artificially increase hygienic behavior (Gramacho et al. 1999). The hygienic test allows us to quickly eliminate hives susceptible to American foulbrood and chalkbrood. Hygienic colonies have lower levels of *Varroa* on the adult bees (Spivak and Reuter 1998). In Chile we have found that hygienic colonies have less *Varroa* in the capped brood (P<.001).

The hygienic test is actually our first step to select for *Varroa* resistance. After we have screened our hives with the hygienic tests we bring the best hives which are 100% hygienic after 48 hours to the same location and stop all anti- *Varroa* treatments. We called this survival test the Bond Test, i.e., "Live and let die" The results are very easy to interpret. Your colonies either remain alive or are they dead. At the present time we have Bond Test colonies in France that have survived since 1993. This test automatically selects against colonies that produce non-resistant drones which in turn speeds up your breeding program and lowers costs. Dead hives don't produce drones! At the same time, while dying out, the non-resistant hives produce *Varroa* mites which helps to maintain selection pressure on the other hives. *Varroa* mites are very expensive when you have to buy them. Under natural conditions certain resistance mechanisms may require several years to reach equilibrium. The Bond Test allows this to happen. The main disadvantage of this test is that it is slow.

To go faster in a selection program that is already in progress it is important to make higher infestations than normal from time to time to provoke strong sanitary reactions in the colonies which will eliminate colonies with lower resistance. One way to do this is to place frames of highly infested brood (40 or more *Varroa* /100 cells) in colonies that have no *Varroa* infestations. This eliminates about 90% of the test colonies in six months. We call this second survival test **"Bonds Accelerated Test" (BAT)** i.e., **survive or die now.** This very destructive method shortens the **Bond Test**. If not enough breeding material exists in reserve, test queens which you wish to keep can be transferred to a healthy colony just before its colony dies out. **"BAT"** reduces testing time and for this reason we think that it is cheaper than other methods of selection. It is a simple technique that can be used to speed up any *Varroa* resistance program. The defect of **BAT** is that you cannot see weak resistance reactions.

HOW DO YOU KEEP YOUR BEES RESISTANT?

Your best breeder queens are not going to survive very long. In fact much shorter than you think. If you do not produce daughters from them

immediately, you will waste all your breeding efforts and a lot of genetic material. This is a point we cannot over emphasize! Once their daughters are in your beeyards the mother queen is not so important. So, the first thing to do is to change out queens in as many of your bee yards as possible, with daughters from each of your resistant breeder queens. The more different groups of daughters at the same yard, the better. Here their drones and future virgin queens will have a maximum impact on the local gene pool and allow new genetic mixing to take place! This mixing can help your bees evolve in their resistance to future changes in the *Varroa* population. The more genetic diversity you have the better **At Pacific Queens in Chile we try to work with about 14 different breeder queens to keep inbreeding at a minimum.**

Once resistant material is spread throughout all your hives the next problem is to decide **what is the best way to phase out all chemical treatments?** You probably do not know why your bees are resistant. So here you have a real psychological dilemma complicated by your "fear of the unknown". One way is to stop treatments at a few of your bee yards and see what happens. That way you reduce your overall risks and if your hives continue to produce correctly and have normal hive mortality you can gradually phase out treatments in your other yards. The problem with this method is that it can take a lot of time to put into practice and it is more difficult to eliminate non-resistant hives.

In France we decided after several years of reflection to take the "sink or swim" approach and **over six years ago** we stopped treatments in all our hives, including the genetic lines purchased from other queen breeders. **During the first two years we lost over two thirds of our hives.** We thought we would lose a lot more. So we were encouraged by the results and began to make new colonies. Our situation is still not ideal because our winter losses are about 15%. However not all these losses were due to mites. Varroa populations are very low in our hives and anti- *Varroa* treatments are not justified. So now we are saving time and money in France because we do not have to make anti- *Varroa* treatments. In Chile we stopped treatments only on the breeder hives because we need 4500 hives for our pollination and pollen collection business. For this reason it is taking longer to obtain resistance.

SOME PRACTICAL ADVICE

The main problem in selecting resistant bees and keeping them resistant, is the beekeeper. If he treats he maintains susceptibility in his bees because normal genetic evolution cannot occur. **We suggest that any hives used for breeding should never be treated against *Varroa*.** Since non-resistant colonies usually occur in larger numbers the presence of their drones will be counterproductive to any genetic advances.

This means that the beekeeper will have to continue testing and changing queens all the time to maintain genetic pressure on the open breeding population.

How do you know if your bees are really *Varroa* resistant? If you are a queen breeder the answer is really quite simple. Your customers stop treating against *Varroa* and their hives survive. BC

The main problem in selecting resistant bees, and keeping them resistant, is the beekeeper.

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Small Scale Almond Pollination
BEES IN THE BLOSSOMS

John Jacob

Pollination revenue is the largest component of most commercial beekeepers' income. The decreasing supply of bees and the steady to increasing acres of crops such as almonds has resulted in extreme demand for pollinators. The primary consequence of this trend has resulted in colony rental fees reaching record levels. Will these higher fees be enough to attract new beekeepers and more bees to the business, or will the bee shortage continue to grow more extreme? The bee shortage is already very evident and more orchards coming into production in the next several years will only exacerbate the situation. In order to elucidate what a small scale almond pollination entails, I have chronicled many of the details of my almond pollination trip this year. The first ingredient in any successful pollination enterprise is plenty of pollinators and that is where this story begins

9/1/04 Southern Oregon. Strong hives by early February 2005 will require lots of bees, excellent beekeeping skills, and some amount of good luck. Without going into the details of what it takes to over Winter hives a Fall assessment of your bees will help guide your decision making and planning for the upcoming season. Mites and disease must be under control, and the hives heavy with stores. I like to do some Fall stimulative feeding of pollen substitute and syrup to encourage a larger Winter cluster.

11/20/04 Pollination brokers begin to call looking for bees and "bees wanted" adds turn up frequently in the bee literature. The buzz, as per usual, is that bees are in short supply and pollination rentals are hovering near all time highs between $75.00 and $85.00. Many beekeepers are also beginning to report heavier than usual losses.

11/25/04 My first offer comes in at $75.00 a colony along with a precious holding yard. This offer is very tempting; it the highest rental ever offered to me personally. Good holding yards can be hard to come by and are valuable staging areas for future bee operations. Ultimately I decide to adopt a "wait and see" approach. A lot can happen bee-wise between now and early February and I do not want to make any promises that I cannot keep. Further, holding for potential higher rental fees is a very viable strategy to consider.

12/6/04 A fairly warm afternoon and the bees are taking cleansing flights and showing signs of foraging. This break in the weather is a prime opportunity to inspect any colonies that appear to have less activity and put out some pollen substitute.

12/27/04 Another unseasonably warm afternoon, and by now word is out on the location of the pollen feeder and the action is heavy Depending on the weather, an apiary of about 70 colonies will take up between a half and two plus quarts of dry pollen substitute in just a few hours of flight time. When the weather warms to near 50° or better the bees will break the cluster and really begin to forage. Today I have seen my first eggs of the new bee year. These eggs are precious and will yield bees that actually do some pollinating. Pollination brokers are really starting to pressure me for a commitment and are now offering between $85.00 and $90.00 a colony I have been getting lots of the "what is it going to take to get you into a contract today" approach. Sometimes I wonder if I am renting bees or buying a car.

1/4/05 It is now about four weeks until the girls will have to go to work in the blossoms so the time for stimulating egg laying for the actual almond blossom pollinators is rapidly narrowing. The weather not always favorable for forage flights. A simple solution for this problem is to use pollen substitute patties in the brood nest. The bees can consume this extra protein despite inclement conditions. This supplemental protein will translate into more bees earlier in the season. Due to time and labor constraints I like to use the pre-made patties that come from Mann Lake. You simply peel back some of the wrapper and drop it over the cluster

1/10/05 I have been hearing tales through the grapevine of some colony rentals in the $100 dollar range. I am beginning to wish I had more bees! A big snowstorm a few nights ago holds worries of an early

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Spring in abeyance. Nearly all Winter losses have occurred by now, and a firm colony count is possible, however I still have no pollination contract. Not to worry demand still seems very strong. How am I going to get these bees to central California? My small bee trailer and truck will never do. Time to look into some equipment rental places and reserve a flatbed truck so it will be ready when it gets down to crunch time. This is also a good time to make sure my farm policy is up to date. The value of thorough liability converges when moving bees cannot be overstated.

1/17/05 Still no contract, and I am beginning to get a little nervous. On the bright side, United Rentals has a Ford F450 with a 14-foot flatbed and a lift gate that should be very suitable to the task at hand. Normally I have a signed contract by this time of the year It is clear that now is the time to utilize all resources and bee contacts to get a commitment in writing.

1/24/05 Excellent news today! Some central valley pollination brokers have returned my phone calls and have verbally offered $100.00 each for a load of 73 colonies. The contract will call for six-frame average, with half the money on delivery, and the other half upon completion. Other details of the contract include provisions for colony inspections if necessary pesticide use, and other protections for each party involved, including the bees. I am looking forward to the contracts arriving in the mail for signing. A good contract will give everyone peace of mind *and* legal protection.

1/31/05 The contracts still have not arrived and the pollination brokers call and inform me that instead of one drop I will have to deliver to three different growers, all within 20 miles of each other, I guess I will have to earn that $100.00 a hive.

2/4/05 At last the contracts arrived and are they eagerly signed. The contracts include maps to each grower's orchard, and based on previous experience, I now double-check the provided maps against an online trip check service. There is nothing worse than being lost in unfamiliar territory short on time, with some eager bees. I also call each grower to confirm delivery date, quantity, and price. All parties involved agree on early Wednesday the 9th for delivery. I estimate a one way trip to Ceres, California, to be about an eight hour drive from Rogue River Oregon in a slow bee truck, so it is clear that Wednesday the 9th will be crunch time for loading and driving, Note to self – "make sure additional labor is on hand for the trip."

This is where things begin to get a little hectic and the journal entries will become more frequent to paint a clear picture of what a pollination trip can be like. Other chores have kept me busy lately and there is still much to do to make sure the hives will be ready to move.

2/9/05, 10:00 a.m., Weather is very warm today and the bees are flying already. Preparatory chores for this afternoon's loading include: making sure bottoms are attached and uniform for easy loading, and application of any last minute medications or treatments because these colonies will be swapping pathogens and parasites with every other migratory beekeeper within their vicinity in the Central Valley.

2/9/05 3:00 p.m., Even with some extra help these last minute chores have taken longer than expected, and the time has come time to make the 90 minute round trip to town to pick up the truck. Timing upon return should be good for loading due to the fact that the bees will be done flying.

2/9/05 6:00 p.m., Full dark now, feeling very daunted about the task at hand, and the bees seem a bit testy I was hoping to have more bees loaded by now. Making sure your load of precious and dangerous cargo is properly secured is of pivotal importance. I

like to use the heavy duty-ratcheting tie down straps across each row of hives. It takes a full three and a half hours to get the hives *hand loaded*, strapped, and midnight lunches packed. Everything takes longer than expected in the dark. (Remember that for next time.) A useful tool for working with bees in the dark is a headlamp with red LED lights in it. The bees will not fly towards it and the batteries will last much longer than with most bulbs. An even more useful tool for loading bees would be a boom or forklift. If pollination prices hold near current levels there may be one in my future sooner rather than later

2/9/05 9:35 p.m., It is now about 28°, and I am beginning to feel behind schedule. Thoughts of a morning departure cross my mind. The consensus amongst the crew traveling with me is to leave now as opposed to in the morning. Time waits for no man and we undertake the long journey.

2/10/05 1:58 a.m., Time for our first fuel up. Fatigue has begun to set in and caffeine has become our best friend. Gabe, my good friend and driver is still going strong and offers to let me nap for a while so I can drive the next leg of the trek. Only about four more hours until it is time to unload. Coffee and sandwiches from home are devoured.

2/10/05 4:50 a.m., We are now just outside Modesto and I place a call to the first grower to meet us for the first delivery of hives. Luckily this particular grower had informed us that we could call his ranch manager anytime after 4:30 a.m. The next hour is consumed by contract signing (this part is usually done months ago), locating the drop sites, and payment. Bleary eyed we go to work still in full dark.

2/10/05 6:35 a.m., Time to call the next grower on the list. The physical work of unloading the hives has our blood flowing, and our energy levels begin to rise, as does the sun. The next drop is just a few miles down the road and things suddenly seem to be right on schedule.

2/10/05 6:50 a.m., My second wind has begun to kick in. Sunrise in the orchard is beautiful and rewarding on many levels this year A tangible sense of Spring and newness is in the air Our timing at this particular point in the universe seems perfect. The blossoms have just barely begun to open and I enjoy a very blissful Zen moment. We finish at this orchard by 8:00 a.m. and call the last grower on the list and he says he can meet us in a half hour No worries here, it's a cool morning and the bees will not fly for a while yet.

