MAR 2005

Bee Culture

ROOT™
PUBLICATIONS
www.beeculture.com

Workers cleaning broken comb. (photo by Larry Connor)

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

MARCH 2005 VOLUME 133 NUMBER 3

FEATURES

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

Subscription Information

U.S., one year, $21.50; two years, $41. Newsstand price: $3.50. All other countries, (U.S. Currency only), $15.00 per year additional for postage. Send remittance by money order, bank draft, express money order, or check or credit card. Bee Culture (ISSN 1071-3190), March 2005, Volume 133, Issue 3, is published monthly by The Root Candle Co., 623 W. Liberty Street, Medina, OH 44256. Periodicals Postage Paid at Medina, OH and additional mailing offices.

Advertising

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

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

DEPARTMENTS & COLUMNS

KEEP IN TOUCH

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

MAILBOX

Why Queen Excluders?

Queen excluders do have some disadvantages, but they are not honey excluders. Extra equipment must be paid for and stored. They must be cleaned yearly, a boring chore. Keeping the queen out of the supers can be accomplished two ways; by a queen excluder, or a rim of honey across the top of the brood chamber. However, if you wait for a rim of honey, you will be late in supering.

Assuming that the beekeeper desires to maximize the honey crop, the most important factors are adequate supering in a timely fashion, and a strong colony of bees. Tests have shown that the hoarding instinct is increased by an increased number of empty supers. Bees will put honey in drawn comb when they would not draw comb. Each pound of wax costs you five to seven pounds of honey. Burr comb is a sure sign that you did not succeed in supering in a timely fashion. What this adds up to is that you should put on your supers early, before there is any rim of honey on the brood nest. If you do this without a queen excluder, the queen is likely to get in the supers. Swarming is caused by congestion of the brood nest by brood or honey. Supering early will help to prevent swarming. Any disturbance of the colony during a honey flow will cost you honey, so super early.

What makes a dark comb dark? The accumulation of waste material does. Tests have shown that dark comb does detract from the quality of honey stored. Check it yourself. Take a dark comb and let water stand in one side for 24 hours. Examine the color and taste of the water. Beekeepers, like ordinary people, enjoy wishful thinking. Brood in a comb is a magnet for wax moths. Para dichlorobenzene, a likely carcinogenic chemical, is absorbed by beeswax.

Super early and use queen excluders before and during the honey flow.

James McCaskill
St. Louis, MO

Assembling Frames!

I am a rank amateur to beekeeping and have been assembling beehives and frames in my basement. It has taken me over one hour per 10 frames to remove the wedge from the Dadant frames, scrape the wood underside the top bar to remove any excess, put the frames in a "Kelly Frame Nailing Device" (jig), apply glue to all joints, nail two nails per corner of each frame, insert the wired foundation, insert the wedge and nail the wedge with five nails. The time has been excessive. The worse problem is removing nails that did not properly go into the frame and which had to be removed and renailed.

I am an engineer who has studied structures. I realized that this way of assembling frames today is essentially 100 years old except that 100 years ago they did not have high strength glues.

"Titebond II" glue is made from polyvinyl acetate and a catalyst. This glue cross links upon drying and is water resistant. A typical wood/wood joint has about 3500 lb./sq. inch shear strength. With this strength it should not be necessary to need nails, unless nails are used to hold alignment which is not necessary with a Kelly jig.

I was easily able to assemble and glue 10 frames in about 10 minutes. I used two spirit levels with pipe wrenches on them to keep weight on the frame joints till the glue had set. This is this system's only disadvantage. The jig and frames cannot be moved for about one hour till a preliminary set has taken place. The solution to that problem is to buy several Kelly jigs at about $23 each if one wants to speed up production.

After the glue has set the frames can be removed from the "jig", the foundation inserted and each wedge nailed into place with five nails. This post glue step takes about two to three minutes.

The time for the assembly of full supers should be also be minimized using this system. Instead of using five nails per side of a joint, or 40 nails total for a super – one should need to only use two nails per side of a joint or 16 nails per super. The two nails are primarily to hold the super in correct alignment and intimate contact while the glue dries. I find that there is no glue applicator like a finger. Each surface of the joint gets an application of glue. Nothing could be tighter nor stronger. This approach saves time, nails and effort.

An advantage of this system is that the small "finger" at the top and bottom of the short side of the super, does not get nailed and can not be split as frequently happens when a 7d nail is sent through it.

I know of no supplier who offers wooden frames substantially assembled without foundation. There is no reason why a manufacturer could not offer substantially glued frames to the public at a profit. This would overcome one of the major problems with keeping bees, namely the large amount of time it takes to make the equipment. Beekeepers would not hesitate to have more hives if the labor problem were largely solved.

Plastic hives and foundation are currently used to solve this labor problem. This is an unsatisfactory solution because Honey bees really do not favor plastic, especially the foundation. I was born in 1943 and my mother told me that because they could not

Continued on Next Page

MAILBOX

get sugar in World War II, that I was brought up on honey. The time may come when plastic, which is petroleum derived, is not available. What do we do then? We go back to wood and glue!

Russ Walker
Phenix, VA

No Queens From Canada!

It is a well known fact that most beekeepers are solitary individuals rarely asking for help and preferring to sort matters and problems out for themselves. This is one of those rare occasions where I request help from the beekeeping community.

There is recent legislation in the U.S. enacted on Oct 21 2004, to the USDA and APHIS Federal Registry, Vol 69, No.203 dealing with the importation of queen bees into the continental United States.

While not an outright ban, which would be contrary to the WTO and NAFTA agreements, this legislation is so draconian in it's conception to make it difficult if not impossible for small/average queen breeders to comply with.

If as I suspect, it is more about trade protectionism, then this document has been extremely well crafted.

A brief overview might be helpful. Each shipment to the U.S. has to be accompanied by a health certificate, the inspection no more than 10 days before shipment. So a weekly shipment, as in our case, will necessitate weekly inspections of our yards, and each shipment has to be accompanied by invoices and export/health certificates. The package has to be sent through a recognized port of entry to enable each and every shipment to be inspected by an APHIS inspector, if the shipping method doesn't meet with his approval, then it can be destroyed at the shippers expense!

The importer now has to apply, in plenty of time, for an import license, to the appropriate authority. Then the necessary parts of the legislation have to be initialed and returned to the authority for onward transmission to the port of entry, in time to meet the shipment with all relevant information regarding who, where and when.

I will agree, each point is not insurmountable, but can you imagine the paper trail necessary to send a single queen to a beekeeper in Ohio? At the same time I very much doubt whether that same beekeeper would even make the effort! As I stated earlier, this legislation is extremely well crafted and is just another nail in the coffin of 'free trade.'

The legislation comes at a time when the border has been opened to allow US queens into Canada, but these restrictions are considerably tougher than the equivalent legislation out of Canada. Another interesting point of argument. The paper states it is impossible to keep bees over Winter in Alaska, yet we have a customer who has achieved just that using queens from Canada. It would appear the legislation is crafted on flawed data and needs reconsideration.

I don't feel I want to get involved in rhetoric regarding keeping the border open, just to say, in my opinion, it is a retrograde step by the industry and while I do not agree with 'tit for tat' action regarding trade it is extremely tempting. If this is the treatment to a 'friendly neighbor' then God help your enemies.

Now comes the uncomfortable area. We have to cancel all queens currently on order and there are a number of you on our files, refund all monies held in trust, and finally apologize for any inconvenience created by us, via the U.S. government.

If you agree with this position I would encourage each and everyone of you to get involved, write to your congressman, and protest at the injustice. It is your livelihood which is at stake.

David Eyre
The Bee Works
Orillia, Ontario, Canada

Experimental Cure

In the Summer of 2004 we obtained from another beekeeper 100 deep boxes of drawn comb in which the bees had died the previous year due to American Foulbrood (AFB). We could see the scales of the dead larvae in the bottom of the cells. The first of July is the middle of Summer in Idaho, which is in the northwest section of the United States. For our experiment we put a box with three frames of mostly sealed brood without bees above an excluder, on top of the parent colony using the before mentioned diseased boxes and AFB contaminated frames now mixing the AFB frames into the parent hive. The following morning after the bees

MAILBOX

had come up through the excluder to cover the brood, we removed the top box with three frames of brood and adhering bees and relocated them about four miles away. As we unloaded the hives we gave them a newly mated caged queen and a gallon of corn syrup. We now had a total of 200 AFB contaminated hives since both the parent and the nuclei have AFB frames. Each of these hives received a generous two tablespoons of Tylosin® and Terramycin® mixed with powdered sugar. We treated all of the contaminated hives every 10 days with the Tylosin®-Terramycin® mix for the rest of the Summer and into the Fall. In October, we reduced the colony to two hive bodies and gave each hive a gallon of corn syrup medicated with Fumidil-B®. These hives were middle to late Summer nuclei. They did not make any honey, but cleaned out most, if not all of the AFB scales and made a good cluster to go into Winter.

In beekeeping in the western United States with cheap or non-existing honey prices those commercial beekeepers that are still in business rely heavily on pollination, especially the almonds in California, to stay in business. This requires bees being held in staging areas of 500 to 5,000 hives in a one-mile radius. Since there are so many bees in such a small area and very little bloom the bees often rob one another thus spreading American Foulbrood.

Before Tylosin® became available the AFB colonies that we found each Fall were on the increase. Since we have started using Tylosin® in our Terramycin® powdered sugar mix our AFB dead have been drastically reduced to four or five hives per year for the 3,000 hives we operate. Our experiment has shown the effectiveness of the addition of Tylosin® to our normal Terramycin® powdered sugar dust disease treatment.

Golden MIllet
Marsin, ID

Better Bear Fence

In response to Peter Krulewitch's letter in the November, 2004, issue of Bee Culture I'm enclosing photos of my beeyard. This set-up has been successful in preventing depredation by our bruin friends.

I, too, suffered two visits by the bears several years ago. I had tried barbed wire. I could show examples of great tufts of bear fur left on the wire as they squeezed through my fence. Electric fencing, however, has been completely successful. My friends have been back, too. I know because I've seen their tracks around the beeyard.

There are many ways to build an electric fence. The photo shows several features that I think are important. One is the fiberglass poles which make support of the wire easy and durable – no worry about wires coming loose from the insulation because the wires are passed *through* the pre-drilled holes in the poles. Another is the use of stainless steel wire – very strong and able to carry lots of current to my friend's nose. Also, the lowest foot or so of the fence and the ground two feet around the fence is covered with ½-inch hole chicken wire. This is attacked to the grounding system to provide optimal ground contact. This chicken wire also keeps another of my previous visitors out – skunks. Every other wire in the fence is actually a ground wire, again to improve ground return of the current as the soil at my site is sandy. Finally, I use three 10-foot grounding rods spaced around the yard to assure good soil contact.

The charger that powers the system is available in many different sizes and can be battery powered, or solar plus battery or plugged into an electric outlet. These boxes deliver pulses of energy to the line in shockingly high voltages. Most will put out about 5,400 to 5,800 volts. This sounds dangerous but it's actually not because the energy pulse is very, very short, much less than a second in duration. The actual energy output is measured in Joules. I presently have a 4.5 joule plug-in charger because I also power a horse pasture fence with it. This much energy is more than I need even for that application but I wanted to "be sure." I have used a 0.8 joule solar charged battery system with good success in the past. But I'd advise something stronger, about 1.5 joules, just to be sure. I prefer the plug-in type to the battery because I never have to worry about a dead battery. Remote beeyards, however, require the solar power and battery charger if an electric line is not nearby to connect to.

For those interested in electric fencing you can find a good source of information at www.kencove.com where you can also buy the equipment. For those of you still keeping your bees in skeps you can write to them at 344 Kendall Road, Blairsville, PA 15717,

Mark Robia
Bemidji, MN

Regular or High Test?

I enjoy *Bee Culture* very much. I'm sending you some pictures of bees that made their home in a gas tank of an old truck.

Robert Sharpe
Newbern, TN

Continued on Next Page

MAILBOX

Beginner's Guides

I am a beekeeper and a member of the SCA (Society for Creative Anachronism, Inc.) (http://www.sca.org/). I have started a guild of beekeepers in the SCA and would like to provide directly, or through links to, Beginners Guides to beekeeping. There is not much out there, and what there is does not have a monthly step by step format for a beginner. The reason I am writing you is to ask your help getting the beekeepers of different states to tailor a guide for their state following an agreed upon basic guide such as this one (www.easttexasbeekeepersassociation.com/guide booketba monthly guide book.htm). I have the permission of ETBA to do this. I would like to provide this on my guild site as well (zeidlerguild.bravehost.com/getbook.htm).

James Brown
Texas

No Drugs Here!

Being a dealer for Mann Lake Ltd., I make many trips to their Hackensack, MN production plant. Usually along the 200-mile trip. I meet fellow beekeepers and sell them usually what is in season at the time.

This past May I had finished selling package bees and was now selling nucs and queens. I made arrangements with several customers en route to Hackensack to drop off nucs and a couple of queens. The five-frame nucs had to be transferred from my equipment to theirs. At every stop, I would don my beesuit, light my smoker, transfer bees, some quick advise, payment for the bees and off I would go.

One of my last stops was near Brainerd, MN. I met a new beekeeper in a gas station. I surveyed the immediate area for a good bee transfer place away from civilians. I noticed a chained driveway at the entrance of a BMX track down the highway. We were lucky that the driveway had enough room for both of our vehicles.

I put on my beesuit (the kind with the self supporting veil), got my smoker going and started the bee transfer. We had finished the transfer and were talking bee strategies when a county sheriff pulled up. He got out of his car and asked us what we were up to. I explained to the deputy that we were transferring bees. I pointed to the nucs in the back of my truck and the many bees airborne around us. He quickly surveyed the scene and must have realized no one could make up a story like that. As he was making a hasty retreat back to his car he told us that he got a call from his dispatcher. He was told that two people were on the side of the road wearing white coveralls and masks and were cooking methamphetamine.

Jim Kloek
Nature's Nectar Inc.
Stillwater, MN

Shredded BC Cover

I was a little dismayed the other day when I opened the

MAILBOX

mailbox and looked at my copy of *Bee Culture*. The whole magazine looked as if it had been sent through a paper shredder. I don't know what they do with these magazines at the post office, but being gentle with them is apparently not high on their priority list.

As both a collector and a reader of your magazine, I feel that it is your obligation to make sure your magazine arrives in good condition. Have you considered putting them in a protective sleeve like the *American Bee Journal* does? While I don't necessarily like generating tons more of plastic, something needs to be done. Possibly a heavy paper wrapping would do the job?

Thanks for an informative and interesting magazine. I hope to be a collector/reader for many more years to come.

Christopher A. Petree
Yadkinville, NC

***Editor's Note**: We've explored the techniques you've mentioned, plus several others, but have passed on all of them. Here's why. In the front of this magazine we proudly display two logos. One, recycled paper, the other, soybean oil ink. And though you don't see it, we're printed in the U.S. We really try to not abuse the world, and the people in it.*

Adding a plastic cover, or even a paper cover, uses additional resources – plastic, paper pulp and the energy to make them. Paper is a renewable resource, but why use more than necessary? Plastic, well, it's here for life. Several lives, actually. There is a corn starch based plastic that is biodegradeable if it comes in contact with water, we are exploring, however, but all add to postage costs, which, I add carefully, you pay for.

As much as we would like to add additional protection (we do take pride in our covers), the Post Office actually does a pretty good job when delivering our magazine. Occasionally they mangle one though, and we are happy to replace them. We replace a dozen or so every month for that reason, at our expense. In the long run it is much less expensive, in resources, in landfill, and in actual dollars for us to do so. We hope you understand.

Teaching With Richard

I've been teaching beekeeping classes this past year (five times). One of the textbooks we use is Richard Taylor's *How To Do It Book Of Beekeeping*. I understand that this book is out of print now, so I wrote to Linden Press, Interlaken, NY, encouraging them to reprint that book because it was such a good book.

I received notification that they had gone out of business and that I should encourage you to reprint it. I hope you do.

Thanks for your good magazine.

Paul Ekblad
Grantsburg, WI

***Editor's Note:** Lloyd Spears, a long time friend of Richard's has undertaken the task of updating the last edition. He tells me it will be ready this Summer. Watch for his announcement when he completes the task.*

INNER COVER

Cell phone conversation overheard in the parking lot of a popular diner, somewhere in the valley, February, suppertime . . . . .

Yeah?

Oh, hi. They must be getting pretty close. A couple days maybe?

I just got here. Still on the truck.

What? Yeah. Them 300 are ready, like I said before I left. Good shape, too.

$60. Like you said before Christmas.

More? Yeah, actually. A couple hundred. Smaller though. Smaller than you wanted. Sixes mostly. Some less. Lookin' for a home though, you know. . . .

What? What? Hello? Say again! Jeeze, I hate this thing. What?

Oh, OK. You want 'em all? Really? I got 515 when I left.

Well. We been doin' this a long time. What were you thinkin' on those extras, now?

Ummmmmmmm . . . .

Well, I was thinkin', maybe the whole load for, say, $120? That'd be fair, don't you think? Round numbers. Easy. They're all healthy. No duds. No ants. Already been checked. An' I hear they're real short 'round here.

No? Well . . . .

Yeah. Yeah. Ummmmmm . . . .

(Lights a cigarette, takes a long, long, draw)

Yeah. $100s OK I guess. That'd work. That's the whole load though, right? Yeah, that's easier all 'round. Sure.

Right. Sure. Tomorrow works. Fax me the map. Gate's open?

I'll call ya when they're in.

OK. OK. Don't worry. We got ya covered.

Bye. Thanks.

•

I made it back to the two hives that sit at the far end of the yard in early February. I hadn't been there since before Christmas for a close exam. Though, with binoculars I can see them from the house. I use those to check covers and entrance reducers.

Two significant snowfalls, lots of north wind and long stretches of cold have taken their toll on lots of bees in this part of Ohio this year. Mine were not excluded. Though stressed, one was still alive when I checked. The top super (a medium, sitting on two deeps) was full, still. It didn't look like it had been touched. Peering into the blackness below I could just see movement, and a couple of workers walked up to see what was going on. I didn't check further.

The other wasn't so fortunate. What happened was clear, but why, wasn't. An autopsy was due.

This is an eight-frame colony in its second Winter. Started from a package, it produced two supers, crammed full, its first season, plus two left behind to Winter on that first year. A late Summer sticky board that first year showed about 100 mites/day were falling naturally, so Apistan was added, left in and removed at the right time. A follow up sticky showed three mites/day – the Apistan worked just fine. (Drone comb frames were started this year, but a screened bottom board was in place.)

The following Spring a grease patty was added, it was requeened (I try to do this every year) early, supers added on time and this past Summer two full supers and one Ross Round were harvested, before July 4th. Plus, the drone comb was removed on a routine basis.

Then, Summer ended in early July. The honey flow ended. Nothing the rest of the season (including drone brood). A late Summer check showed hardly any mites, but it was feed, feed, feed all Fall. Nothing else came in.

Here's my guess. Not nearly enough pollen came in to support a population of going-into-Winter bees. It was obvious they quit raising drones, but there was a little worker brood the rest of the Summer.

How healthy? Good question. Healthy enough? Probably not. A nutritionally challenged larva turns into a sub-developed adult with less than perfect glands to produce less, or less-than-perfect brood food. The rest of the story is predictable. Winter bees were underfed.

This happens, too, when late season worker larva are attacked by *Varroa* (drone population is decreasing, *Varroa* population is increasing and they go to worker cells). Sub-developed workers are less able to tend those in the next generation who will be Winter bees and, as they say, the rest of the story is predictable.

If your colonies showed nothing wrong, except dead bees, check your notes to see when you treated. Maybe it was too late last Summer. And the rest of the story is predictable.