2/10/05 9:45 a.m., Well nothing lasts forever The moment is clearly over The last grower is late to meet us and the troops are growing weary and restless. We drive to what appears to be the drop sites on the map marked by little x's and sit and wait some more. The bees are waking up and beginning to take orientation flights. Breakfast and more coffee are now long over-due. To make matters worse the whole time we are sitting in the truck waiting, unbeknownst to us, we are sinking deeper and deeper into the very sticky mud known to inhabit these areas. It is about this time the grower shows up and decides he wants the hives where there is no way to get the truck, even if it was not drifting ever deeper into the quagmire. I explain to the grower that the bees would do better in a sunnier location than where he had chosen due to the fact that the bees would get to work earlier if the hives got more solar gain in the mornings. After some discussion we comprise and decide on a couple of drops not too far from the truck. Fortunately on this excursion a third pair of hands had traveled along with us in a separate pickup truck to help document the trip and learn about bees. The guys promptly begin to unload the last of the colonies while I begin to shovel. How I got the shovel detail when I was not the driver who got the truck stuck I will never know.

2/10/05 11:57 a.m., With a little sweat, some ingenuity, and some old boards for traction we get the truck unstuck and the bees placed before too many started to fly. By now we are bone tired and beyond ready for sustenance and a rest. After a quick meal Gabe declares he is amazingly ready for more driving and we begin the journey home. A trip like this is not for the faint of heart; the value of great help cannot be underestimated. This is the most grueling part of the trip due to sleep depravation and the monotony of 16+ hours of driving. The driving is a bit easier with two people in the truck to take turns. Normally I would rent a room and rest before the trip home.

2/10/05 7:45 p.m., At long last, nearing the end of our journey. Now that we are back in Oregon, all that remains to do is to gas up the truck and drop it off at the equipment rental place. The last hour drive home

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from Medford is definitely the toughest.

Thirty-five hours straight is enough to test the nerves of any person, however it was nice to get away with a one-day truck rental and sleep in my own bed. All in all, the trip went very well. However, this is only half the story. Next we check up on the bees, do some supplemental feeding and equalizing. This trip occurs when the bees are about half way through their contract during the crown bloom. The check-up trip is usually my favorite because I can travel relatively light; the orchards are in glorious full bloom. Hopefully by this point in time the beneficial effects of the substantial forage opportunities for the bees will be evident. As long as Mother Nature has been cooperating and the bees have been able to fly there should be lots more bees by now. This saga will conclude with the return trip home and a few side adventures on the way with other beekeepers while picking up bulk bees for mating nucs and cell starters. Stay tuned. BC

John Jacob is a commercial beekeeper from Rogue River, Oregon.

POLLEN TALES

Larry Connor

Introduction

When I speak to beekeepers I am surprised to find that there is some general confusion about pollen in their minds. What is pollen? How do bees use it? How do you get rid of it? In this article I will review the role of pollen in plants, the collection of pollen by bees, and the management of pollen by beekeepers. The subject of bee nutrition will be put off for another day.

Pollen

Pollen is produced by flowering plants as part of the male reproductive system. Evolved from spore-like structures and utilized in plants such as ferns, pollen serves the role of transferring male sexual materials within a flower, or from flower to flower, thus providing out crossing and genetic diversity in the plant species. Pollen grains are often elaborate, intricately packaged microscopic spheres that alight on the flowers' reproductive structures, the stigmas, and germinate by rupturing the pollen coat, and then growing a pollen tube down the stigma and style to reach the ovaries. There, male sexual material combines with female materials in the ovule to form the resulting embryo that becomes part of the seed. There are endless complexities to this system, and the role of bees as pollinators is only one of them. Every species of flower and every species of pollinator has its own unique tale to tell.

Pollens are complex materials. They have hard protective coatings (the exine) that survives environmental exposure and extremes in weather Inside this coat are the materials required for plant sex, including proteins, enzymes, vitamins, lipids (fats), carbohydrates (sugar, starch and cellulose), minerals (calcium, magnesium, phosphorus, iron, sodium, potassium, aluminum, copper, manganese, sulfur) and even pigments.

A honey bee scrabbling for pollen in the center of a rose.

Pollens from different plant species are highly variable in any of these components. The most important to the beekeeper is protein levels. Bee collected pollens vary from as low as seven to over 35 percent protein. Wind-borne pollen is usually very low in protein, usually under 5%, which helps explain why bees only gather pollen from wind-pollinated flowers like oak, corn and ragweed when there is little else to collect. It is generally thought that bees need a minimum 20% protein level in their own physiology in order to sustain colony growth, so low protein pollens must be consumed in larger quantities than high protein pollens.

Not all bee-collected pollens are balanced in all the building blocks of proteins, called amino acids. Dandelion pollen, for example, cannot sustain bee development by itself because it lacks specific amino acids needed for bee growth. It must be supplemented by other plant species pollen. Fortunately, this is what bees do in nature – collect a highly varied supply of pollen. Some analyses of trapped pollen show that the most frequently collected pollen may contribute only five percent of the total volume the bees collected. Bees seem to like multiple trips to nature's buffet table, rather than ordering a single dish off the menu.While this not a concern to most beekeepers, it could become important when providing bees for pollination of huge areas of the same crop, with an incomplete nutritional profile.

I have seen trapped pollen sellers claim that pollen is nature's "most perfect food." [I have also seen this on egg cartons.] This may be going too far. We should accept the fact that for bee colonies, pollen is the sole source of all nutritional requirements other than nectar and water This may be different for other animals, including humans.

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Pollen collection by bees

Scout bees search for sources of nectar and pollen throughout the foraging season and return to the hive with samples to share. How waiting field bees determine the relative attractiveness of different pollen sources is unclear to me. It is not like nectar, which bees can taste the degree of sweetness in the same way humans can. I do not doubt the bees are able to evaluate the quality of the pollen when given a sample. I suspect that many scout bees return with both nectar and pollen, so the attractiveness to foragers, the effect toward stimulating foraging for that source, is additive. Many foragers collect both pollen and nectar at the same time, a double recruitment message.

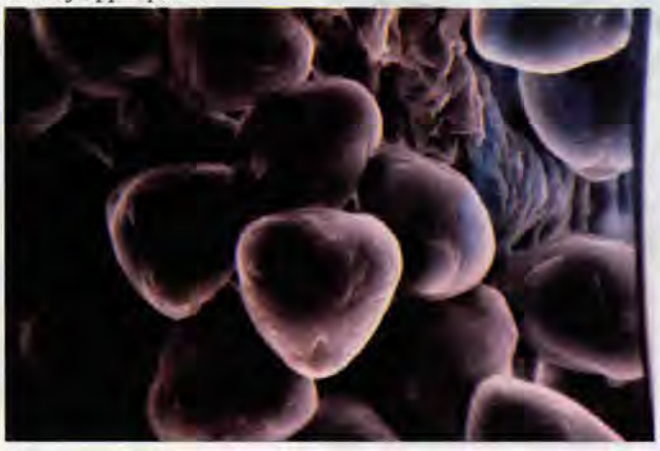
Bees will gather pollen on flowers until their pollen baskets are full or their honey stomach is full, or both. Bees that forage solely for pollen carry honey or nectar from the hive and add it to the pollen as they pack it onto their bodies. Once the supply is exhausted, the bee is running on empty, and must return to the hive. Pollen foragers often exhibit a different behavior than nectar gatherers. They run or "scrabble" over the surface of the flowers where the anthers are located, and collect pollen rapidly on their bodies. They will of then fly off the flower and pack the pollen with their legs, adding honey/nectar and collecting the pollen in their hind leg pollen baskets (corbiculae).

A few flowers have pollens that are repellant to the bees and they discard the pollen by reversing the combing action of their legs while grooming their bodies. They do this with some oil rich cultivars of sunflowers, and the pollen will fall onto the leaves of the plant underneath the grooming bees.

Bees may collect a full load of pollen from one large flower, or need to visit hundreds of smaller flowers to get a load as they collect nectar. To obtain a full load of pollen observers have determined that it takes 346 visits to red clover florets, 84 visits to Bartlett pear blossoms and 350 to alfalfa florets. There should be little doubt as to the significance of honey bees as pollinators based on their pollen collection behavior

Depending on the species, pollen is released by flowers at different times of the day, and morning foragers may be loaded with pollen while afternoon foragers have little. Each flower, each plant species, has its own tale to tell.

SEM of apple pollen.



In the hive

Foragers return to the hive with pollen pellets of different sizes, and proceed to the brood nest and its periphery to deposit the pollen pellets into cells prepared by the bees for pollen or already containing pollen. This pollen is then available to the bees for brood rearing – a separation of brood from pollen by as little as a few inches will prevent the bees from utilizing the pollen. This is a common mistake of beekeepers who do not replace combs in their original position, or in a manner that the bees will benefit from the pollen.

Loose pollen pellets are not efficiently stored in the honey comb, so the bees pack the pollen with their efficient pollen packing tools – they literally pack it in their heads! This gives efficient pollen storage, with two or more times the amount of pollen packed into the cell than if left unpacked. The house bees also add more honey, which undoubtedly contains microorganisms that help preserve the pollen for storage in the comb. Bee trapped pollen declines rapidly in food value when left at room temperature (why good pollen should be sold frozen), but apparently is preserved by the bees while being converted to stored pollen, sometimes called bee bread.

Nurse bees feed on stored pollen and digest it. This allows their mandibular and other gland systems to produce royal and worker jelly that they feed to bees during development. Without pollen in the hive, nurse bees quickly become depleted of body proteins and other nutrients needed to produce these foods, and brood rearing stops. Cannibalism of eggs, then larvae takes place, starting with any drone brood. This appears to keep the "investment" in the developing brood from being lost.

At the colony level, the dynamics of pollen foraging is stunning. One colony, in Orange County, California, during a 1938 study indicated that a single colony made 1 7 million foraging trips resulting in pollen loads. Estimates have been made that one "average" pound of pollen will result in 4,500 bees, and that the average colony produces somewhere around 200,000 bees per year, requiring about *44 pounds* of pollen. Operators of pollen traps report that much or more in a season's collection, showing the colonies hoard pollen much as they do honey.

Another way to look at this is that it takes about 10 average pollen loads (20 pollen pellets) to provide the pollen needed to feed one developing larvae. I think it difficult to have too much pollen in a colony, although it might be possible. We know that pollen hoarding is a genetic trait, and has resulted in strains of bees that are able to preferentially collect certain pollen types (alfalfa), or are generally high pollen foragers. This is important to overall colony development, since there is a statistical correlation between the amount of pollen collected and the amount of brood a colony produces. The amount of brood a colony produces is correlated with the amount of honey it will produce, all things being equal. Thus high pollen foraging is desirable, as long it is not at the expense of nectar foraging.

There are natural cycles in pollen collection, often alternate with those of nectar collection. In turn, the brood rearing cycles of a colony are related to these pollen foraging cycles. In areas where there is a dearth

of pollen at certain times of the year there will be a drop in brood rearing that cannot be countered by feeding sugar syrup. Supplemental protein feeding may be required.

Enter the beekeeper

Depending on their genetic background, most overwintered colonies of bees have started brood rearing by mid-Winter, and have brood on one or more frames by late Winter. One estimate of wintering needs in northern states was 600 in^2 of pollen stored in the comb. The nutritional needs for this brood comes from the stored food reserves in the bees themselves (Winter bees that have not reared brood) and this stored pollen the bees reach as the cluster expands. Towards the end of Winter the colony's brood area expands into honey frames with pollen stored in the corners. If no such pollen exists, the colony may become depleted of the nutrients needed for brood rearing. In many years this times to about the same point that late Winter and early Spring pollen begins to appear (depending on your area), and this pollen is highly critical for proper colony growth. Fortunately, some of our most abundant and diverse plant communities bloom in the spring and support rapid colony growth. Key plants include various willows, soft maples, and countless Spring wildflowers.

Beekeepers are wise to make sure that their colonies have adequate stored pollen in the combs when they prepare them for Winter These pollen frames must be in the areas the colony will expand into as Winter progresses, where it can be consumed and converted into brood. If frames containing pollen are placed away from the brood area, say in a box over the cluster, that pollen will not benefit the bees. Some beekeepers collect frames of pollen during the season, store them carefully to prevent wax moth infestation, and slip a frame of pollen and usually honey into the brood area of the colony during Spring inspections. This may be beneficial in some areas, but it would be better to overwinter this pollen on the hive where the bees will reach it during cluster expansion.

Many pollen substitutes are marketed to feed to the colony during late Winter to stimulate brood rearing. This stimulation results in stronger colonies earlier in the season. If unmanaged, these colonies may produce swarms, with a net gain of zero, or less if an important queen is lost. Pollen substitutes do not contain pollen, while pollen *supplements* do. If so, the pollen must be treated to kill foulbrood and chalkbrood spores, both of which are easily transmitted to a colony if fed in a pollen supplement patty.

Like the natural pollen in the comb, pollen supplements must be placed into the brood area, where the bees can reach it. Beekeepers who do not know this may place the supplement on the top frames of the honey supers, a foot or more away from the brood area, and the bees will not touch this food, which then dries and is wasted. Supplements must be placed *immediately* over the brood area, or between the brood boxes if the bees occupy two hive bodies.