•

The erosion continues. 13,390 farms disappeared last year. Poof. Gone. New roads and Wal-Marts, houses and hospitals, schools and parking lots consumed 2,050,000 acres of what was always prime farmland. People don't build on the gullies and lowlands, on the hills and gravel banks that grace our land, but rather, they take the best land closest to town. The orchards and fields that once fed us our daily bread.

In the last 10 years those numbers have become obscene. 84,220 farms have been swallowed by development and greed, covering 29,335,000 acres of land we once used and will no more.

In this huge country those are tiny percentages of what we have. But each year a tiny piece is lost. Each and every year. It won't stop. Nobody wants it to. Not anymore.

•

March – Mega meeting month. Meetings, meetings everywhere. Get to at least one, somewhere. Your bees will be glad you did.

Kim Flottum

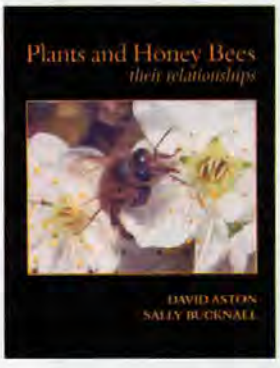
March Madness

MORE NEW BOOKS FOR 2005

Plants and Honey Bees – Their Relationship. David Aston and Sally Bucknall. Soft cover, 7½" x 9½". Color and black and white, 151 pages. Northern Bee Books, UK, ISBN 0393308790. $35 from *Bee Culture* Books.

Every beekeeper becomes a botanist, a horticulturist, a pollination expert, a honey connoisseur, a pollen specialist and an environmentalist, sooner or later. Plants and bees go hand in hand, and the more you know about all the kinds of flowers your bees interact with, the better able you are to understand what's going on in your hive.

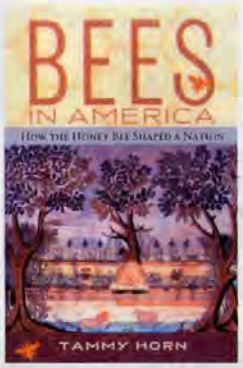
This book is especially for beekeepers who want to know the fundamentals and more advanced aspects of floral biology. Chapters cover flower structure, nectaries, nectar, pollen, honeydew, propolis, foraging behavior, pollination, bee forage and conservation.



Clean and understandable line drawings demonstrate floral structures, and how bees utilize the nearly infinite variety of flowers available. A very complete and useful glossary, and many tables make the information understandable, and more important – useful.

Bees Is Bees. John Kopecky. 5½" x 8½". Soft cover, color. Self published and from the author, 3206 Grimms Road, Reedsville, WI 54230.

This is a short reminiscence of being the child of a serious beekeeper in the 50s, and 40 years later, deciding to try it out. The author is about the same age as I am, and I enjoyed the walk down memory lane. Do you recall when your family had 'The Good Car?' This small contribution is good to have for the similarities in the lives of many late bloomers.



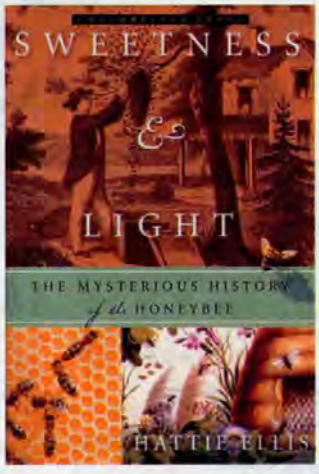
Bees In America – How The Honey Bee Shaped A Nation. Tammy Horn. 6"x 9". Black and white, 368 pages, hard cover. ISBN 081312350X. University Press of KY. Available from *Bee Culture* Books, $30.

If knowing more about the history of the honey bee, honey, beekeeping, beekeepers, bee things, and more bee things is what gets you up in the morning, you will love this book. It is a nearly 400 page sprint from colonial bees to the almond pollination extravaganza of 2004. The pace is nearly frantic, and incidental and monumental events covered rush by.

And there are so many to rush by. Four parts cover bees from Europe to the New World, Colonial America, the ambitious and inventive 1800s, and the 20th century.

Though you've read some of this before because everybody who writes about bees includes the obvious – for instance – tanging, women beekeepers, Sylvia Plath, Langstroth, *Fried Green Tomatoes* and the invasion of African Honey Bees. All familiar topics to seasoned bee readers. Not, however, completely. There are a million (well, close) tiny events sandwiched between these that tie them together, affect their importance and add depth and breath to the story of the honey bee.

That honey bees helped shape America cannot be disputed. Here are many of the ways they worked their magic.



Sweetness and Light – The Mysterious History of the Honey Bee. Hattie Ellis. 5½" x 8½". 288 pages. Hard cover, black and white. Harmony Books ISBN 1400054052. $25 from *Bee Culture* Books.

This book is going to be popular. Not because it is cutting edge anything though. The content is tried, true, interesting, illuminating to a degree for a well-read beekeeper (very illuminating to someone never having read about bees), and truly well written. Poetic prose, almost, but not quite. It covers some of what *Bees In America* covers, but not nearly in the same detail, and it's not nearly as serious.

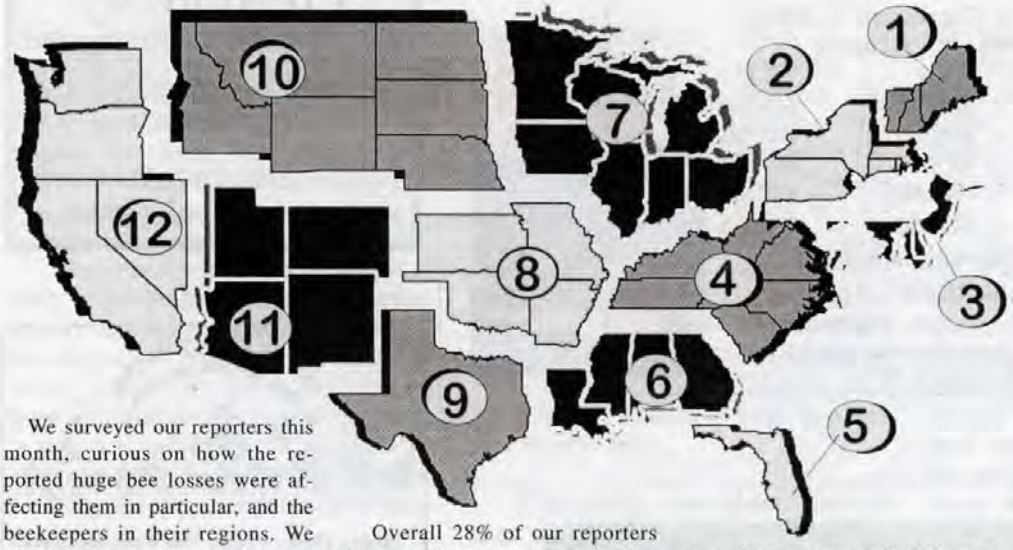
The world will enjoy this book as it covers much of it, from the perspective of one learning about bees, beekeeping and honey for, it seems, the first time. And, interestingly, the authors, Horn and Ellis, follow similar paths, draw similar conclusions, and offer similar speculations. The difference is coverage – Horn stays closer to home.

Sweetness and Light is a pleasant read, slow, meandering, sometimes unguided. Unbiological by choice. Tammy Horn's book is a rush to capture all that exists before it is gone. Both strategies have merit and deserve attention.

A note to the publishers of *Sweetness* – Graphic designers being what they are, a fly on the cover that *looks* like a bee (but is a fly), is close enough, doesn't work. That's a bad detail to miss, but then, most people don't know the difference. Let's hope they fix it before the second printing.

All Books Postpaid In The U.S.

MARCH – REGIONAL HONEY PRICE REPORT



We surveyed our reporters this month, curious on how the reported huge bee losses were affecting them in particular, and the beekeepers in their regions. We asked how losses compared to previous years, what percent loss they had experienced so far (late January – when the reports started coming in daily especially from the western states). We also asked what replacement plans they had (none, replace some, all or more than before), and how they planned to replace colonies (splits, packages, buy colonies). And finally, we asked what a five-frame nuc was worth to them – unfortunately we didn't specify buying, or selling, but the numbers are interesting nonetheless.

Overall 28% of our reporters have, so far, colony losses exceeding normal losses. 48% are right where they expect to be, while 24% are below normal losses. Northern Regions 1, 2, 7, and 10 on average have so far a 22% loss. Southern Regions 5, 6, and 9 have a 20% loss. Central 3, 4 and 8 had 19% loss, while 11 and 12 have by far the highest losses, but then only 33% (I use *only* carefully here).

Looking at it another way, as one commercial beekeeper explained, it's an east/west thing, not north/south. Let's see. East would be 1, 2, 3, 4, 5, 6, which had 20.1% loss. Central, then, are 7, 8, 9, which have 20.5% loss. Western, 10, 11, and 12, which have 30.2% loss. Seems there's some truth to the western problem. Remember, this is data from late January and the next month things change.

Too, recall that most of the bees in the U.S. are in the west, so that a 30%, or 33% loss represents a lot of bees. Half the bees in the U.S. are in California even yet, and if, indeed, 30% of those have been lost (and it seems probable that is the case), that comes to something like 17% of all the bees in the whole country. Just in California.

Scarier still, if you take all losses across all regions, you end up with one hive out of five empty, in January. 20% across the board. Imagine if that were beef cows. Recall what happened when four cows from Canada were diagnosed with BSE.

What will beekeepers do this Spring? 6%, nothing. 17% rebuild some, but not back to where they were. 53% will go back to where they were. 24% plan to expand. Three quarters will be the same or bigger, but a quarter won't. Smaller. Or, as one said, gone.

Splits by far are the replacement of choice, with 64% rebuilding this way. 28% will get packages, and 8% plan on buying colonies.

Finally, what is a five-frame nuc worth. Well, overall, our reporters put a price of $56 on one. That seems low, since a three-pound package is, on average $60 plus freight. But, unfortunately, we didn't ask, buying, or selling. They are different prices.

Right at press time we had a report of ELA at $0.52/lb., down nearly $0.50 from just a couple months ago. The prices in the report don't reflect that rapid a drop. They probably will in a month.

	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	Average	Month	Yr.
Wholesale Bulk													Lowest - Highest			
55 gal. Light	1.01	1.13	1.01	1.13	0.95	1.08	1.19	1.01	1.01	0.98	1.20	1.21	0.95-1.21	1.08	1.09	1.47
55 gal. Amber	0.94	0.93	0.94	1.00	0.65	0.83	0.92	0.94	0.65	0.65	1.10	1.08	0.65-1.10	0.89	0.95	1.27
60# Light (retail)	95.00	116.70	110.22	96.25	85.00	102.50	102.63	93.33	120.00	110.22	125.00	109.00	85.00-125.00	105.49	110.25	103.03
60# Amber (retail)	122.50	106.65	109.29	94.44	83.00	93.67	99.57	95.00	100.00	109.29	123.50	104.00	83.00-123.50	103.41	100.03	95.15
Wholesale - Case Lots																
1/2# 24's	42.84	41.50	39.73	36.85	39.73	37.00	38.39	39.73	39.73	35.76	29.20	34.32	29.20-42.84	37.90	40.42	37.52
1# 24's	54.28	58.06	57.60	53.84	52.28	45.00	59.36	60.80	49.82	76.80	74.40	66.48	45.00-76.80	59.06	59.57	58.07
2# 12's	51.72	57.99	55.20	50.20	44.40	55.00	51.49	60.15	42.28	57.84	48.00	59.44	42.28-60.15	52.81	52.71	52.28
12 oz. Plas. 24's	53.16	53.90	54.00	52.90	41.25	52.00	47.50	50.00	45.63	47.64	65.70	51.44	41.25-65.70	51.26	50.95	49.00
5# 6's	53.41	54.75	64.44	53.83	64.44	60.00	59.03	52.50	54.60	56.43	57.00	63.90	52.50-64.44	57.86	57.61	55.03
Quarts 12's	82.92	100.35	82.20	75.38	76.18	78.25	81.19	76.00	81.00	100.25	84.20	81.76	75.38-100.35	83.31	82.64	78.10
Pints 12's	55.33	49.95	54.60	51.13	44.25	47.25	50.07	44.00	42.20	54.50	54.00	51.96	42.20-55.33	49.94	49.12	48.99
Retail Honey Prices																
1/2#	2.35	2.40	2.66	2.56	2.87	3.00	2.23	1.89	1.89	2.54	2.67	2.38	1.89-3.00	2.45	2.37	2.48
12 oz. Plastic	3.45	2.96	3.50	3.19	3.31	3.08	2.85	3.39	3.24	3.23	3.45	3.07	2.85-3.50	3.23	3.12	3.10
1 lb. Glass	3.35	3.57	3.95	3.82	3.95	3.87	3.40	4.13	4.07	4.00	4.09	4.00	3.35-4.13	3.85	3.85	3.71
2 lb. Glass	4.95	6.09	6.49	5.94	6.53	5.99	6.11	7.25	5.85	7.15	5.62	6.93	4.95-7.25	6.24	6.76	5.90
Pint	4.88	6.88	5.95	5.12	5.09	7.00	5.41	5.33	4.90	6.95	4.96	6.16	4.88-7.00	5.72	5.54	5.64
Quart	8.13	8.55	9.50	7.80	7.88	10.13	8.62	8.43	8.25	10.95	8.36	9.59	7.80-10.95	8.85	9.14	8.69
5 lb. Glass	11.63	13.47	12.46	12.50	12.00	11.25	12.95	14.95	12.99	14.06	13.20	13.70	11.25-14.95	12.93	14.31	12.68
1# Cream	4.00	4.98	4.74	4.40	4.74	3.95	4.43	4.68	3.99	5.15	5.25	4.08	3.95-5.25	4.53	4.61	4.42
1# Comb	4.50	4.43	4.75	5.15	5.86	4.00	5.65	4.99	5.86	6.25	6.00	5.38	4.00-6.25	5.23	5.01	4.85
Ross Round	4.51	3.85	3.60	4.65	4.51	3.75	5.06	4.99	4.51	4.50	5.50	3.45	3.45-5.50	4.41	4.92	4.64
Wax (Light)	1.92	3.00	2.25	1.96	1.30	2.10	2.26	2.50	2.50	2.48	1.98	2.38	1.30-3.00	2.22	2.47	1.79
Wax (Dark)	1.67	2.60	2.08	1.66	1.25	1.95	1.75	2.25	2.15	2.59	1.85	1.87	1.25-2.60	1.97	1.98	1.56
Poll. Fee/Col.	45.00	41.50	40.00	36.67	37.50	42.50	43.56	40.00	60.00	54.03	55.00	59.50	36.67-60.00	46.27	48.93	41.40

RESEARCH REVIEWED

Explaining • Defining • Using

Steve Sheppard

"More on resistance reversal and tiny . . . Russian . . . flies."

The rapid development of pesticide resistance by the parasitic mite, *Varroa destructor*, is well known. Mite resistance to the active ingredient of Apistan®, fluvalinate, is widespread in the United States and many other countries. In a recent scientific note, two researchers (Elzen and Westervelt, 2004) provided additional evidence that the process of resistance is somewhat reversible, if a period of "abstinence" from the pesticide can be maintained. To set up the experiment, they started with a population of honey bees from Florida that was highly resistant to Apistan. In initial assays for resistance, only 10% of the mites from this population were killed by fluvalinate. They established two apiaries of eight colonies each from the population and treated one of the groups twice with Apistan® over a nine-month period. The other group was designated as unselected and was not treated with Apistan®. After nine months, mites in the twice-treated group were still resistant to Apistan®, whereas the mortality of mites in the unselected group of colonies had increased significantly to 50%. The authors considered the increase in susceptibility to be modest. However, the results of this study also suggest that mite control programs that rely on chemical treatments should most definitely rotate the treatment being used. In cases where a program can provide an adequate period of non-exposure to the active ingredient fluvalinate, even when mites were known to be previously resistant, there may be death after life for mites that face Apistan®.

•

How small can you go? Beekeepers often are faced with small clusters of bees after winter or tiny swarms and may think wistfully about the minimum size needed for a "colony" to survive. In truth, beekeeping experience teaches us to not attempt to keep colonies on that edge of minimalism and we prudently combine small clusters or swarms or otherwise supplement their numbers. However, for research purposes related to automated observation protocols, there is some interest to study colonies at their smallest and presumably simplest form. Working in this area, several researchers from Austria recently published results of a study where they attempted to find the minimum number of bees that could successfully care for brood (Hergouth et al., 2004). The authors established "dwarf colonies" ranging from 20-120 bees and, under various conditions of foraging and queen status, measured a number of parameters including brood sealing rate and survival rate of adult bees. They reported that the minimum number of bees needed to care for brood was 120. With fewer individuals than this, the bees often sealed brood that was underweight or otherwise damaged. No information on the honey production from 120 bees was provided.

•

Evaluation of the so-called "Russian bees," a strain of honey bee imported from the Primorski region of far-eastern Russia, is ongoing by the U.S. beekeeping industry and hobby beekeepers. This bee was selected for importation in part due to its "prior association" with *Varroa destructor*, whereby a century of contact between parasite and host likely resulted in some measure of tolerance or resistance of the bee to the parasitic mite. In a recently published abstract, researchers reported the preliminary results of an experiment to compare various Primorski lines of honey bees to Carniolan honey bees in Germany. The researchers set up 149 colonies divided among 12 Russian and three Carniolan lines, infested each colony with 160-180 mites and evaluated the colonies for colony temperament, swarming tendency and mite infestation during the study. Of the three Carniolan lines, two were part of an ongoing selection program for resistance to mites and one that was "unselected." After 10 months of study, the researchers reported a high degree of variability, but noted that the line unselected for *V. destructor* tolerance performed poorly compared to the others. They found infestation rates of about seven mites/100 bees in the unselected line compared to about four mites/100 bees in the two selected Carniolan lines and about three mites/100 bees in the Primorski lines. However, under the local conditions in Germany, the Primorski lines exhibited significantly higher swarming tendency and were considered slightly more "nervous." This study shows that selection of honey bees for tolerance to mites

Continued on Next Page

is effective and appears to work across geographic distances (at least within the temperate zone). However, fine scale "tuning" of the bees, by selecting appropriate swarming traits and gentleness under local conditions may be worthwhile.

•

Not to worry – but there is a fly on the loose. While we typically lament the loss of innocence in beekeeping associated with the introduction of *Varroa destructor* into this country, it is always worthwhile to realize...things could be worse. In an interesting observation from Borneo, several researchers reported that three local species of honey bees (*Apis cerana*, *A. koschevnikovi* and *A. dorsata*) are host prey for a parasitic fly *Physocephala paralleliventris* (Tingek et al., 2004). Prior to the discovery by these researchers, the host of this fly species was unknown. The authors report that the apparent mode of action of this fly is to hang around the entrance and then "swoop down" to contact an adult bee and deposit an egg on it. The larva then develops within the body of the host. Parasitized adult bees can be found crawling around on the ground under the hive or nest. Using a dead bee trap, the authors reported that the infestation rate in dead bees being removed from three colonies of *A. cerana* was 50%, 63% and 90%. While it is too early to estimate long-term damage from the fly, the authors concluded that infestation by the fly "certainly will cause losses to the bee colony."

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

Elzen, P and D. Westervelt. 2004. A scientific note on reversion of fluvalinate resistance to a degree of susceptibility in *Varroa destructor*. Apidologie 35: 519-520.

Hergouth, M., M. Petz, T. Schmickl, and K, Crailsheim. 2004. Minimised structural complexity of honey bee colonies (abstract). Apidologie 35: 544-545.

Berg, S., Fuchs, S, N. Koeniger and T. Rinderer. 2004. Preliminary results of the comparison of Primorski honey bee lines (abstract). Apidologie 35: 553-553.

Tingek, S., Koeniger, G., Koeniger, N. and M. Gries. 2004. *Physocephala paralleliventris* (Conopidae), a parasitic fly of three *Apis* species in northern Borneo (abstract). Apidologie 35: 549-550.