Beekeepers generally feed sugar syrup to stimulate brood rearing in the late Winter and Spring, and may score the surfaces of frames of over wintered honey to stimulate feeding by the bees. Set off (given a spring "kick start") the colonies will then grow according to their genetic programming. Some races, like Italians, will grow rapidly when stimulated by sugar feeding, for they will gather pollen early in the season. Other races, especially from more northern locations, will resist such a growth stimulus and wait until their seasonal 'clocks" tell them that it is suitable for brood rearing. A large part of the popularity of Italian bees over the past century and a half has been due to this responsiveness to sugar feeding. This has a down side, of course, because these stocks continue brood rearing when natural forage is cut off, and will exhaust the stored pollen and honey reserves quickly. This may be suitable in some areas, but not all.

When I worked with Dr. G. H. "Bud" Cale Jr of Dadant and Sons, he was a strong advocate of bee colonies with excellent pollen foraging traits. He worked in the 1970s to develop inbred lines and a hybrid bee that collected high amounts of alfalfa pollen. The hybrid was never accepted by the industry and was abandoned soon after it was released. The inbred lines, however, found usefulness as part of the Starline hybrid of the late 1970s, as the high alfalfa pollen collection traits translated into high general pollen foraging, greater brood rearing, and thus higher honey production.

Some beekeepers panic when they open a colony and find solid frames of pollen, often asking how to remove the pollen to let the queen lay. This is part of the pollen cycle in the hive, and reflects a period of heavy pollen collection that will result in its conversion into brood and bees. If a nectar flow follows, the wise beekeeper will leave this to the bees and let them carry on their work. Some frames of pollen may be removed for feeding in the spring. I have no difficulty with that, since frames of pollen are often needed in nucleus increase colonies. But for over wintering colonies, pollen in the brood nest is a very good thing, something to appreciate.

Pollen and pollination

Finally, a comment about colony pollen foraging and pollination. It is the growing colony that is the most effective pollination unit. Large, over wintered colonies may have more bees, but may reduce pollen foraging if they enter swarming behavior, commonly correlated with fruit bloom and just after Very small colonies, such as newly installed packages and newly made splits, are often lacking in the numbers of bees to be adequate pollen foraging units. It is the established and rapidly growing colony, with a new queen, six or more frames of brood, and expanding bee population, that collects the most pollen on a per bee basis, and is thus the best pollination colony. BC

Larry Connor is owner of Wicwas Press, New Haven, CT where he edits and publishes books on bees and beekeeping – LJConnor@aol.com or www.wicwas.com.

While the hurricanes ravished the Florida coast last Fall, there were calm days in Northern Alabama. My hive activity was normal. Foraging increased a little. Normal inspections revealed most would make it through the Winter A recent hive added from a swarm in June required feeding to improve its odds for surviving the Winter Medication is planned.

In August, two hurricanes in Florida proved to be devastating but not in North Alabama. Warnings in Alabama consisted of severe thunder storms and flooding type rains. On September 15, winds in Alabama from Hurricane Ivan going straight North were predicted to be high in the 40 to 50 mph range, a surprise from normal expectations. Maybe some shingle damage or some dead trees would go down. On the morning of September 16, winds were gusting to 50 mph and higher An especially agonizing issue, they do not stop. The trees begin leaning towards the rain-soaked ground. I am glad the hives are covered with cinder blocks thanks to a recommendation from my son Chris who helps a lot with moving heavy bee boxes whenever they need moved. It is getting dark now The trees are leaning at very hard angles, reminiscent of videos of hurricanes where royal palms lean harmlessly to save themselves from devastation. But these trees are 70 foot Poplars and Sweet Gums threatening to go down. The roots are still not fully saturated with water yet so maybe the bees are safe. With the winds and torrential rain falling, the trees are being pushed to the limit. To the East of the beeyard is a 60-footer already leaning at 45 degrees, a point of no return. I watch it smash down on my wooden fence with an invitation for more than a day's work of clean up. Still there is no danger to the beeyard. To the South another very tall gum tree is down mooning me with its entire root system, another two or three days of work for someone. To the West still no damage to the beeyard, but wait. Is that hive a little tilted? I can barely make it out but something does not look right in the yard.

What do I do now in the rain? The rain subsides. There appears to be nothing but brush in the beeyard. It is not brush and three hives are flipped on their side with supers and frames scattered everywhere. One hive is totally flattened under a 30-inch diameter Sweet gum. It was the hive under jeopardy to last the Winter but no longer Nothing can be done. The bees are genuinely upset but are staying with what is left of their hives. I upright one hive and put a broken cover on it for now. Another hive is ready to fall off its stand and needs to be moved to a safer area. I hoist it to my chest. Oh no, it is loaded with honey. My back is breaking and the bottom board drops out. My back goes out and I drop what is left, which brings everyone out of the hive. I'm covered up with bees and I walk away and get my back working again. The bees follow me for 10 minutes. They are unsympathetic and blame me for their plight. Afterward, I find that the tree is in the way, preventing me from saving the other hives. Decision: All hives in one piece must be moved to another beeyard. Fortunately, an open invitation from the owner of a farm nearby already holding bees being managed by me can hold my beehives. A good decision based on all the wood cutting needed in the beeyard that would have made an already agitating situation for the bees even more difficult. I move all the hives.

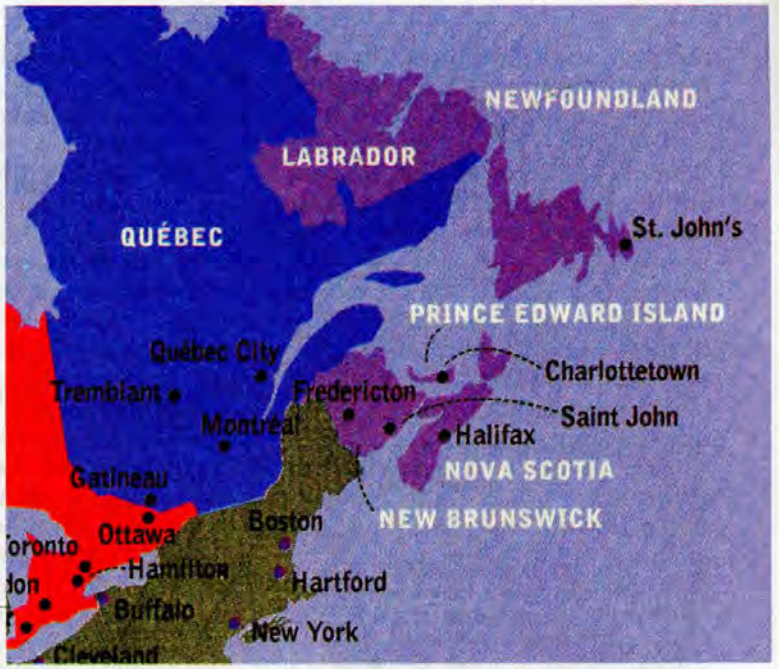
It is early Spring now. The gate and all beeyard fencing must be rebuilt. Any high trees threatening the bee yard will be considered for cutting. This beekeeper has acquired a new perspective regarding placing hives near trees. If I forget, the twinge in my back will remind me. I can no longer ignore hurricanes on the shores of the Gulf even though they are over 300 miles away.

The weather is warming now and tornado season is here just in time for the bees to be returned. Will they remember? Another excuse to swarm? There is more sun light now in the yard. Maybe they will consider staying in their new yard and not swarm, but if we have another storm like the last one I would not blame them. BC

Robert Martin carefully keeps bees in Harvest, Alabama.

SHORTAGE OF BEES HINDERS BLUEBERRY CROPS

Kathy Birt



A shortage of bees to pollinate blueberry crops on Prince Edward Island (PEI, Canada), has growers and beekeepers urgently requesting the opening of Nova Scotia's border

Jasper Wyman's blueberry plant in Morell, grows and manages upwards of 1000 acres of blueberries. But due to a shortage of bees, this company, with headquarters based in Maine, may have to look at whether it is economically viable to stay in the blueberry business on PEI.

Reg Trainor, Operations Manager at Wyman's says the company was not able to rent bees in the Spring of 2004, and with their own overwinter losses, Trainor says, "Yields were not as high as they could be."

He estimates that with more bees, the yield of 2,000 pounds per acre could be increased to 3,500. "We are not only growing blueberries, but we look after and provide services to other growers' land some with a few acres, some with a few hundred."

Trainor says he can see no scientific reason to close the Nova Scotia border "I've talked to Nova Scotia Beekeepers and they want to bring their bees over. But, with the border closed, they have to keep coming back to take care of those hives. This is an economic hardship for them."

As the border issue stands with neighboring province, Nova Scotia, beekeepers can bring in their bees to PEI, but cannot take them back due to the risk of disease.

And, Geoffrey Paynter, president of the Prince Edward Island Beekeepers Cooperative Association says, "If they open the borders, we don't want unhealthy bees being brought in. We (the association) would like to see the person allowed to bring in bees, be able to show a certification of healthy bees."

He says with both provinces already having bees with *Varroa* mites, it would make sense for only these bees, or disease free bees to be brought in. "One of the problems is that the science of disease control could get waylaid in the interest of crop pollination."

He says there is the risk of the blueberry industry bringing in as many bees as they need and look at disease control later "It's a bit of a balancing act that has to occur in regards to the economics of pollination."

A total of 4000 acres of blueberries were harvested in 2004, and this industry, worth $25 million a year to the province, is always on the increase.

Presently there are just 30 beekeepers on the Island with about 2000 colonies and the president of the Association says among those 30, a half a dozen beekeepers own the majority of colonies. And, Paynter says he believes the demand for blueberry pollination is leading to a crises in the bee industry.

He says there is a concern for saturation of areas for nectar Depending on how out-of-province bees are managed while in the province, Paynter notes, "Beekeepers who keep bees for honey or wax production could be in trouble. This industry could fade away in the interest of pollination."

As for Wymans, Trainor says more bees are definitely needed to bring berries to a full harvest in 2005, and notes, "Unless this issue is resolved, we will have to look long-term to see if we can stay in the blueberry business on PEI. "I'm not suggesting we will close our (plant) doors (on PEI) Another alternative is to increase production in Maine and truck blueberries to PEI. But, again, this is not logical or economical."

Island beekeeper Daniel Ficza, of Honeydew Apiary in Canoe Cove, has 300 colonies, and relies heavily on the blueberry industry to maintain his business (through pollinating), and producing blueberry honey.

It's beekeepers like Ficza that Chris Jordan wants to protect. Playing a dual role as Berry Crop Development Officer with the PEI Department of Agriculture, Fisheries and Aquaculture and also

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the provincial government contact for beekeepers, Jordan may be looking at a busy Spring.

He says the Ontario Honey Council has expressed an interest in bringing bees to PEI, to pollinate the blueberry crops and this, he believes, has prompted the Nova Scotia beekeepers to take a second look at the situation. "If we allow Ontario bees in, there is the risk they have diseases that we don't have here on PEI. We don't want that to happen."

He points out that Ontario growers, as in Nova Scotia growers, would bear no expense bringing in the bees. "All expenses would be on the backs of the blueberry growers."

Jordan says if the Nova Scotia beekeepers vote to say yes there is a lot more work to be done to get ready. "There is a lot of inspections to be worked out to get the protocol in place before the pollination season begins in May."

He says the inspections would be the same as they were last year for Nova Scotia bees coming in, but adds, "Should the border open, Nova Scotia may have other ideas. Bragg brought bees in last year and Nova Scotia would have inspected them."

He says should the Nova Scotia bees come in, they would be allowed to go back when the season is over, as long as they met the Nova Scotia health requirements.

Jordan says if the Nova Scotia border opens, there is the possibility of others (bees) coming from other provinces. Hence, the concern expressed by Paynter of an over saturation on areas for nectar.

Whatever the outcome, Jordan says the Nova Scotia border opening should allow PEI blueberry growers to maximize yield production.

However, he says it is not completely cut and dry. "It doesn't necessarily mean if we put in this many bees, we will get this many pounds per acre. We do know when there is more bees, there is more berries, as long as the blueberry acreage has the potential to bear fruit." BC

Kathy Birt is a freelance journalist and photographer from Cornwall, PEI.

Swarm Behavior

Jim Cowan

An interesting happening occurred more than 15 years ago at our home.

I had just completed a six-foot fence along the west side of the house, and was in the process of painting it. There was an old junky hive body near the wood pile, which also had two or three old combs inside. There was a lid but no bottom board so the only entrance was a knot hole just below the cover. I noticed quite a few bees scouting in and around the old hive.

My wife, Barb, was also working in the backyard. Upon seeing the bees I asked her to watch for *something*, and tell me when this happened. I will now digress.

It was perhaps 15 years before this that I found out what this *something* was. I had put out numerous decoy hives up to this time and had captured lots of swarms but had never actually observed the coming of the bees. I would see them looking, and sometimes there were so many I thought I had a swarm, but when removing the lid, I saw only scouts. But by the time I next visited the decoy there would be a swarm inside.

On this particular day I had worked the graveyard shift at the paper mill. It was such a nice day I decided to stay up and go to bed in the late afternoon.