Mark Winston

Venomous Statistics

"I have had 28 graduate students during my career as a professor, and five of them have had to terminate their research due to serious reactions to bee stings."

I have spent much of my professional life in the world of statistics, paying attention to how averages and analyses help us to probe the mysteries of nature. My students know me as "that data nut." The sight of a graph presenting results from a new experiment will stop me dead in my tracks, and whoops from my office usually mean statistically significant numbers have emerged.

I'm not thrilled with every data set, though, and there's one batch of numbers that continues to perplex and disturb: the statistics concerning anaphylactic reactions among my students. If there were world records to be achieved in the Laboratory Olympics, my lab would be gold medal in the category of anaphylaxis, stings down.

I have had 28 graduate students during my career as a professor, and five of them have had to terminate their research due to serious reactions to bee stings, a high 18%. More significantly, astounding actually, since 1998 I have had five of 11 graduate students end up in the emergency ward with anaphylactic reactions, a whopping 45%.

Oddly, all of these serious incidents occurred in the last seven years, with no reactions from my students during the first 18 years of my career. How unusual is this cluster of sting reactions? Conventional wisdom points to fewer than 1% of the population responding to bee stings with serious reactions, so my 45% reaction profile is whopping, indeed.

We did have some sting reactions from spouses in the early 1980s, my wife for one. Her reactions progressed through the classic local swelling to whole-body reactions, when she had a mild anaphylactic reaction we decided the bees in the backyard had to go, and the Ana kit became standard gear when leaving the house.

Harold, husband of my student Liz, had a more extreme and sudden reaction. He had helped Liz with her research for a full season, and the following Spring was stung in the head and knew immediately that he was in trouble. Fortunately Harold was a dental student at the time, and more fortunately I had insisted that all my students carry anaphylactic kits even then. Harold injected himself with epinephrine, and then Liz whisked him off to the hospital.

That was about it until the late 1990s when a cluster of heavy-duty reactions to bee stings hit. Four of my five anaphylactic graduate students were close to the end of their research, and with the help of other students were able to finish their degrees. The fifth was just beginning her first field season, and after an agonizing year of soul-searching, wisely decided to give it up and work on beetles instead.

Two of the five had reactions to bumble bee stings, actually three since one of the others decided to see whether she would cross-react to bumble bees after an anaphylactic episode following a honey bee sting. Result: a second trip to the hospital by ambulance after another life-threatening reaction.

The good news was that we have always taken bee stings seriously, and insist that all of our students and employees go through a sting seminar prior to doing field work. Thus, everyone involved in these anaphylactic incidents knew how to recognize the signs of a reaction, carried sting kits, and responded appropriately at the first signs of a reaction.

Well, almost everyone. One student was wise enough to call for help, but did argue with the paramedic in the ambulance all the way to the hospital, insisting that she wasn't having an anaphylactic reaction. Denial, of course, is a classic symptom.

We also insisted on stinging every potential student in the laboratory a few times prior to the field season, reasoning that we preferred any reaction take place where medical help was quickly available rather than at a remote field site. Unfortunately we decided that we should consult the university health service about that practice, and they quickly nixed our pre-field sting test due to liability concerns. For odd legal reasons, the university might be liable for damages if we deliberately stung a student in the relatively safe laboratory environment, but not if they were randomly stung out in the field, far from medical help.

This cluster of student anaphylaxis is unprecedented in my experience, and that of my colleagues. All of us in bee research have had a student or two with bad reactions, but for unexplained reasons my laboratory has been more afflicted than most. As a result, I've had more than my share of conversations with emergency room physicians, nurses, and allergists, and discovered to my chagrin that not everyone in the medical community is up to speed on bee sting allergies.

We've run into some fine physicians, and over the years have learned who to avoid and who to seek out for treatment. Oddly, allergists are often the most poorly informed, while it's the front-end emergency room doctors who seem most aware of immediate and long-term treatment options.

All of my reacting students decided to undergo desensitization treatments, which basically involve receiving weekly, biweekly, then monthly shots with increasingly

Continued on Next Page

"This mother-lode of anaphylactic data mining addressed a critical question in post-reaction treatment: do children outgrow allergies to insect stings, and if so is desensitization treatment uncessary?"

high concentrations of bee sting allergens. Treatments are considered successful if patients can tolerate one or more bee stings without an anaphylactic reaction, a level most reach within one to three years of treatment.

I've learned that the statistical rigor with which we approach bee research in my laboratory is not matched by how the medical community approaches clinical research. It's astounding, scandalous really, how decisions about treatment are made based on little data and no statistics.

I'd be laughed out of the bee research community if I tried to publish studies based on observations from three bees, with no controlled experiments. Yet, much of what allergists base their treatment recommendations on come from reports in the medical literature about one patient who presented with such and such symptoms, or three patients over 20 years who showed a similar pattern.

Thus, it was with amazement that I came across a recent study by David Golden, a physician from Johns Hopkins Asthma and Allergy Center in Baltimore, and colleagues in the 2004 New England Journal of Medicine (351:668-674, "Outcomes of Allergy to Insect Stings in Children, with and without Venom Immunotherapy"). Here, at long last, was an actual study with real numbers, following 1033 patients for an average of 18 years each.

This mother-lode of anaphylactic data mining addressed a critical question in post-reaction treatment: do children outgrow allergies to insect stings, and if so is desensitization treatment unnecessary? As the authors put it: "*The perception among parents and physicians is that children generally outgrow this allergy, although no formal evidence in support of this hypothesis has been reported. This perception implies that virtually all children who have had systemic allergic reactions to stings will not have severe reactions when they are older, and therefore do not need venom immunotherapy for protection.*"

Indeed, their voluminous long-term study indicated that the majority of children who experienced serious reactions to bee stings when young outgrew those reactions as adults. Overall, 17% of children who did not receive desensitization treatment reacted to bee stings as adults. However, this percentage was quite a bit higher if the initial reaction had been moderate to severe. Then, 32% of seriously reacting patients not receiving treatment reacted as adults.

For those children in their study who had serious reactions and then underwent treatment, only 5% reacted as adults if they had received desensitization shots as children. The percentage of reacting patients with mild initial sting reactions who had been treated as children and then stung as adults was even better, zero.

For parents, the decision about making your kid go to the doctor and get a desensitization shot once a week for a few years is now based on data rather than anecdote. Basically, there's one chance in three that a seriously reacting child will react as an adult without the treatment, and one chance in 20 that they will react following desensitization.

For my students, their desensitizations may have been successful but their careers with bees are over. The student who switched to beetles received her doctorate degree in forest entomology last year, a second just finished her Ph.D. in biological control, while a third is studying pollination for her Ph.D., but from the plant rather than the bee point of view. The other two both finished their M.Sc. degrees and recently have been working as wildlife biologists studying wolves and birds.

Statistically, 5% of those students could return to bee research after a few years with reactions no different from the general population. But, would you base your life on statistics? Personally, one chance in 20 is too high for me, and wisely they have moved on to other things.

Still, the data maven in me is thrilled that there are finally some numbers available for parents and patients to use when deciding whether to receive treatments. Now if I could just figure out why so many of my students are anaphylactic. Perhaps it will take 1033 students before I get a handle on that one . . . BC

Mark Winston is a Professor at Simon Fraser University, Burnaby, B.C., Canada. He will also be one of the keynote speakers at EAS 2005 in Ohio.

Malcolm T. Sanford

The 2005 ABF Convention

"Honey standards and *Varroa* control top Reno meeting."

The 62nd convention of the American Beekeeping Federation found itself meeting in the town of Sparks, Nevada, January 12-15, 2005 at John Ascuaga's Nugget Casino. This town is a suburb of the U.S.' Biggest Little City in the World, Reno. At the opening ceremony it became apparent that this was not a random choice. It turns out the National Honey Board's Tina Tindall is a niece of Mr. John Ascuaga, who, coming from sheep herding roots in Spain's Basque country welcomed the beekeeping industry with open arms, as he has done in the past for both the sheep and cattle folks. The convention also coincided with Mr. Ascuaga's 90th birthday; high rollers from around the world (I know of no beekeepers in this category?) were invited during the week to help him celebrate. Mr. Ascuaga's story is true Horatio Alger, emerging from a poor background to own and run one of the state's top resort casinos. During his welcoming address, he gave most of the credit to the "people you work with," and to his philosophy, "never take no for a starter."

One of the major themes in Reno was ensuring fair trade in honey. A distinguished panel moderated by Bob Coyle of the Coyle Group in Bellevue, Washington (and spokesperson for the Western Honey Packers and Dealers Association) discussed the situation surrounding the development of international standards for honey. Two leaders in this area were invited from German laboratories, which arguably do the most comprehensive testing in the world. Dr. Kurt-Peter Raezke of APPLICA Gmbh, Bremen, said that harmony in the international honey market is lacking. In spite of all those actively involved in the honey trade looking at themselves as "partners," there simply are too many unknowns coupled with little cooperation. Because we often don't know what beekeepers are using worldwide to control *Varroa*, Dr. Raezke said, it is practically impossible to come up with practical, cost-effective tests to certify honey. On top of that many laboratories use different testing methods and often keep their techniques secret. Most testing regimes, he said, don't fit reality. Until they do, he concludes, there will be entirely too much variability in the certification process. In another session, Dr. Raezke showed that not only parent materials, but also their metabolites appear in honey (and sometimes disappear in a short time), making certification even more difficult. For example, tylosin (an antibiotic used to control American Foulbrood, not yet registered in the U.S.) breaks down into A and B forms and both therefore may call for their separate tests.

Dr. Cord L. Lüllman, Managing Director of Quality Services International GmbH, who is also vice chairman of the International Honey Commission, echoed Dr. Raezke saying that all participants in world honey trade need to agree on a standard. He urged compromise among interested parties, concluding that lower standards (many are simply set too high) are better than none at all.

Mr. Jerry Probst, formerly of Sioux Bee honey, discussed the shifting sands of the international honey market, with reference to both adulteration and labeling. Of concern is beet sugar from a C3 plant, more difficult to detect than that from corn, a C4 plant. The relatively new "ultrafiltered" product is extremely difficult to detect, especially when blended with real honey. Traceability is also an issue that needs to be addressed; there will be more and more emphasis on this in the future as honey will be tested with increasing frequency during its journey from hive to bottle. Another sticky situation is truth in labeling. Without some kind of standard for honey, use of the name remains in limbo and provides for many an "unacceptable" flexibility to use the term. Take for example, HoneyBaked Ham®, a brand that uses no honey, but defends employing the name as a processing method (and has trademarked the word HoneyBaked).

The lack of standards is a big reason that the Honey International Packers was developed at the 2003 Apimondia meeting, according to Dr. Peter Martin, its Chairman. I wrote about this in the December 2004 *Bee Culture* embedded in my report about the 18th Mexican Beekeeping Seminar in Tabasco. I said then, that he "provided information on world standards in accordance with what is known as the Codex Alimentarius, revised in 2001. He listed the current procedures in the European Union to monitor honey and said that so far neither Mexico nor China followed the Codex as revised. The former country permits antibiotic residues and use of high levels of pesticides, something that does not coincide with norms in most other countries. In China, two standards are available that are not implemented elsewhere: 'superior product' and 'acceptable product.' The latter allows up to 24% moisture. He summarized the current activities in the European Union with respect to honey legislation and marketing, and concluded that labeling requirements will be heavily affected by the fact that the Union has been expanded to 25 countries and the number of official languages has increased from nine to 17.

In Reno, Dr. Martin also called for surveys to be done on production and processing of honey and that the information be collated and analyzed, while at the same time ensuring those contributing the information would remain anonymous. As an example of this, he pointed to Zambian honey, which has natural background levels of antibiotics. If this information were

Continued on Next Page

not published and made available, detecting residues of antibiotic would no doubt exclude that particular sweet from the world market place. Of course, given the vagaries of certification, there is no guarantee that the honey would be accepted, whether the antibiotic source is natural or not.

Both Dwight Stoller of Heritage Foods and David Allibone, President of Sioux Bee Honey Cooperative provided their views on honey testing and traceability. They concurred with the other panelists and called upon the U.S. Food and Drug Administration (FDA) to help the industry in developing standards.

Enter Martin Sutsman of FDA's Center for Food Safety and Applied Nutrition. The FDA would only become involved in this fray he said if it could be shown that a honey standard was relevant and needed by the majority of the industry. Standards are difficult to achieve and it is even more difficult to retain their relevance in fast-moving environment of technological change. Any standard must have unqualified unanimity by an industry, something difficult to achieve. Some standards are being abolished according to Mr. Stusman. An example is that the one on grits was recently dumped. Other things working against standards for honey are that FDA is mainly concerned about other issues like food safety and food "bioterrorism." It has no resources to embark on a honey standards mission. Standards are also viewed by FDA and courts as inhibiting innovation in food products, making them easy targets for law suits by food manufacturers.

There are some possibilities that the industry might look at Mr. Stutsman said. One is to use a standard already in place. In response to a question from Mr. Stoller, Mr. Stutsman said the FDA might be more interested if the industry brought a standard to it. The obvious one, according to most of those on the panel is the Codex Alimentarius. This standard is already in use in the European Union, however, there are questions about its relevancy and adaptability to U.S. producing and packing procedures.

Mr. Stutsman also said the FDA might be amenable to considering a labeling change, which would state the percentage of honey in a product. This sort of thing is already routinely done for fruit juices and some drinks. A strategy that has worked, Mr. Stutsman concluded, is to first cause change at the state level before getting the federal government involved. By getting standards on the states' agendas, the federal authorities at some point would be forced to look at the issue much more closely.

A major problem in developing a standard is the amount of time, energy and funds it would take to collect and analyze data into a coherent whole and eventual standard. Thus, the American Beekeeping Federation in its resolutions adopted in Reno, called for the following: "the ABF petition Congress to appropriate funds to provide laboratory facilities, equipment, personnel, and material and initiate a research program on the chemistry of honey, potential and actual honey adulterants, potential honey contaminants, and blends of honey and honey adulterants toward the end of developing, testing, validating and certifying new methods for the detection of adulterants and contaminants in honey." According to Mr. Stutsman and others, the budget for this would be in the neighborhood of a quarter of a million dollars per year, with half a million in startup costs. Most agreed that this is unlikely to happen, given the present federal budgetary priorities. Finally, many of those at the meeting believed the money could be better spent supporting existing private laboratories.

•

The Reno Convention revealed an increasing number of mite control products that are becoming accessible to beekeepers. Although the number is increasing, the effectiveness is not. Dr. Eric Mussen kicked off a session on developments in mite control by relating that the "magic bullets" beekeepers have relied on to control *Varroa*, from the relatively benign Apistan® (formulated on fluvalinate) to the more toxic CheckMite+® (formulated on coumphos) are no longer working, and there are none in the developmental pipeline. Thus, beekeepers will have to rely on softer chemical and biological control with a decreased effectiveness (forty to seventy percent or so) in the future as part of an Integrated Pest Management (IPM) approach.

Formic Acid

David VaderDussen of NOD Apiary Products, Stirling, Ontario, Canada said that his product, Mite-AwayII, a formic acid pad should soon be labeled for use in the U.S. Formic acid has been touted as a control for both *Varroa* and tracheal mites. The material is also found in honey and so residues conceivably would not be a problem. I wrote about formic acid in the June 2003 *Bee Culture*. I said at that time, "The use of liquid formic acid can be looked at as a way to transfer application "risk" from the consuming public to the beekeeper. The tradeoff is that beekeepers will be much more at risk of harming both themselves and their bees with inappropriate application, while potential product contamination, putting consumers at risk, is minimized. Liquid formic acid can be easily and legally purchased in several concentrations; 85 percent is most common. A concentration of 60 to 65 percent is generally recommended for beekeeping use and so it will often be necessary for users to acquire sufficient education and experience to dilute the material to the proper level."

Mite-AwayII pads would be a reasonably safer way to apply formic acid than its liquid counterpart. However, Mr. Bill Ruzicka, who has indefatigably advocated the use of liquid formic acid through his Mitegone® evaporation system believes this registration would eliminate use of the acid itself at considerable cost to the industry.

Thymol

Two products were described based on the essential oil thymol. The first is ApiLife Var®, that comes in a wafer and is marketed by Brushy Mountain Bee Farm. Mr. Steve Forrest gave an impassioned presentation on this material, saying in no uncertain terms that it works and could be responsible for saving a lot of colonies. So too was Apiguard® promoted by Dr. Max Watkins of Vita (Europe). This product is "different" because not only

Continued on page 28

Negotiating & Drafting Effective Pollination Contracts

Sylvia Ezenwa, J.D.

The pollination business, similar to any other business, is a commercial activity or enterprise that is engaged in by beekeepers and growers for livelihood or profit. This is true regardless of whether the transacting parties consist of small, family-owned businesses or large, agricultural corporations (i.e., agribusinesses). Furthermore, success or failure in the pollination business, also similar to any other business, depends heavily on the ability of the parties to communicate effectively with each other.

Communication in any business transaction begins with a contract. It may be an informal or oral contract; or a formal or written contract. If the terms of a contract have been expressed partly in writing and partly in words, or all in words, then the contract is an informal or oral contract. Conversely, if the terms of a contract have been expressed entirely in writing, then the contract is a formal or written contract.

Usually, a formal or written contract is preferable to an informal or oral contract. Why? Because the parties to a business transaction, no matter how well-intentioned, are human; and thus, are subject to typical human foibles: forgetfulness, ignorance, mistrust, misunderstanding, neglect, etc. Therefore, informal or oral contracts that are predicated on little more than verbal commitments and handshakes are more likely than formal or written ones to cause conflicts among the parties. Particularly when, after performance of the contract has begun, one or both of the parties realize that they have failed to consider, comprehend, or agree on an essential term of the contract.

Moreover, with the demise of one or both of the original contracting parties (e.g., through death or incapacitation (in the case of an individual) or the transfer of ownership or assets (in the case of a corporation)), an informal or oral contract may not provide an adequate blueprint for the parties' heirs or successors in interest to follow. This lack of guidance may cause disruptions in the performance of the contract, as well as jeopardize the continuation of the business relationship.

Considering the potential pitfalls of informal or oral contracts, beekeepers and growers should try to understand the basic elements of a standard contract, which will enable them to negotiate and draft effective pollination contracts with all of the basic elements.

Also, because beekeepers and growers do vary in the size of their operations, each has a different amount to spend on hiring an attorney to negotiate and draft its pollination contract. In general, large agribusinesses have more assets available to allocate towards legal fees than their smaller counterparts, and so they are less reluctant to do so. But by understanding the basic elements of a standard contract, beekeepers and growers with smaller operations can negotiate and draft their own pollination contracts, and they can tailor the complexity and scope of those contracts to suit their particular circumstances.

Basic Elements of a Standard Contract

A contract is formed when two (or more) parties agree to a promise or a set of promises that impose a legal duty on each party to do, or refrain from doing, a specific thing, and that gives each party the right to seek a legal remedy when those duties are breached or not performed.

To be valid, a contract must possess certain basic elements: (1) competency or capacity of the parties; (2) a subject or topic; (3) legal and sufficient consideration; (4) mutuality of agreement or assent; and (5) mutuality of obligation.

(1) Competency or Capacity of the Parties

Both parties to a contract must be competent (i.e., have the capacity) to make a contract. To be considered "competent," a party must possess the mental capability to understand his or her rights and duties under the contract. Minors are considered to be legally incompetent to make contracts because they generally do not have the requisite mental capability. Consequently, when a minor is a party to a contract, the minor may void the contract if he or she wishes.

(2) Subject or Topic

A contract requires a subject or topic, which is the matter or material that the contract is about.

(3) Legal and Sufficient Consideration

The consideration for a contract is the cause, reason, or motive that induces a party to make a contract (e.g., profit, price, etc.). A valid contract requires legal and sufficient consideration. This means that the stated cause, reason, or motive for the contract must not be illegal or immoral, and must be of sufficient value or worth to support the contention by the parties that it is indeed the true reason for the contract.