I was checking on decoys, and upon coming to one saw lots of scouts. The time was a little after 1:00 p.m. and about 75° I said to myself "These bees will be coming soon probably within the next hour. I'll just sit next to this stump and wait." I had my little dog with me, so we both sat and waited. I was somewhat mesmerized by all the scouts coming and going plus the steady hum. As you might have guessed, I dozed off. What woke me was the lack of sound. I looked at the decoy and saw *no bees*. How long they had been gone I don't know, but it was probably no more than five minutes.

We sat there a little longer and dejectedly I told the dog, "They must have picked another spot." As I got up to leave I heard a hum coming from out of Mill Creek Canyon. The bees were perhaps a hundred feet away when I first heard them. The dog took off for the car. I sat in front of the hive and watched. It was quite a site and very loud. There were bees everywhere, all over the decoy, the stump it was setting on and also me.

I sat there for over 20 minutes to watch. It looked like someone was pouring them into the entrance. I might add that this was a very large swarm – 10 frames solid. Since that time I have watched many more bees go into decoys and even video-taped them from start to finish.

Now, getting back to the fence project. What I told Barb was if she saw the scouts disappear before I noticed to let me know.

I didn't really want this old hive to be their home. My thinking was when the scouts left, I would replace the junky hive with a brand new one with only foundation.

It was about 11:00 a.m. when she said "I don't see any bees." I quickly picked up the old hive and ran it to the basement, then grabbed the new hive and ran back to where it had been. I no sooner sat the hive down, when I heard them coming. Pretty quick the backyard was buzzing with bees.

As I looked at the new hive I noticed bees clustering and dropping off exactly where the knothole had been on the old hive. This went on for quite some time. I was thinking these bees aren't going to accept this box, but pretty soon the ones dropping off were now going into the entrance and began fanning. They all went in. I thought I had discovered something that no one else knew, as I had never read about it until I got Karl von Frisch's book, *The Dance Language and Orientation of Bees* (page 276 – 1993 edition).

"We have followed the proceedings in the cluster up to reaching of agreement by the scout bees. But who finally gives the signal to depart? It is the scout bees themselves that, as soon as matters have gone thus far, *gather in almost full number on the cluster* and by means of the characteristic "Buzzing Run" (Schwirrlauf) within a few minutes stimulate the entire company sitting there to fly off."

This goes along with what I witnessed, the puzzling part is that when scouts disappear from the decoy it is not spontaneous, but a dwindling down over a period of time, perhaps 15 minutes. Who tells them to quit coming and stay at cluster. Is it done at the decoy or back at the cluster?

I've noticed a lot of what I refer to as excitement at the decoy running and bumping into other bees, but this doesn't just happen before they disappear but might go on for two or more days prior to their coming.

One other thing I've noticed is sometimes, or most times, after scouts disappear, the swarm doesn't come, but maybe 15 or so minutes scouts start returning one by one, and start the process all over again.

I believe that they couldn't make it in one move, perhaps by distance or that wind came up and blew the scent trail off (Wenner). The scouts seem to lead the swarm. BC

Jim Cowan closely watches swarms around his home in Aberdeen, Washington.

INNER ... Cont. From Page 10

and let them fly, and pollinate.

Moreover, shipped-in packages are probably more predictable as far as condition and health are concerned. Foreign honey, too, is more predictable, according to packers, because there's no dickering about price, delivery and color. Or so they say, anyway.

If agriculture requiring pollination continues on its steady decline this event will prove to be rare. If, however, it goes the other way, it will become an annual event. I am guessing, but my guess is that those bees from Australia don't really have resistance to anything lethal we already have . *Varroa*, AFB, TMite, EFB or even Winter. So, will they thrive after they arrive, or will they become a disposable pollination unit – arrive, pollinate, make some honey and poof, gone. Only to be replaced next year.

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Have you ever tasted Goldenrod honey from Vermont? What about New York? Or Wisconsin? Well, there's different species of Goldenrods growing there, different soils, different weather and even different rain water pH falling there in the Summer.

So when you say you think Goldenrod honey from your place compares well with a fine, red, earthy wine, you may be exactly right. And, when I say mine is exactly like the real, real expensive butterscotch candy I used to know, I am correct, also.

And, some think Goldenrod is worse than bakery grade, bad beyond belief. So who's right?

Maybe everybody. Micro environmental science is becoming fine tuned enough to discern these differences. Wine growers are beginning to make some outrageous claims about the soil quality they have that affects their final product. Fine wines, it seems, may not all be the same.

Nor are fine honeys. We need to explore this bit of snobbishness I think, to our advantage. A fine Ohio Locust is just so much better than that run-of-the-mill stuff you get in Pennsylvania, you know. And vice versa for their Linden, I hear (but

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HONEY PRODUCTION ... Cont. From Page 17

CALIFORNIA 1995-2004

	colonies x1,000	avg. lbs./colony	Prod. lbs. x1,000	Carryover Stocks x1,000 pounds
2004	390	45	17.6	5792
2003	480	67	32.2	6432
2002	440	53	23.3	3525
2001	425	65	27.6	7735
2000	440	70	30.8	11396
1999	505	60	30.3	10302
1998	450	83	37.4	12326
1997	420	75	31.5	9450
1996	390	70	27.3	4641
1995	420	93	39.1	4687
Avg. for all years		**68.1**	**29.7**	

million pounds this year, while exports rose from 2.3 million last year to 7.1 million pounds this year. When all honey out (domestic and imported stocks left over, exports) is subtracted from all honey in (produced in 2004, stocks remaining from 2003, honey coming in from loans and imports), what's left is how much honey was consumed in the U.S. in 2004. Divide that by the population (we used July 1, 2004, at 293.7 million people), and, you have per capita consumption – this year at 1.1 lbs/person or 17.6 ozs. Last year it was 19.7ozs., and in 2001 it was 18.9 ozs/person. See the chart, page 17

Data from the top 10 producing states is always illuminating. There was a change this year with New York falling to number 11, and Idaho rising to number eight, the first time that high in the list.

North Dakota, South Dakota, Florida and California are always in the top tier producing states, and though rearranged, this year, they're still the big guys in the game.

The top 10 states (see page 17), have 71% of U.S. colonies, produce 75% of U.S. honey, are holding back 25% of all U.S. honey (45.2 million of 183.6 million as loan or unsold), and have nearly 6% of all U.S. honey under loan, and own 62% of all the loan honey. They are the 800 pound gorilla.

Since 2003, the U.S. dropped 1.3% of its colonies total, but the top 10 were down only .01%. They actually increased total production in 2004 1.6% while the U.S. overall was up 1.0%. As they go, so goes the U.S.

Honey prices during 2004 took a dive, overall dropping 22%. Water white, extra white and white, that is 0-34 mm, honey was down 15.6% overall, but 22% at the packer level. ELA was down 26%, and darker was down 32%. The big guys took the hit pretty hard this year, with all honey in bulk down 25% overall. Ouch.

The Honey Price Chart on page 17 bears notice. The very bottom line about the difference between the average retail shelf price compared to the average wholesale price to packers bears notice. Somebody, somewhere is making a lot of money on honey, wouldn't you say?

The average price of wholesale honey in 2004 dropped 30.2 cents/lb., a 22% decrease in price. Meanwhile the retail prices stayed steady. What happened? Imported honey happened. This contributed to the 26% markup that happens between bulk honey and retail honey sales.

You can get a decades worth of this data if you've a mind at http://usda.mannlib.cornell.edu/reports/nassr/other/zho-66/ They won't do the analysis for you though. But then, nobody else will. BC

EVALUATING DIFFERENT STRAINS OF HONEY BEES

M Spensley **Rickert**

Using five strains of bees, survival was the selection key of choice.

With the help of some matching grant funds from the Northeast SARE, a project was undertaken to evaluate different strains of bees. The major goal of this project was to try and identify specific strains of honey bees – which are commercially available to beekeepers – and will also perform optimally in the Northeast. The crucial benchmark being survival, i.e. over wintering. There are numerous factors many of which are interrelated, that affect a colony's ability to survive. However, due to the limited scope of this project, survival was the factor we keyed in on.

The project consisted of the following. Twenty three-pound packages of bees were ordered from Georgia in order to ensure uniformity and a set arrival date for all the packages. Selected queens were ordered from different queen breeders with shipping dates that coincided with the arrival of the packages. The queens consisted of the following: four each of five different strains. Four Italians (two from Hardeman in Georgia, two from Strachan in California), four Russian hybrids (two from Hardeman in Georgia, two from Strachan in California), four SMR (two from Jester in Arkansas, two from Bee Happy in California), four Minnesota (two from Jester in Arkansas, two from Honey Land in Florida), and four New World Carniolans (two from Strachan in California, two from Bee Happy in California).

The package bees and queens all arrived on a timely basis with the exception of the Jester queens. A long stretch of poor weather caused difficulty in making mating flights, something the queen producer certainly has no control over. I attempted to hold those packages, with caged queens until the desired ones arrived, but this delay led to problems with those hives in the long run and made comparisons difficult.

The packages were placed and the queens introduced into hives which consisted of all new equipment, i.e. (bottom board, bottom screen, deep hive body, inner cover, outer cover, and new undrawn wax coated plastic frames). New equipment was used to ensure that all the hives started at the same point, and so no diseases or parasites were introduced from an outside source. Each hive was given a two gallon pail feeder with a 50:50 ratio of water and sugar, to help get them started.

This particular Spring (2003) the weather consisted of prolonged periods of cold and wet weather, which certainly seemed to hinder the build up of all of the hives, with some being more severely affected than others. The Jester hives appeared most affected due to the delayed queen introductions. As the season progressed the bees seemed to get on track, expand, and build up as expected, with slight to moderate variations. An additional deep super was placed on all of the hives as expansion continued into the Summer. By the time Fall rolled around three hives had been lost due to apparent queen related problems (Hardeman-Russian, Jester-Minnesota, and Jester-SMR). Ultimately 17 hives were prepared for the Winter and no chemical treatments of any kind were used.

In the Spring of 2004, 10 hives had survived the Winter. Consisting of: two Italians (one Hardeman, one Strachan), three New World Carniolan (two Strachan, one Bee Happy), One Russian (Hardeman), two SMR (Bee Happy), and two Minnesota (Honey Land). The main reason for the demise of the seven hives over the Winter was due to starvation. All food reserves had been exhausted in these hives with no signs of disease or parasites. Numerous factors probably contributed to this situation and it would be difficult to isolate them and the related level of impact. The wet cool Spring delayed early season build up; the ability of some bees to forage better and under less favorable conditions; building comb is done better by certain bees; population levels during specific times of the season are often variable; some strains "shut down" early in the late Summer and Fall as external food sources begin to dry up, while others carry larger populations later into the season thus consuming more food; also, some bees buildup rapidly toward the end of Winter, while others are slower to get started and attain large populations; finally, the trait to be food thrifty, (overwintering on small amounts of stored food) which can be related to population levels, but not exclusively.

It is a little difficult to draw a set of hard conclusions from this project. What I can say is that great

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THIS INFORMED RESEARCH SHOWS TREDS, BUT MORE DATA IS NEEDED.

care was taken to provide a consistent, level playing field from which to evaluate the different queens. Based on the key criteria (overwintering survival) the New World Carniolans performed the best with 75% survival, there was a cluster in the middle with the Italians, SMR, and Minnesota hives with a 50% survival rate, and the Russian hybrids had only a 25% survival rate. It must be noted however, that the Russian hybrids, SMR, and Minnesota sets went into the Winter with only three hives each, due to the earlier losses, but they were losses none the less. The late arrival of the Jester queens pretty much discounted their role in this research.

The sample size and the single season of observation were probably the areas, had they been increased, that could have provided more information. The advantage of the sample size used was that it allowed for all of the hives to be in the same beeyard, which was necessary from the standpoint of equalizing forage access. Better data could be obtained if multiple sets like the one described, were placed in various locations but that was not within the scope or budget of this particular project.

I can't remember when I first heard the saying there are beekeepers and keepers of bees. Although I'm working toward becoming a better beekeeper, this project was definitely from the standpoint of the later It should also be noted that under normal management practices certain things would have been done which were not done here, because of the need to maintain a level playing field. Mainly, hives showing problems could have been requeened, and many of the hives which were lighter than desirable could have been fed or given extra honey supers or combined before going into the Winter

Conclusion. It would appear beneficial to track the performance of different bee strains because variation exists between queens which are commercially produced for resale. I must add however, that although I was looking for a strain or strains that appeared to be superior, and certainly the New World Carniolans look pretty good, it would be short sighted at this point to eliminate any particular bees from further consideration, based solely on this one project. By selecting bees which "consistently" perform better in a specific region and under a particular individual's management practices, beekeeping operations over the short and long term should improve, become more profitable, and efficient. In plain language it's pretty simple, dead bees don't produce honey, provide pollination services, and are becoming increasingly expensive and difficult to replace. BC

Southern Illinois University, Edwardsville, IL

USING THE WORLD-WIDE-WEB TO REVIEW TECHNIQUES FOR THE PRODUCTION OF COMB HONEY

James E Tew

Serious Play

I admit that I am tinkering on the web, searching for information on comb honey production. Any topic would have sufficed, but I'm presenting a talk later this week on producing and marketing comb honey so it seemed appropriate to review the subject. (Plus spring is all over me and I am planning to produce some myself.)

Now having said that, I really don't care how the web works so long as it works. Vast amounts of time can be spent on the web reading, frequently becoming distracted by some popup screen. Many of us procure information from the web and its use is only going to increase. However, it's not just as simple as deciding to go the web, getting the information and signing off. There are lots and lots of dead ends and busted leads.

My present environment

For this project, I have the following necessary components:

1. Several common books on Comb Honey production
2. All the major bee supply company catalogs
3. A computer with cable access to the web
4. Some passing experience with comb honey production
5. Some university fact sheets
6. A deadline for getting this information to *Bee Culture*.

My comb honey books

Having already looked at current catalogs and having seen some of the new devices for comb honey production, I rapidly realize that my hardcopy books are out-of-date. A quick web search shows no newer comb honey books other than what I already have, are available. But abundant information popped up on various commercial pages with instructions for producing and purchasing the latest comb honey equipment. I did a Google search looking for comb honey (exact phrase) and book (at least one word). Google found about **8,940** listings for **book "comb honey"** and it only took 0.16 seconds. I looked at the first few hundred listings, but looking at everything would take hours – even days. This excess of information happens with most Google searches.

So my conclusion is that there are no readily available hardback books other than the ones I already have. For this discussion, I will use these dated books, fact sheets, my catalogs, and additional information from the web.

Why produce Comb honey?

Equipment Comb honey production requires more beekeeper expertise than producing regular liquid honey, but it needs less processing equipment. There is no requirement for extractors, uncapping devices, sumps or pumps – comb honey production equipment is simple.

Demand The demand for local comb honey is normally pretty high. We sell all that we can get and in many cases it's not particularly pretty comb honey. But, I'm always surprised to hear from beekeepers who produce the crop and are then stuck with it. Comb honey – all types usually sells itself.

Taste For honey purists, there is not a better honey source than comb honey Having not passed through an extractor, comb honey still has all the bouquet and ambience of seasonal flowers. It is truly a delectable food.

If it's so great, why aren't we all producing it?

I suspect we could quickly outrun our comb-honey-consuming public if all beekeepers produced it. You see, we've lost at least one generation of comb honey eaters – maybe two. At our annual honey sale, we spend a good deal of time telling people how to eat wax, what the effects are on the human digestive system (none), and whether or not it is impolite to spit the wax out. Each sale potentially requires a short course.

True, comb honey generally sells itself, but even so, beekeepers should grow their comb honey crop at about the same pace as their comb honey consumers are growing.

Types of Comb Honey

Comb honey is not always just comb honey. The common forms are:

- **Bulk frame** comb honey
- **Cut comb** comb honey
- **Chunk honey**
- **Section honey** – *Wood sections, Round sections, Plastic sections*

You choose

You choose the type you want to produce. Bulk frame, the style in which the entire frame is sold, is now really uncommon. As late as the 1970's. cardboard shipping boxes could be purchased for boxing bulk comb honey, but no more.

Comb honey is a good seller.

Continued on Next Page

I wonder what information I can find on this old procedure for producing comb honey. I checked my collection of comb honey books and found no listing for "Bulk Comb Honey." Off to the web I go. (Now, I'm sitting here waiting as my computer grinds.) Google came back with Results 1 - 5 of 5 for **comb OR honey "bulk frame"** (0.10 seconds). The term turned up at www.maafs.com/JudgesBook/Honey.pdf, which is a listing for a PDF file for Maryland Honey Judging Standards, but the file won't load. So I wasted five minutes. Interestingly, the April, 2001 issue of *Bee Culture* had a listing, but that page would not load either *(Error message – "can't find server.)* I then went directly to *Bee Culture's* home page and sweated out the listing. Is this funny? It's an article I wrote in 2001 entitled; *"The Underappreciated Bee Supply Catalog[1]"* and I only said that bulk frame boxes were no longer available. (This abortive process has taken 15 minutes.) So, forget bulk comb boxes and bulk comb production. It's not worth it.

Producing Comb Honey

Okay, entire books have been written on this subject. What can I say in a few hundred words? I could go to my books or I can canvass the web. I'll do both, but to the Web first.

I told Google to look for the exact phrase "comb honey" with at least one of the words to be "Prod*" I gave the wildcard character (*) in order not to miss either of the words "production" or "producing." Google came back with: Results 1 - 10 of about 240 for **prod* "comb honey"** (0.36 seconds). I was immediately buried in advertisements for buying comb honey, but essentially nothing on the production of the product. I will need to rewrite my search queries.

Boom, Big Hits.

A simple set of search commands for "comb honey equipment" pretty much buried me. Modular Half Comb Cassettes, Round Section Comb Honey, and Bee-O-Pac Comb Honey Systems turned up – in addition to the traditional information about cut comb and chunk honey production techniques. There is abundant reading here – with lots of photos – to readily supplement my dated books. As you would expect, many of the listings are from well-known bee supply companies. I went to several of them to see what they were listing for Comb Honey Production.

Bee Supply Company Web Pages

Most companies list the readily available comb honey equipment, but a few oddities still remain in the catalogs. The Dadant Company[2] lists a Wax Tube Fastener as did the Walter T Kelley[3] Company as well as other companies. This device still being available is interesting. Most of the traditional comb honey devices are gone from the catalogs. I don't know if I even have one these gadgets. Using that lead, I went to my catalogs where it was reported that the Wax Tube Fastener is used to secure foundation in grooved top bars. I then checked the web to be sure that grooved top bars were still available. They are – everywhere. (Results 1 - 10 of about 24 for **"grooved top bars"**. (0.23 seconds)

In my beekeeping memory, I have watched most of the heretofore traditional methods of comb honey change to modern methods. The basswood contraptions are gone from almost every catalog, having been replaced by the current plastic devices for producing comb honey. In fact, the Walter T. Kelley Company is the *only* remaining company that I could find that was still manufacturing *any* basswood comb honey devices. If I've missed anyone, no doubt I will hear from them.

Cut Comb and Chunk Honey

The production of cut comb (honey simply cut from the frame with a knife or cutting device) and chunk honey (cut comb honey that is surrounded by liquid honey) is still the same. Abundant listings turn up from simple searches.

The New Plastic Devices

For this project, the web was immensely helpful in researching and reviewing the availability and function of the few plastic comb honey devices. I started my search under *comb honey equipment* and then went to subsequent pages. Draper's Super Bee Apiaries, Inc has posted a good set of instructions for the new Bee-O-Pac at: www.draperbee.com/info/newitemsb.htm

Information was available for both Ross Rounds and Half Comb Cassettes; however, I was required to specifically go to commercial supply companies to find the products.

What have I accomplished?

I have no interest in writing a "How to use the web" article. But increasingly, the web is the primary information source for *any* beekeeping subject. I would be lost without it. From writing this article for you, I have reviewed: (1) the availability of different pieces of comb honey equipment, (2) the procedures for the "clamshell" devices (Bee-O-Pacs) including seeing photos, and (3) found information on current production techniques. I also found the following: (1) innumerable dysfunctional web pages, (2) useless pages or pages with no information, (3) abundant advertisers selling either the product or comb honey itself. While the web is immensely helpful, it can require a significant time commitment.

Who to believe? Who to trust?

When using the web, please be skeptical of nearly everything. Anyone can write anything about anything and put it on the web. Boom – it's done. But you already know this. When I look at web pages – especially when writing articles or searching for proper information – I look for credibility. "Who wrote this page?" There is nothing wrong with individuals selling bee products, but I frequently question their objectivity in the information they provide. Much of the time, the information from the web is junk with occasional pearls of wisdom – not necessarily incorrect, but just the wrong answer to my search question. It's a classic situation of separating the wheat from the chaff. The web is a great – but imperfect – information device. I love it. BC

Dr. James E. Tew, State Specialist, Beekeeping, The Ohio State University, Wooster, OH 44691, 330.263.3684, Tew.1@osu.edu; www2.oardc.ohio-state.edu/agnic/bee/; beelab.osu.edu/

[1] http://www.beeculture.com/storycms/index.cfm?cat=Story&recordID=105

[2] http://www.dadant.com/catalog

[3] http://go.netgrab.com/secure/kelleystore/asp/home.asp

APRIL

Come She Will

This Year, Make A Journal . . .

Ann Harman

The First Day of Spring has come and gone but that doesn't mean much to Mother Nature. April is a month of totally wacky weather in the middle eastern states, just about as wacky as March. A meteorologist once said that this area is one of the most difficult for weather predictions. Evidently fronts go north, go south, all at a moment's notice. Some areas of the middle eastern states now will definitely be warm, while in other areas you are still finding snow in the hedgerows.

However, wacky weather should not stop beekeepers in their progress into Spring. I assume you did the Winter check on food stores when appropriate in January and February, and you've cleaned off the bottom board – a task made easier if you are using screen bottom boards. And during March you checked the brood chambers for reversing. How is the queen doing? You could certainly tell whether or not she was performing during March.

Did you put strips in for *Varroa* control? And did you note down the date to remove them? It is so important to do treatments correctly. We need to keep our colonies healthy but at the same time prevent any contamination of our honey crop.

So – what next? Now we are into package bee season, queen replacement if needed and the major problem of beekeepers – swarm season. A busy time for all. And that includes the bees.

Have you ever kept a journal? If not, this is a good time to start. It does not have to be complicated but it can help you plan. You can write down what you wish to do in the beeyard so that nothing gets overlooked. Putting down the results of your management helps you to realize what improvements can be done next time. Information jotted down this year can help you to understand next year whether your efforts accomplished something or whether a new approach is needed. There is no need to make the journal day-by-day. It can be by the week. But do enter some information about the weather.

Weather affects the plants – early bloom, frosts, too much rain. The bees' lives and the plants' lives are inseparable. Be a weather watcher.

Ready to get started on a journal for April?

April First: Put salt in sugar bowl. Then call up beekeeper friend who lives 20 miles away and tell him you just saw a swarm of his bees fly past your window. During the puzzled pause that follows this strange statement, shout April Fool and hang up. He'll probably call you back so fix yourself a nice cup of coffee while waiting. Aaak! Dummy. You forgot you put salt in the sugar bowl. Replace sugar in sugar bowl (and why aren't you using honey, anyway)?

April 3. Back to bee business. Take a rainy afternoon this week to sit down and do a simple calculation. You should know when your major honey flow starts. In these middle eastern states the black locust nectar flow keeps us guessing. If the trees cooperate, then you want to be ready. Oh – I am assuming that you do have enough supers and that they are ready for the hives. That work should have been finished by the middle of March. Make a note in the journal that supers should have been ready.

Now for the calculation. You need a calendar. Count six weeks back from the supposed start of black locust nectar flow. That is when you want to have seen maximum egg-laying by the queen. Those are your field bees. The next few weeks of March into April should give the queen an opportunity to produce more bees to carry you through black locust into the following nectar flows.

During this First Week of April many beekeepers are eager for new queens. I have never fully understood this. I can certainly see wanting to replace a queen quickly that spent the Winter dawdling around and has not produced the brood necessary for a big spring population. But consider weather in queen-breeding country (there's that word "weather" again). Poor weather there can mean poorly-mated queens. No opportunity to take enough mating flights. If you like standard Spring requeening, then wait a bit before wanting delivery of queens for general requeening. Make a note in your journal for next year as a reminder of the time to ask for queen delivery. Remember that thousands of other beekeepers are ordering queens – all at the same time.

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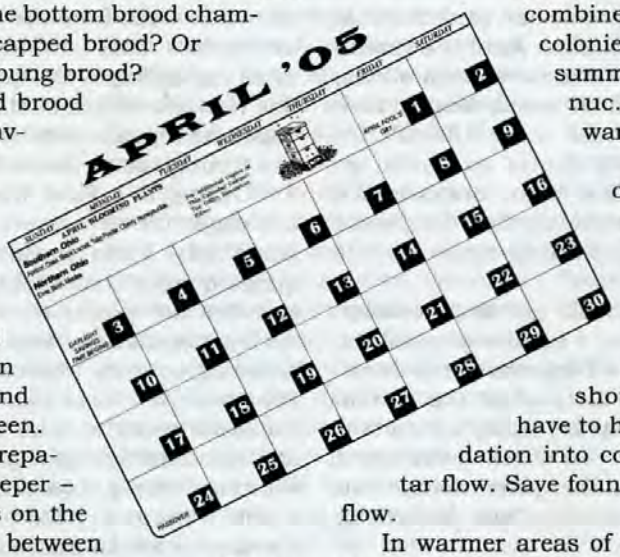
. . . so you can use the info next year.

Speaking of queens – do you have any two-year-old queens in your colonies? If your queens are marked – and they should be – then you know their age. These two-year-olds are the colonies you will now need to watch carefully for swarming signs. Unfortunately the bees have made all their swarming plans by the time April arrives. It is up to you to discover which colonies are well along with their plans.