(4) Mutuality of Agreement or Assent

Mutuality of agreement or assent requires that both parties to a contract agree or assent to all the terms of the contract, and that there be no disparity in the way in which each contract term is understood by both parties. The evidence of mutual agreement or assent is an offer and an acceptance; an offer alone cannot make a contract. One party's offer (or promise) to do, or refrain from doing, a specific act becomes a contract only after it is accepted by the other party. Acceptance may be in the form of a reciprocal promise to perform some other act, or the performance of the act itself.

(5) Mutuality of Obligation

As discussed earlier, each party to a contract is induced to make the contract by a stated cause, reason, or motive (i.e., consideration). Mutuality of obligation requires that

Continued on Next Page

each party to the contract be obligated to perform the acts that form the basis of the other party's reason for making the contract. If only one party is obligated to perform, and the other party is not, then the law negates the obligation of the first party to perform, which renders the contract invalid.

Essential Terms of a Pollination Contract

Apart from the elements basic to a standard contract that ensure its validity, there are certain terms that are essential to a pollination contract, regardless of the complexity and scope of the document. And when negotiating a pollination contract, each essential term should at least be discussed by all beekeepers and growers, irrespective of the size of their operations or whether they have chosen to use the services of an attorney or not. For maximum protection from future conflicts, each essential term should be inserted in the contract, but the beekeeper and the grower can adapt the terms to suit their desire for either a simple or a detailed document.

The six-part structure of an effective pollination contract, along with a checklist of contract terms, appears below. The beekeeper and the grower should treat each term as essential, but may give varying amounts of attention to different terms – both during the negotiation process and in the contract itself – depending on the applicability of the respective terms to their particular circumstances.

ESSENTIAL CONTRACT TERMS

INTRODUCTION
- What is the date of the contract?
- What are the business names of the beekeeper and the grower?
- To which growing season is the contract applicable?

BEEKEEPER RESPONSIBILITIES
- How many colonies should be delivered?
- When should the colonies be delivered?
- To which crops should the colonies be delivered?
- Where are the crops located?
- How should the colonies be placed in the crops?
- Should the beekeeper or the grower decide how to place the colonies?
- What is the minimum standard for the strength of the colonies? Is it the industry standard of eight (8) frames of bees and brood minimum? If not, how many frames of bees and brood minimum?
- Has the beekeeper agreed to the payment by the grower of a premium (over the rental fee) when the number of colonies that exceeds the minimum standard for colony strength is a certain percentage of the total number of colonies? If so, what is the percentage that is required? Does the percentage vary by type of crop, time of year, or other factors? And what is the premium per colony? (E.g., if the minimum standard for colony strength is eight (8) frames of bees and brood and, in the course of measuring colony strength, it is found that more than X% of the total number of colonies exceeds eight (8) frames of bees and brood, then a premium of $Y per colony will be paid by the grower to the beekeeper.)
- Has the beekeeper agreed to the deduction by the grower of a penalty (from the rental fee) when the number of colonies that falls below the minimum standard for colony strength is a certain percentage of the total number of colonies? If so, what is the percentage that is required? Does the percentage vary by type of crop, time of year, or other factors? And what is the penalty per colony? (E.g., if the minimum standard for colony strength is eight (8) frames of bees and brood and, in the course of measuring colony strength, it is found that more than X% of the total number of colonies falls below eight (8) frames of bees and brood, then a penalty of $Y per colony will be deducted by the grower from his payment to the beekeeper.)
- Has the beekeeper promised to allow the grower to inspect the colonies to verify their strength?
- Has the beekeeper promised to regularly inspect the colonies and maintain them in proper pollinating condition?
- When should the colonies be removed?

THE RESPONSIBILITIES OF THE GROWER
- Has the grower promised to provide a suitable location for the colonies?
- Is the proposed location for the colonies accessible by the vehicles that are to be used by the beekeeper in delivering and servicing the colonies?
- Has the grower promised to allow the beekeeper the right to access or enter the grower's premises and crops when necessary to service the colonies?
- Has the grower promised to pay for any damage to the crops resulting from the beekeeper's vehicles during the delivering and servicing of the colonies?
- Has the grower promised not to apply pesticides that are toxic to bees when the bees are pollinating the crops, or immediately before the bees are delivered?
- Which pesticides or chemicals that are not toxic to bees is the grower allowed to apply to the crops when the bees are pollinating the crops, and how may they be applied?
- Has the grower promised to notify the beekeeper before applying pesticides that are toxic to bees, or that have not been mutually agreed upon by the parties?
- Has the grower promised to pay for moving the colonies to and from (or within) the crops when it is necessary to apply a pesticide that is toxic to bees?
- How much has the grower promised to pay for the colonies (i.e., the rental fee), and when are the payments due?
- How much has the grower promised to pay for any additional movement of the colonies to and from (or within) the crops?
- Has the grower promised to provide each colony with an adequate water supply when none is available within a certain distance from a colony?
- Has the grower promised to pay for any damage to the colonies resulting from unauthorized movement, theft, or vandalism of the colonies by the grower, its employees, or agents?
- Has the grower promised to assume any legal liability for personal injuries (e.g., bee stings) or property damage resulting from the bees?

PENALTIES
- What penalties should the bee-

keeper face for failing to deliver the colonies after receiving notice from the grower to do so?
- What penalties should the grower face for failing to make a scheduled rental fee payment?
- What penalties should the beekeeper and the grower face for failing to perform any of their other responsibilities under the contract?

OTHER PROVISIONS
- Which events will excuse the beekeeper and the grower from performing their respective responsibilities under the contract (e.g., an act of God)?
- Must disputes between the beekeeper and the grower be settled by arbitration? And if so, who selects the arbitrator, and who pays the arbitration costs?
- When arbitration is not mandatory, and the parties have the option of litigating a dispute, should their right to a jury trial be waived, and which state's law should govern the resolution of the dispute?
- Can the beekeeper and the grower freely assign or transfer their responsibilities under the contract to other parties?
- In the event of the demise of either the beekeeper or the grower (e.g., through death, incapacitation, or transfer of ownership or assets) should their heirs or successors in interest be bound by the terms of the contract?

SIGNATURES
- Have both the beekeeper and the grower signed and dated the contract?
- Have both the beekeeper and the grower provided their contact information, including social security or tax identification number?

Additional Theft Protection

Because of the substantial number of colonies that were lost this past winter (by some estimates, as many as 40 percent), as a result of infestation with *Varroa* mites, the 2005 growing season will likely be characterized by a severe shortage in the number of colonies that are available to growers for the pollination of their crops. The shortage is sure to cause an increase in the theft of colonies from the crops or orchards that the bees are pollinating. Which is why it may be wise for the beekeeper and the grower to insert additional terms in a pollination contract resolving financial responsibility for theft if, and when, it does occur.

Of course, if the grower or one of its employees or agents commits the theft, and there is irrefutable proof to that effect, then the contract should contain a term that holds the grower financially responsible for the loss. The problem is that most perpetrators of colony theft are rarely caught. It is likely that many of them are fellow beekeepers with the knowledge and expertise, not to mention the equipment, that is necessary to commit the crime. Therefore, an effective pollination contract should include terms that resolve the potential issues surrounding both situations: (1) theft by a known perpetrator who is affiliated with the grower; and (2) theft by an unknown perpetrator.

A checklist of contract terms dealing solely with the theft of colonies from the grower's crops or orchards appears below. Similar to the other terms discussed earlier, the beekeeper and the grower should treat each theft-protection term as essential; and once agreed upon by the parties, each term may be inserted into a pollination contract under either the responsibilities of the beekeeper, or the responsibilities of the grower.

THEFT-PROTECTION TERMS

(1) THEFT BY A KNOWN PERPETRATOR

The following terms resolve issues that may arise when a theft is committed by a known perpetrator who is affiliated with the grower:
- Has the grower promised to pay the full cost of any damage to the crops resulting from the equipment or vehicles used by the known perpetrator during the theft?
- Has the grower promised to fully reimburse the beekeeper for the cost of any colonies that are stolen from the crops (including the cost of the bees)? And if so, how much per stolen colony?
- Has the grower promised to pay for any colonies that the beekeeper may provide to replace the stolen colonies? And if so, how much per replacement colony?

(2) THEFT BY AN UNKNOWN PERPETRATOR

The following terms resolve issues that may arise when a theft is committed by an unknown perpetrator:
- Has the grower promised to pay the full cost of any damage to the crops resulting from the equipment or vehicles used by the unknown perpetrator during the theft?
- Has the grower promised to fully reimburse the beekeeper for the cost of any colonies that are stolen from the crops (including the cost of the bees)? And if so, how much per stolen colony?
- Has the grower promised to pay for any colonies that the beekeeper may provide to replace the stolen colonies? And if so, how much per replacement colony?

[Sample pollination contracts can be found online at the Web sites of the University of Florida, Institute of Food and Agricultural Sciences at http://edis.ifas.ufl.edu/, and the

Mid-Atlantic Apiculture Research and Extension Consortium at http://maarec.cas.psu.edu/.]

A Word about Bargaining Power

Bargaining power is the amount of power that a party wields during the contract negotiation or bargaining process. The party with the greater bargaining power is more likely to persuade (or intimidate) the party with lesser power into acquiescing to certain contract terms. This may occur when a beekeeper with a small operation (and less bargaining power) is negotiating a pollination contract with a grower that is a large agribusiness.

The party with the greater bargaining power (i.e., the stronger party) commonly elicits the acquiescence of the party with less bargaining power (i.e., the weaker party) with the use of an adhesion contract. An adhesion contract is basically a form contract that contains standardized, boilerplate language. An adhesion contract is often foisted upon the weaker party because its complex legal jargon gives the false impression that the

Continued on Next Page

ABF ... Cont. From Pg. 24

is it formulated on a gel and considered safer, but actually does not have the essential oil as an ingredient.

Oxalic Acid

Another likely product is oxalic acid, being actively used in Canada. Dr. Marion Ellis at the University of Nebraska provided some information on this material. It currently does not have a label, but no doubt we can expect an increase in interest rather like we've seen for formic acid. Oxalic acid appears to be much safer in general than its formic acid cousin.