During this first week of April take a look in the brood frames. One visible preparation for swarming is the lack of egg laying by the queen. Yes, eggs are hard to see but the glint of royal jelly in the cells of newly hatched eggs can be easier to see. If the queen seems fat and happy and the cells are filled with young larvae, all is well – for the moment.

What is going on in the brood chambers? Your journal is going to be important now. You need to note down what you find there. Is the bottom brood chamber empty? Does it have old, capped brood? Or is it occupied by queen and young brood?

That area with old capped brood is going to be emptying out, leaving space for egg laying. But the placement of it is important. In the spring bees go upward. The place for empty comb is where the queen can find it. That is why you need to note where old capped brood is so that you can keep track of available comb and make it accessible to the queen.



The next sign of swarm preparations – visible to the beekeeper – is the presence of queen cells on the bottoms of frames, especially between the upper and lower brood chambers. These cells tell you that the colony is pretty well committed to swarming. If you find a capped cell, swarming is inevitable, and is going to happen soon.

The Second Week of April may well see beekeepers reversing the brood chambers to provide space for that upward progress of the queen. Take a good look at the numbers of bees in the colony. If you have queens arriving during the second week of April you may be able to split a big colony and still have enough strength for an early nectar flow. If you cannot obtain a queen for creating a nuc, you can let the bees in that nuc raise their own. But bees do not always make the best choice of young larva. For the bees it does not matter – they will have a queen. For the beekeeper, it does matter. You need a colony headed by a top-quality queen.

Removing frames of brood and replacing with drawn comb provides space for egg laying and perhaps reduces chances of swarming. Leaving the field force with the main hive gives plenty of worker bees for nectar flow.

Every beekeeper will have a way of lessening swarming by making a nuc or by manipulating hive bodies, frames, brood. Books will give detailed descriptions of preventing and controlling swarming. What's right? What's wrong? Neither, any or all – whatever works for you. But write down what you do. And the results of what you do.

Although many reasons for swarming exist – including just plain swarmy queens – most agree that providing space for the colony is of great importance. Plan how you can allow the colony to expand as it wishes but not create endless work for you.

The Third Week of April should give you an idea how your swarm prevention is working. Reversing hive bodies should still be on the agenda when the bottom hive body is empty or contains only old capped brood, ready to emerge.

Although swarm phone calls are not as common as in the distant past, a few calls from hysterical homeowners do indicate when peak swarm season is in your area. Capturing a swarm should be in your plans for obtaining drawn comb from foundation. Even if you really do not want to add to your number of colonies, using the swarm's comb building ability is worthwhile. You can always combine the swarm with one of your colonies later in the spring or early summer. It can be used to boost a nuc. Just remember—you do not want to save the swarm queen.

Suddenly it is the Last Week of April. At this point your honey supers should be ready for duty. Adding supers to a colony as the nectar flow is approaching does give more space for the colony. Those supers, however, should have drawn comb. Bees have to have a reason for drawing foundation into comb and that reason is a nectar flow. Save foundation drawing for peak nectar flow.

In warmer areas of the middle eastern states it is possible that supers could be put on during that Third Week of April. Get outside and look at the trees. Do those black locust trees still look bare and miserable as if it were the dead of Winter? Or is the view over the countryside one that looks like spring has definitely arrived.

Back to your hives. Do you see lots of comb with fresh nectar? If so, the bees have found a great source. Those supers are needed now. In a few days take a look inside the supers to give you an idea of the progress of the nectar flow.

Now go and write down the date you put supers on and some short notes on their progress. Go back through your journal for April. Did you say anything at all about the weather? No? Go back and fill in weather information before you forget what it was like. Yes? Good for you. You now have some information to make you a better beekeeper next year. BC

Ann Harman chases swarms in April all around her home in Flint Hill, Virginia.

Honey Plants

Connie Krochmal

Early Blooming Spring Flowers

Isn't Spring terrific? If we're glad that Winter is over, think how the bees must feel. Now they can get outside and work the Spring-flowering plants. Of the early-blooming species, here are some perennials that yield both nectar and pollen.

Though these garden flowers are seldom plentiful enough to produce pure varietal honeys, they remain helpful to bees. Like many cultivated plants, the ones below prefer rich, moist, well-drained soils.

BASKET-OF-GOLD (*Aurinia saxatilis*)

Also known as gold dust, golden tuft, and rock madwort, basket-of-gold is adapted to zones three through nine. This European native is a very popular rock garden plant. Though it grows well in both full sun and partial shade, the latter extends the life of the plants.

About eight inches in height and somewhat wider, basket-of-gold has a mat-forming growth habit. This has attractive, silver-gray foliage. The basal leaves are slightly larger than the upper ones. Appearing in terminal clusters over a period of a month or so, its blossoms are very tiny and four-parted. Normally, they're bright yellow, though an apricot-flowered variety is also available.

If neater-looking plants are desired, shear them after they bloom. Other than that, basket-of-gold requires very little attention.

BLEEDING HEART (*Dicentra spectabilis*)

Hardy in zones three through nine, this elegant species is a longtime favorite for perennial gardens. Spots with morning sun and afternoon shade are ideal. A sturdy, heirloom plant, bleeding heart is about two to 2½ feet in height. The feathery, compound leaves are gray-green. In the dog days of late Summer, these may die back.

Opening freely in arching clusters, the graceful, spurred, heart-shaped blooms appear for several months from early Spring to mid-Summer. Usually pink to rose-red, they feature white inner petals. A white-flowering variety is available. In addition to the cultivated forms, there are several native species, such as the fringed bleeding heart.

If left alone, bleeding heart will spread, but it is never invasive. This perennial will also self sow. It rarely needs attention, and is unbothered by insects and diseases. Though bleeding heart can withstand drought, it will go dormant until the rains return.

Forget Me Not Rosylva (Myosotis sylvatica)

FORGET-ME-NOT (*Myosotis sylvatica*)

This is also called woodland or garden forget-me-not. Suited to zones five through eight, it will survive in zones three and four if given adequate winter protection. Forget-me-not prefers partial shade – particularly in the afternoon.

Forget-me-not is variable. North of zone five, it behaves as a perennial where it lasts for several years. In areas with mild Winters, gardeners often treat it as a Winter annual. For that purpose, forget-me-not is planted in the Fall, and blooms the following Spring. It readily self-sows.

Introduced from Europe and Asia, this plant has naturalized in parts of the eastern U.S. The ones growing wild will generally have slightly larger blooms than the cultivated garden plants. Around a foot tall, forget-me-not has spoon-shaped foliage in basal rosettes.

Initially flowering for about a month in early Spring, this can re-

Continued on Next Page

bloom several times during the Summer The funnel-shaped flowers are held well above the foliage. Only ¼ inch across, they have five lobes and yellow, star-shaped centers. Though forget-me-nots are traditionally in varying shades of blue, they're available in other colors as well. About six inches tall, Victoria produces white or red blooms.

When grown in a garden setting, forget-me-not may suffer from powdery mildew.

HELLEBORES (*Helleborus spp.*)

The reliable hellebores are shining stars in shade gardens. They do best in neutral to alkaline soils, and generally exhibit fast growth. Native to Europe and Asia, these often self-sow.

For the most part, hellebores are essentially stemless. Generally evergreen, their large, shiny foliage is thick and leathery The palm-shaped leaves are deeply divided into three to 20 segments. Often, these become tattered over the Winter months. They're replaced by crisp, fresh ones in the Spring.

Depending on the species, hellebores can bloom from December through the Spring. The flat or cup-shaped flowers occur singly or in nodding clusters. Their vividly colored sepals are often mistaken for petals. In fact, the true petals form funnel-shaped nectaries.

If consumed, these plants are poisonous, while the foliage can cause dermatitis.

Christmas-rose (*Helleborus niger*)

Christmas-rose thrives in zones three through nine. Around a foot tall and 1½ feet across, this is evergreen in warmer climates. The dark green foliage is toothed with five to seven segments.

Its flower stalks are reddish. Two to four inches wide, the solitary blossoms are greenish-white to white with touches of rose. Their centers are vivid yellow. If given protection during the colder months, Christmas-rose will bloom throughout the Winter into the Spring. Some varieties have larger flowers.

Corsican Christmas-rose (*Helleborus corsicus*)

This species is somewhat tender with its Winter hardiness limited to zones six through nine.

Coral Reef (Papavor orientale)

About two feet in height and almost as wide, Corsican Christmas-rose has spiny, gray-green foliage. With white veins, these are three-parted.

Corsican Christmas-rose produces masses of cup-shaped blossoms with up to 30 per cluster These pale green flowers have hints of dark pink. In areas with mild Winters, they open from December onward.

Green hellebore (*Helleborus viridis*)

This slow-growing, deciduous species performs best in zones six through eight. Reaching one to 1½ feet in height, the foliage is very finely divided with downy undersides. When young, the leaves have a purplish tinge. Green hellebore is named for its pure green to yellowish-green flowers.

Lenten-rose (*Helleborus orientalis*)

Of all the hellebores, this is the easiest to grow. It does well in zones five through nine. Native to Asia, Lenten-rose is about 1½ feet tall and two feet across. The finely toothed leaves are borne on long stems. Its foliage is lighter colored than that of the Christmas-rose. Held in clusters, the pendant, cup-shaped blooms begin opening around March. These may be white, green, or any shade of purple. Up to four inches wide, they're decorated with dark blotches.

Stinking hellebore (*Helleborus foetidus*)

Also known as bearsfoot hellebore, stinking hellebore is hardy in zones three through nine. Reaching 1½ feet in height, it has an equal spread. This European native eventually forms clumps. With up to nine segments, the foliage is deeply divided. Its ill-smelling blooms, an inch across, may be purple or green. These are present from late Winter through the Spring.

JACOB'S LADDER (*Polemonium caeruleum*)

Doing best in zones four through eight, Jacob's ladder is adapted to full sun and partial shade. The latter is recommended in warmer climates. If protected from afternoon sun, its blossoms will last longer.

From 1½ to three feet in height, this upright European plant is over a foot wide. It is readily distinguished by the attractive, alternate, fern-like foliage. Arranged in a ladder-like fashion, the small leaflets are uniform in size and shape. The name purportedly refers to the ladder Jacob saw in his dream.

Freely borne, the nodding, terminal panicles of small blue flowers emerge in Spring. One inch wide, these continue to open sporadically throughout the Summer Their pollen is golden yellow.

Several varieties of Jacob's ladder are available. A variegated form produces violet-blue blossoms with conspicuous golden stamens. In the Spring and Fall, Bressingham Purple has colorful purple foliage. Creeping polemonium, a related species, is found in open woods over much of North America. It is sometimes cultivated in gardens.

This carefree plant is generally left untouched by insect and disease

Checkers
(Papovar orientale)

problems. Rarely needing attention, Jacob's ladder needs no staking or trimming.

LEOPARD'S BANE (*Doronicum cordatum*)

Suitable for zones four through eight, this reliable perennial is native to Sicily and Asia Minor Tolerating both partial shade and full sun, leopard's bane does best with afternoon shade in hot areas.

Around a foot in height, leopard's bane is easily recognized by its heart-shaped leaves, nearly a foot wide. The deep green, toothed foliage clasps the stem. In Southern areas, this can die back during the hot Summer months.

Leopard's bane blooms for a month or so in the Spring. Opening terminally in tall flower heads, the cheery yellow blossoms are daisy-like. They're 2½ inches across.

Several varieties are sold. Finesse features very large flowers, while Magnificum is more uniform in appearance than the species plant. Madam Mason is less likely to go dormant in hot weather

Easy to grow, leopard's bane can sometimes be short-lived. It will need watering during Summer droughts. To encourage re-blooming, deadhead the plant in the Spring after it quits flowering.

ORIENTAL POPPY (*Papaver orientale*)

Most appropriate for zones three through eight, Oriental poppy is a popular perennial. So far as exposure is concerned, it does best with morning sun and afternoon shade. Poppy flowers are somewhat fragile, and can be damaged by strong winds. For that reason, sheltered locations are best.

This is originally native to Persia (modern day Iran) and the Mediterranean region. Oriental poppies can reach four feet in height with a spread of three feet. Gray-green, the foliage is lobed and toothed. This tends to disappear with the onset of hot, humid weather However, it returns in the Fall. Both the stems and leaves are rough and hairy.

Oriental poppy is noted for its eye-popping, papery blossoms, up to six inches wide. These have prominent centers with dark purple or black blotches at the base of the petals. Though orange and scarlet are the most commonly seen colors, the palette extends to pink, salmon, white, and purple in some cultivated forms. There are well over a hundred varieties with some having double flowers, which are of less interest to bees.

Typically, Oriental poppies can spread by runners, but they aren't invasive. I've never seen the plants develop any problems, but they're occasionally attacked by bacterial blight and aphids.

PURPLE ROCK CRESS (*Aubrietia deltoides*)

Sometimes called false rock cress, this resembles true rock cress. Both are members of the mustard family. Doing well in zones four through nine, purple rock cress prefers cool, moist growing conditions with some afternoon shade. It thrives in rocky or gravelly, limestone-rich soils. When grown in warm climates, this petite Greek native goes dormant during late Summer.

With a mat-forming growth habit, purple rock cress is an excellent choice for rock gardens. It is only six to eight inches in height with a spread of about 1½ feet. The gray-green foliage is spoon or diamond-shaped. Growing in the form of a rosette, this is hairy and toothed.

The cross-shaped blooms appear in masses on upright stems. With four petals, they're ¾ inch wide. Most often, these are lilac, violet, or true purple, but are sometimes red. Several varieties of purple rock cress are offered. Only four inches tall, Red Carpet has deep red blooms, while those of Whitewell Gem are violet.

Shearing the plants after they bloom in the Spring encourages a flush of new flowers. If it isn't divided every three years or so, purple rock cress can be short-lived.

ROCK CRESS (*Arabis procurrens*)

Introduced from Europe, this species grows well in zones three through eight. Preferring full sun, it will tolerate light shade. Like most rock garden plants, rock cress does best in an infertile, gravelly, well-drained soil high in limestone.

A low, spreading evergreen, rock cress has leafy stems that hardly reach a foot in height. It is 1½ feet across. With a creeping growth habit, this spreads by short runners. Occurring in a mass, the dark green foliage is dense and shiny Usually hairy, it is oblong. There is also a variety with variegated foliage. Opening in terminal spikes, sweetly scented white flowers cover the plant. Very showy, these bloom for several months beginning in April. Less than one-half inch wide, they're cross-shaped.

Very easy to grow, rock cress will rot in heavy, water-logged soils. Cut this back after it quits blooming to keep the plant compact.

In the early Spring, there are nectar and pollen plants aplenty. Bees can choose from woody plants, bulbs, wildflowers, and garden flowers like these perennials. **BC**

Connie Krochmal is an award winning garden writer and a beekeeper.

? DO YOU KNOW ?

Swarming & Nectar

Clarence **Collison**
Mississippi State Un versity

Management of honey bee colonies in the Spring is concerned with the development of strong, productive colonies. Peak bee populations need to coincide with the primary honey flows in the area. In addition, the beekeeper also needs to effectively manage their colonies in order to keep them from swarming. Failure to do so will result in the beekeeper ending up with unproductive colonies. Understanding the factors that affect colony development, flowering and nectar production is also an important consideration so the beekeeper can have their colonies in peak condition at the appropriate time. Please take a few minutes and answer the following questions to determine how familiar you are with these important topics.

Level 1 Beekeeping

1. ____ The Demaree technique is used to stop a colony from swarming by dividing a colony into two separate units. (True or False)
2. ____ The Spring swarming season occurs earlier in the south than it does in the north. (True or False)
3. ____ Drone production in a honey bee colony is related to the formation of queen cells in the preparation for swarming. (True or False)

As a colony is making preparations to swarm, please explain what structural, behavioral and physiological changes you would expect in relation to:

4. Foraging activity-
5. Wax glands-
6. Queen's egg laying rate-
7 Queen's diet-
8. Scout bees-
9. Queen cups-
10. ____ Initiation of the swarming impulse is related to congestion in the brood nest and the production and distribution of:
    A. 2-heptanone
    B. 10-hydroxy-2-decenoic acid
    C. Isopentyl acetate
    D. 9-oxo-2-deconic acid (Queen substance)
    E. Nassanoff pheromone
11. After a primary swarm leaves a colony, explain what two events may occur back at the parent hive. (2 points)
12. What is the primary explanation for a colony issuing a swarm in the Fall? (1 point)

Advanced Beekeeping

13. ____ Amino acids within floral nectar appear to be universally present and in a characteristic pattern for any particular plant species. (True or False)
14. ____ Nectar concentration in a particular plant species is influenced by the nectary vascular supply: nectaries supplied by predominantly xylem produce a highly concentrated nectar (True or False)
15. ____ Floral and extra-floral nectar basically differs in sugar composition. (True or False)
16. ____ Basswood nectar (*Tilia* spp.) can be toxic to bees. (True or False)
17 ____ *Nectar has a wide range of pH values even though the final product, honey, is acidic. (True or False)*
18. ____ Nectar robbing bees are effective pollinators. (True or False)
19. ____ The strongest amino acid concentrations in nectar are in flowers that simulate carrion or dung. (True or False)
20. ____ At times honey bees become secondary nectar robbers. (True or False)
21. ____ Anatomically, extra-floral and floral nectaries are similar. (True or False)
22. ____ What is the primary purpose of extra-floral nectaries? (1 point)
23. ____ A typical flower begins to secrete nectar prior to the activity of its pollinators. (True or False)
24. ____ Flowers actively regulate the sugar concentration of their nectar so that the viscosity remains relatively constant during the day. (True or False)
25. ____ Flowers pollinated by diurnally active animals produce nectar during the day and flowers pollinated by nocturnally active animals produce nectar at night. (True or False)

ANSWERS ON NEXT PAGE

?Do You Know? Answers

1. **False** With the Demaree technique the entire honey bee colony is kept as a single unit, with the unsealed brood being separated from the queen with the use of two queen excluders. Even though this technique requires a great deal of labor and time, it allows the colony to continue to develop as one unit and stops them from swarming. All frames of brood must be examined and the queen cells destroyed. The queen must be located and placed in the lower brood chamber All frames of uncapped brood are placed in the upper brood chamber. Capped brood may be left in either the upper or lower brood chamber. One or two hive bodies full of empty combs are placed between the original two brood chambers. A queen excluder is placed on top of the bottom hive body prior to adding the middle hive bodies, then a second queen excluder is added below the upper brood chamber. In seven to 10 days, the beekeeper should return to inspect the colony and destroy any new queen cells that may have developed in the upper hive bodies.
2. **True** Several studies have shown that the swarming season in the southern United States occurs earlier in the year than in the north. In Ithaca, New York, swarming normally starts around May 15th, peaks around June 5-10th and there is almost no swarming after July 15th until Fall. In Maryland swarming normally begins about one month earlier. In the panhandle of Florida swarming begins in late March and occurs primarily in April and May.
3. **False** No evidence has been found that drone production is related to the formation of queen cells in preparation for swarming. Drone production is a virtually universal event in colonies, whereas, the formation of queen cells is not. Therefore, the presence of drone brood cannot be taken as a definite indication that queen cells will be formed later. In colonies making swarm preparations, the interval of time between the start of large scale drone production and the laying of the first eggs in queen cups is highly variable. A mean duration of approximately three weeks has been observed.
4. As workers begin to engorge on honey in preparation for swarming, foraging activity decreases. Eventually foraging virtually stops prior to the issue of a swarm.
5. Workers engorge on honey, which causes the wax glands to develop, so comb construction can begin immediately after swarming. Thus, a large proportion of the population making up the swarm has active wax glands when they swarm.
6. Workers cut down on feeding royal jelly to the queen and as a result the queen's egg laying rate is reduced.
7. Workers place the queen on a diet, as she needs to slim down so she can fly. She loses 1/3-1/2 her body weight in eight to 10 days time.
8. Scout bees stop scouting for food and start looking for a new home site.
9. The number of queen cups in the hive increases. Those already present have new wax added to the cup opening and are slightly enlarged in size. Then the queen lays an egg into each cup.
10. D) 9-oxo-2-deconic acid (Queen substance)
11. After a primary swarm issues from a colony, there are several queen cells back at the parent hive. Either the first queen that emerges goes around and kills her rival queen cells so she becomes the queen heading up the colony or she does not kill her rival queen cells and leaves the hive with another group of bees as a secondary swarm.
12. Swarms issuing in the Fall are a real mystery, since they will not survive the Winter It is thought that it may be a means by which colonies get rid of excess bees (population control).
13. **True** Analysis of the nectar from many species of flowering plants has shown that the occurrence of significant concentrations of amino acids in nectar is the rule. Amino acid concentrations in nectars are considerably lower than sugar concentrations but they are consistently present in floral nectar.
14. **False** It has been shown that the sugar concentration of nectar in a particular plant species is influenced by the nectary vascular supply. Nectaries supplied by predominantly xylem produce a dilute nectar whereas, those being supplied by phloem tissue produce higher sugar concentrations.
15. **False** The study of floral nectar and extra-floral nectar have shown that they are similar in chemical composition having the same kinds of sugars.
16. **True** Nectar from basswood trees (*Tilia* spp.) is usually considered to be an excellent source of honey. In certain locations and situations, however, nectar from these trees is found to be toxic to bees and other insects. Affected bees are seen underneath the trees, unable to fly, appearing paralyzed and dragging their abdomens on the ground. The monosaccharide mannose in the nectar is reported to be toxic to bees.
17. **True** Nectars display a wide range of acidity or alkalinity (pH) even though the final product, honey is acidic. pH values have ranged from three to 10.
18. **False** Nectar robbing bees are not effective pollinators since they extract nectar from the flowers without coming into contact with the reproductive structures. Nectar is obtained through holes bitten near the bases of the corolla. Primary robbers are those species or individuals which make the holes and then extract the nectar Secondary robbers are those species or individuals which obtain nectar by using holes made by primary robbers.
19. **True** The strongest amino acid concentrations in nectar are found in flowers that simu-

late carrion or dung and attract the females of flies that use these substrates as larval food.

20. **True** A variety of bees, including honey bees, have been observed as secondary robbers of floral nectar, using the holes provided by primary robbers, such as carpenter bees or a few species of bumble bees.
21. **True** Anatomically, extra-floral and floral nectaries are similar, however, extra-floral nectaries are often larger and more varied in external appearance.
22. Extra-floral nectar is important in maintaining the mutually beneficial relationship between many plants and certain insects, especially ants, which are attracted to the extra-floral nectaries and in turn offer the plant varying degrees of anti-herbivore protection. Also, the presence of ants on extra-floral nectary sites on outer floral parts may deter other organisms that reduce reproductive capacity of plants by avoiding normal pollination procedures and robbing nectar.
23. **True** A typical flower begins to secrete nectar prior to the activity of its pollinators. The rate of secretion is constant and continues until some critical amount has accumulated and then nectar secretion ceases. Nectar secretion resumes only if nectar is removed. The beginning of nectar secretion reflects the activity period of the pollinator class and begins one to four hours before the pollinators become active.
24. **True** The rate of nectar extraction by a pollinator is a function of the nectar's viscosity. Research has shown that flowers actively regulate the sugar concentration of their nectar such that the viscosity remains relatively constant during the day. Small changes in either the amount of water and/or sugar in the nectar would significantly alter the sugar concentration and thus its viscosity.
25. **True** It is generally accepted that flowers pollinated by diurnally active animals produce nectar during the day and that flowers pollinated by nocturnally active animals produce nectar at night.

There were a possible 13 points in each test level this month. Check the table below to determine how well you did. If you scored less than six points, do not be discouraged. Keep reading and studying – you will do better in the future.

Number Of Points Correct	
13-11	Excellent
10-8	Good
7-6	Fair

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

GLEANINGS

APRIL, 2005 • ALL THE NEWS THAT FITS

NATIONAL HONEY BOARD HIRES KATIE ROCHE

The National Honey Board hired Katie Roche as Director of Industry Services as of February 14. She is responsible for managing industry relations programs and providing support services to the industry.

"We're very pleased to be able to find someone with Katie's skills, background and level of experience," said Bruce Boynton, Chief Executive Officer of the National Honey Board. "I'm confident she'll do a great job maintaining the many services and providing materials the beekeeping and honey industry has come to expect from the National Honey Board. She's gotten off to a good start by meeting many industry people at our February Board meeting in Anaheim, and we're planning some trips this Spring to visit with others."

SMUGGLED NORTH

A British Columbia man has been fined C$10,000 after being intercepted trying to smuggle bees from the United States to Canada.

Dudley Paul Gottfriedson of Osoyoos was convicted in provincial court of one count of violating the Honeybee Importation Prohibition Regulations, 1999 made under the Health of Animals Act.

The court was told that on May 28, 2003, Gottfriedson attempted to import 8,416 queen honey bees, valued at C$84,160.

Osoyoos is in the southern Okanagan Valley and is about five kilometers (about three miles) from the U.S. border.

Canada Border Services Agency inspectors discovered the bees upon a secondary examination of the vehicle. The bees were destroyed immediately after seizure except for a sample that was retained as evidence.

PA'S BEST

Jerald Ely, the "grandfather of beekeeping" in the NE Pennsylvania, was awarded the Beekeeper of the Year by the PA Beekeepers Association at the 100th Anniversary Dinner in November.

Jerry began keeping bees under the guidance of Elmer Cornwall, Mansfield, PA almost 60 years ago. He, in turn, has been teaching and mentoring new beekeepers ever since. In the 70s while teaching an adult education class, he founded the Susquehanna Beekeepers Assn. serving five counties.

NHB FUNDS PRODUCTION RESEARCH PROJECTS

The National Honey Board is funding production research projects to combat *Varroa*.

Since *Varroa* have become resistant to registered methods of control, the National Honey Board, in 2004, decided to fund production research to help discover new ways of fighting the mite (while not contaminating the honey) and thus keep the beekeeping industry economically viable. Three production research projects were funded in 2004 with two of those projects continuing in 2005. In addition, three new projects were selected for funding and start-up in 2005.

"As a commercial beekeeper, honey producer and orchard owner, I can pretty much see all sides of this problem," said Lee Heine, Chairman of the Board of the NHoney. "Usually, a few winners can emerge in any agricultural shortfall situation. Right now there are absolutely no winners except, maybe for the mite itself."

The following three projects were started in 2004:

An integrated approach to reducing pesticide and antibiotic use in honey bee colonies – Marla Spivak, Dept. of Entomology, University of MN. Funding period: Spring 2004 – Spring 2005

Twenty four hour fumigation of colonies with formic acid and acetic acid for the control of *Varroa*, small hive beetle, honey bee tracheal mites, and honey bee viruses – Dennis vanEngelsdorp, PA Dept of Agriculture and Dianna Cox-Foster, PA State University Funding period: Spring 2004 – Spring 2005

A fogging method with food grade mineral oil to control *Varroa destructor*. The treatment method was determined to be unsafe for beekeepers and of no benefit in controlling *Varroa* populations or improving the overall health of the colony during the test period during the Spring conditions in South Texas.

The following three 2005 projects have been selected by the NHB for funding:

Testing Oxalic acid for *Varroa* control in dry vs. humid climates, and colder climates – Diana Sammataro, Carl Hayden Honey Bee Research Center, Tucson, AZ Funding period: Spring 2005 – Spring 2006

Effects of mineral oil and essential oils on honey bee worker brood and colony *Varroa* mite populations – Jeff Pettis, USDA-ARS Bee Research Laboratory, Beltsville, MD Funding period: February 2005 – Summer 2005

Ozone as a fumigant for honey bee supers and comb – Rosalind James, USDA-ARS Bee Biology & Systematics Laboratory, Logan, UT Funding period: Summer 2005 – Summer 2006

CONTROL OF *VARROA* & TRACHEAL MITES

The Dept. of Agr. Economics at LA State University is asking for help in a study we are conducing in cooperation with the USDA Agricultural Research Service. This study focuses on options for controlling *Varroa* and Tracheal mites in the beekeeping industry. From this survey, we want to determine: 1) how much economic damage has been caused by *Varroa* and tracheal mites; 2) how beekeepers are dealing with *Varroa* and tracheal mites; and 3) the economic value to beekeepers of these new lines of honey bees for dealing with *Varroa* and tracheal mites. The address online is www.honeybeesurvey.com

For questions contact John Westra, jwestra@agcenter.lsu.edu or 225.578.2721.

CALENDAR

♦INTERNATIONAL♦

Apimondia 2005 – August 21 - 26, 2005 Dublin, Ireland. For information visit Apimondia2005.com

International Beekeeping Congress, Bangalore, India, November 13-18, 2005. The main aim of the congress is to bring together the beekeepers, honey traders and International Scientific Community involved in research. Watch for details.

For information visit www.cenfound.org or contact info@cenfound.org.

Apimondia 2007 – September 9 - 13, 2007 Melbourne, Australia. For information visit Apimondia2007.com

♦CONNECTICUT♦

The Backyard Beekeepers will be host Dewey Caron, April 26 at 7:30 p.m. at the Norfield Congregational Church in the Community Room in Weston.

For more information contact Serge Boyce, 203.259.4861; sergeboy@optonline.net or visit www.backyardbeekeepers.com.

♦DELAWARE♦

Delaware Valley College will offer their three-day beekeeping short course, June 24-26. The course is taught by Bob Berthold and Gary Bradshaw.

For more information contact Dr. Berthold, Delaware Valley College, 700 E. Butler Ave., Doylestown, PA 18901 or call 215.489.2285.

♦GEORGIA♦

Young Harris College and the University of Georgia will host their 14th annual Beekeeping Institute, May 19-21 on the campus of Young Harris College.

Guest speakers include Eric Mussen from the University of California and Mike Stanghelline from Rutgers University.

For information visit www.ent.uga.edu/bees/Meetings/workshops.htm or contact Detsy Bridges, 706.542.2816.

♦ILLINOIS♦

The Heartland Apicultural Society will host its 4th annual conference July 7-9 on the campus of Southern Illinois University at Edwardsville.

See www.heartlandbees.com for details.

♦INDIANA♦

The Indiana Beekeepers Association will hold their Fall Conference at Pokagon State Park, Angola, Steuben County, November 4-5.

A block of rooms has been reserved for Thursday night and Friday nights. Make your reservations now by call Diane or Valerie at 877.768.2928 or 260.833.1077. Be sure to tell them you are with the Indiana Beekeepers Association.

For more information contact David Barrickman, 765.623.4633 or dbarrickman@iquest.net.

♦MAINE♦

Maine State Beekeepers Association will host their annual meeting at the Elks Club in Augusta, April 9, 8:00 am.

The featured speaker is James E. Tew, Ohio State University's Extension Specialist in Apiculture.

For more information contact Dick Vose, 207.563.7564 or visit www.klcbee.com.

♦MASSACHUSETTS♦

Massachusetts Beekeepers' Association will host their Spring meeting April 2, 9:00 a.m. at Coolidge Hall, Topsfield Fairgrounds, Topsfield.

Robin Mountain and Dr. Larry Connor will be the featured speakers. Registration is $15/members which includes lunch ($5/program only) and $25/non-members ($15/program only). Lunch reservations must be received by Friday, March 25.

For more information contact Paul Desilets, 508.888.2304, president@massbee.org or Andrea Desilets, 978.772.4417, treasurer@massbee.org.

♦NEW JERSEY♦

The New Jersey Beekeepers Association will host their Beekeeping Short Course at Cook College, April 15-17.

For information visit www.cookce.rutgers.edu/courses/current/ae0401ca05.

♦NEW YORK♦

Champlain Valley Beekeepers will host speaker Marla Spivak, April 30, 9:00 a.m. at Bookman Town Hall in Bookman.

For information contact Dick Crawford, 518.561.7167.

Organic Beekeeping Workshop will be held at the Pfeiffer Center for Biodynamics and the Environment in Chestnut Ridge. The date is April 29, 2005, 3:00 p.m. to 9:00 p.m. and April 30, 2005, 9:00 a.m. to 6:00 p.m. This workshop is for active beekeepers and also beginners. The presenter will be Gunther Hauk.

For more information contact The Pfeiffer Center, 845.352.5020, ext. 20; email: info@pfeiffercenter.org or visit www.pfeiffercenter.org.

The Sullivan County Beekeepers Association will hold its Annual Beekeeping Seminar/Workshop, April 30 at the Cornell Cooperative Extension Bldg., Ferndale Loomis Road, Liberty. Workshop will cover basic bee biology, equipment, how to work with bees, management, diseases, honey production, queen bees, pesticides, swarms, mites and moving the bees.

Registration begins at 9:00 a.m. and is $15/person, $5/children 12-17 accompanied by an adult. The program runs until 4:00 p.m.

For more information contact Jim Kile, 845.647.6759.

The Cornell University Master Beekeeper Program will conduct its Apprentice Level Spring Course in Ithaca, May 14-15. Topics include history of beekeeping; anatomy and life history of the honey bee; colony inspections and more.

The cost is $125 and you can download a registration form at masterbeekeeper.org. For more information contact 607.255.3280.

♦OHIO♦

The Ohio State Beekeepers Association will hold their Summer meeting, June 18 at Kingwood Center in Mansfield. Watch for more details in the next publication.

The Art of Queen Rearing Short Course will be held May 12-13 in Columbus.

Registration is $175 and the deadline is April 15.

Instrumental Insemination and Bee Breeding Workshop will be held June 1-3 in Columbus.

Registration is $350 and the deadline is May 1.

Advanced Techniques Instrumental Insemination will be held June 15-17 in Columbus.

Registration is $350 and the deadline is May 15.

For further information on all of these courses contact Sue Cobey, 614.292.7928 or cobey.1@osu.edu.

♦PENNSYLVANIA♦

Pennsylvania Montgomery County Beekeepers Association will hold a seminar called *Bee Plants and Nectar Sources*, April 5 at the Montgomery County 4-H Center, Route 113, Creamery at 7:00 p.m.

Horticulturist and beekeeper Chick Culp will discuss and show images of the major nectar sources for honey bees in the mid-Atlantic region.

For information contact Jim Bobb, 610.584.6778 or JimBobb@act21.net.

♦TEXAS♦

The Texas Beekeepers Association Annual Convention will be held at the Omni Marina Hotel in Corpus Christi, November 10-13. More details will be published as they become available.

INNER ... Cont. From Pg. 49

then you know how those keystone folks exaggerate, right?).

Well, you can see what you can do with this if you choose. Go to the net and spend a few bucks and get some 'other' honey. And then capitalize on the luxury of 'Local.' It's worth its weight in gold (enrod), don't you know!

•

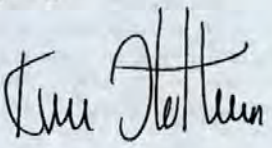
April is *finally* here. If you're way up north, it's gotta be May before Spring comes to stay, but here, it's Spring. Almost everyday, anyway.

There a million ways to measure the way seasons arrive and leave. Winter eases into Spring, often hesitant about letting go. Spring may suddenly be Summer, hot and dry and fast, or it, too, may linger, with cold rain and cloudy, windy days. Summer sometimes never lets go, and keeps Fall at arms length as long as possible, or it may just shut down, like a light switch switching off.

The way I know the season has changed – which to me is even more sure than the sun in my eyes in the morning drive during the equinox, is . do I need a coat to get the paper in the morning?

Long sleeve shirt – Spring and Fall. T-shirt, Summer. Heavy coat, boots and a hat – Winter

April, you should know, is when I shed that big, heavy, cumbersome coat. It's Spring!



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Dear Silas Dogood

Editor's Note: It gives me great pleasure to introduce to you a new feature, "Dear Silas Dogood." Due in part to the abundance of correspondence we receive each month, it seemed only appropriate to address some of questions and concerns that so many of you have regarding bees, beekeeping and other quasi-related topics. After an exhaustive search for the perfect beekeeping ambassador I am pleased to introduce you to Silas Dogood. Silas has proven to be a man of great wisdom, forethought and commonsense; he is a real Jack of all trades and the first to point out, master of none. Please feel free to send your questions to Silas, care of *Bee Culture* Magazine and look for his columns here in the future.

Dear Silas Dogood, I just joined my local beekeeping organization and I feel a little lost. The club is full of old timers who seem to take charge and bully us new guys. I'd like to learn more about bees and beekeeping, I've only been keeping bees for about 17 years. These fellows really seem to know their stuff, but they really get on my case because I don't treat chemically for mites and do other things different than they do. It's my hive; can't I do as I please? Sincerely, Ed Westhaven, NB.

Dear Ed, Why are you bothering another old timer to comment on the comments of other old timers? It is our nature to do what we please, including hollering at younger beekeepers. It's a sport I relish! That's how I got this job. Let me tell you what to do, which I thought you were trying to get away from in the first place. Keep your bees anyway you want. You don't want to treat? Then don't. No queen excluder? Fine. Mesh bottom board? Suit yourself. Stop getting bullied and roll up your sleeves for a good debate over the merits of each side – that's what those meetings are for! After a lively discussion and some good natured argument, agree to disagree and share a plate of cookies together

Dear Silas Dogood, My hive swarmed this past Summer and landed square on the neighbor's dog. Now this mutt has come on my property plenty of times and done his business so I think it's a fair punishment, but my neighbor disagrees. Once the fire department came, which I said was unnecessary, they removed the swarm and destroyed my bees! I think I'm entitled to be reimbursed for the cost of the bees by my neighbor and he's telling me to jump in a lake. What do you think? Sincerely, Tom, Oberlin, OH.

Dear Tom, Jump in a lake. Those bees are your responsibility, and that poor animal was surely terrified. I think you owe that neighbor at least a quart of Spring honey and an apology for your unkindness. After that, ask him nicely not to let the dog on your property because you're afraid it might get hurt. You don't have to mean it but you do have to say it – unless you want to plead your case in town hall. You know as well as I do that you can't control where those swarms end up, but they're still your bees so in the spirit of neighborly goodness and in the good name of beekeepers everywhere – do it.

Dear Silas Dogood, It's my wife! She's making me crazy. Every time I spend the day checking my bees she's all over me about spending too much time in the beeyard and never enough time with her She wants me to spend more time with her, but frankly I like my bees a whole lot more! Please help, Abraham, Little Rock, AR.

Dear Abraham, Well, now if I had a dime every time I heard some young man complain that his wife wants to spend more time with him and less time doing whatever it was that he was doing, I'd be writing to you from Tahiti. Let me just cut to the chase here and tell you that you're a fool. Of all the things two people could argue about, two people who married one another and agreed to love and honor all the days of their lives mind you, wanting to spend time together should not be one of them. Don't be angry with her It sounds like she loves you and only asks that you do the same and show it more often by spending a little time together You don't have to go shopping or to high tea but a little effort on your part here will reap great rewards. So put down the smoker, make some lemonade, and sit on the porch swing for a while with your queen bee.

Questions for Silas Dogood? Bee questions, family questions, neighbor questions, politics or even religion? Well, maybe not religion. Send them to Silas Dogood, care of this magazine. Maybe we'll be able to use them.