Food Grade Mineral Oil (FMGO) and Sucrocide. Neither of these products were discussed at the session, but deserve consideration.

A recent article in *American Bee Journal* (November 2004) states: "I conclude fogging with mineral oil can work to repress some of the populations of *Varroa* mites in some of the hives, to a limited extent, but the results of this experiment caution one not to put too much trust in fogged mineral oil as the only method in reducing populations levels of *Varroa* mites." Representatives of the Weslaco, TX bee laboratory reported in Reno that FGMO results did not seem impressive, but more importantly experience with the fogger indicates it can be a danger to both bees and beekeepers.

According to Dr. Eric Mussen at the University of California, Davis, "Sucrocide contains an ester of sucrose and octanoic acid (sucrose octanoate) that acts as a detergent and dissolves the cuticle of the mites, allowing them to dehydrate. Thus, Sucrocide must contact each mite in order to kill it. That requires three consecutive treatments, at weekly intervals, to contact most of the mites as they leave the cells with emerging adult bees. Sucrose octanoate is not poisonous to bees or humans, but it does have a color and flavor that might taint honey (tests have not been conducted, yet)."

Biological Control

Unfortunately, Dr. Lambert Kanga, now Chairman of Entomology, Florida A & M University was not present at the Reno meeting, but his research on a fungus (*Metarhizium anisopliae*) as a biological control for *Varroa* is certainly of interest to many. Dr. Kanga did give a presentation at the recent meeting of the Florida State Beekeepers Association in Chipley, FL (November 12, 2004). The development was also written up in the October 2004 *Agricultural Research Magazine* and *The Speedy Bee* (September 2004) provided a series of questions and answers on the product. The Agricultural Research Service (ARS) is currently working with a fungus-producing company to fine tune the technology. A product that beekeepers can use is expected to be in the pipeline fairly soon. The initial report on this material was made a year ago. Dr. Patti Elzen, reporting for Dr. Kanga at the AHPA meeting last year, gave essentially the same report. Little has happened in that year.

Warning: Any of the materials mentioned in this article may or may not be registered and/or labeled at certain times or in specific places. The Federal law is clear that using any material with **intent** to control any organism, requires registration and a label to be in hand. That label is the law! Thus, for availability of any of these products, one must be in contact with bee supply providers.

Physical Control: Screened Bottom Board

Most of the above technologies would be employed in conjunction with the best-known device used to physically remove mites from a colony, the screened bottom board. There is more and more evidence that this will become a standard beekeeping technology in the future.

Genetic Tolerance

Though not identified in this section of the program, there was a lot of information at the Reno meeting on *Varroa* tolerance in bees. There is no question that it exists and there are several breeding programs that emphasize it with good success, especially using Russian stock introduced by the Baton Rouge Bee Laboratory (See Bob Harrison's anlysis in the January 2005 *Bee Culture*). The exciting part is information at the Reno meeting providing a link between two known technologies thought to be responsible for tolerance. These are hygienic behavior identified by Dr. Walter Rothenbuhler and associates, and suppressed mite reproduction (SMR), pioneered by Dr. John Harbo and his colleagues at the Baton Rouge Bee Laboratory.

Using any and/or all of the above mentioned products or techniques provide a potent combination of possibilities for beekeepers as they search for successful IPM solutions to mite control. This should aid them considerably in their attempt to gracefully exit the pesticide treadmill. BC

POLLINATION ... Cont. From Pg. 27

contract's terms cannot be negotiated or modified. This is unfortunate, because all contract terms should be negotiable between the parties, despite any inequities in their bargaining power.

The bottom line is that a beekeeper with a small operation that is negotiating a pollination contract with a grower that is a large agribusiness should assert its right to negotiate each and every contract term. And it is likely that the mere assertion of that right by the beekeeper will prompt the grower to commence the bargaining process in earnest.

Conclusion

Although the process of negotiating and drafting a formal or written pollination contract may take much more time and effort than the mere discussions and handshake that so often characterize an informal or oral contract, it is time and effort well spent. Miscommunication and misunderstandings occur even amongst the best of friends, so why not amongst the parties to a contract? But a beekeeper and a grower, by simply memorializing their discussions in a written contract, can hope to avoid many conflicts. BC

Sylvia A. Ezenwa is a lawyer, author, and freelance writer based in Superior, Colorado. She is licensed to practice law in the State of Texas.

BASIC CLOSEUP TECHNIQUE

Luke Marshall

As promised in my last installment of "Photographing Bees & Beekeeping" this article will focus on the use of the equipment previously outlined. We will look at focusing techniques as well as the use of shutter speeds and depth of field to give photographs certain desired effects.

The techniques I will be discussing in the article do require some basic knowledge of photography. I would suggest visiting the library and reviewing a book on basic photographic techniques, as the ones in this article are specific to close up photography.

We will start with what I believe is the most important aspect of close up photography, focusing. With closeup photography your camera's focus is used in a different manner than when shooting traditional subjects. While it is regular practice, when shooting distant subjects, to pick your distance and focus accordingly, things change when subjects are mere inches from the camera.

Much of the time, when shooting small subjects such as bees, the tendency is to want the largest possible magnification of the subject. In order to achieve this, you must prefocus the camera to the selected distance; in this case you will turn the focus ring until the lens is focused down to the shortest possible distance. Having done this you will notice that everything is very blurry, but as you move the lens closer to the subject things slowly become clearer. Once you get to a certain distance away (your lens's minimum focusing distance) you will see the subject in perfect focus.

This is consequently the largest magnification possible with that particular lens, if you begin to move closer the subject it will again fall out of focus. It becomes apparent at this point that movements of only a fraction of an inch can throw the shot out of focus. You will come to find out that it is easiest to focus your lens manually and to the approximate magnification at which you will take the picture and then fine tune the focusing by moving slightly closer or farther away from the subject. This might take some getting used to but after spending time using this method it will eventually become second nature.

In most cases involving close up photography manual focus is preferred to autofocus. I say this because most macro lenses have very long ranges of focus, which allows for minute adjustments. This will, most of the time, be hard for your camera's autofocus to control as it will be constantly readjusting itself with your slightest movements and never giving you a properly focused image.

Closeup photos don't necessarily have to be of small subjects. A macro lens is used here to focus in on a small part of a larger activity and bring out its inherent details.

Now that focus is out of the way we can move on to a short discussion on depth of field. Your lens's depth of field is controlled using the aperture ring on your camera and is measured in f-stops (f/8 or f/11 for example). Depth of field is the amount of distance in the photograph that will be in focus, from foreground to background. The higher the f-stop number the longer the depth of field. As you focus closer and closer to a subject the depth of field will decrease, to mere millimeters in the case of most macro lenses. It is for this reason that in most cases you will want to use the largest f-stop possible in order to be sure that the most amount of the subject will be in focus. Other times it's preferable to use a smaller depth of field in order to achieve special effects. For example, if you wanted only a bee's eye or head to be in focus, you would use a smaller f-stop such as f/4 or f/5.6.

So far, things seem pretty easy, just adjust the f-stop to whatever number will give you the desired effects, but you are not always able to pick the f/stop you want using available outdoor light. The f-stop you are able to use depends greatly on two major factors, the amount of light falling on the subject and you shutter speed.

Shutter speed and aperture are dependant on each

Continued on Next Page

other as they both determine the amount of light that reaches the film with each exposure. Shutter speed determines the *time* that the film is exposed and aperture determines the *amount* of light that is let in during that amount of time. A larger depth of field means more light is hitting the film. There is usually a trade off between these settings because it is rare that in normal daylight that you will be able to use a fast shutter speed and also achieve a large depth of field as that will produce an underexposed (dark) image. And, with a slow shutter speed and small depth of field chances are that too much light will enter resulting in an overexposed (very light) image. In most cases you are able to have one or the other the way you want it or you must pick a happy medium for the two settings.

Shutter speeds are measured in seconds and fractions of a second. For this application you will pretty much always be using a shutter speed of a fraction of a second ($1/250^{th}$ for example). When it comes to shooting general macro subjects such as flowers and bees and when there is no special effect trying to be achieved you will want to try and find a good balance between your aperture and shutter speed. In most cases you will want to try and use the fastest possible shutter speed in order to freeze the action and reduce camera shake. But on the other hand, if you want to have as much of the scene in focus as possible you will want to have the largest depth of field possible. Both of these settings greatly restrict the amount of light hitting the film and so in most cases you will be forced to change one or the other. It's simply a matter of give and take. With close up photography you are working with subjects on a miniature scale and this restricts your options when it comes to choosing shutter speeds and f-stops. In the next article I will discuss accessories that can help you reach your desired effects and the compromises that must be made when using them.

It is difficult to try and tell a person what camera settings to use in order to produce a good photograph. In this series of articles it is my intention to try and explain techniques and let you put them to work. There are infinite possibilities that can be explored when you combine focus, shutter speed and depth of field in different combinations. Please experiment with these setting as that is the best way to learn. BC

Luke Marshall is a professional photographer who is also a beekeeper. His photos have been used for both editorial and commercial applications, in magazines, posters, brochures and newspapers. Luke_marshall@yellowknifehost.com

RESTORING HEALTH

Kirk Webster

After many dreary years, when the American beekeeping community seemed unshakably committed to stop-gap mite control measures that were sure to prove self-destructive in the long run, there are now popping up around the country various success stories from beekeepers producing good crops of honey, pollen, bees and queens without the powerful hormone-disrupting chemicals; and in some cases without any treatments at all. This group of beekeepers is quite small at the moment, but between them all they are using, and having at least partial success with, an astonishing variety of bee stocks and management techniques. Some of them are slowly building mite resistance in their old bees, and can now control *Varroa* with Formic or Oxalic acid. Others are using the Russian, SMR and Hygienic stocks imported or developed by USDA scientists. Still others have tapped the mite resistance of Africanized bees, and incorporated it into their apiaries. Large amounts of small cell size foundation are now being manufactured in Scandinavia, and hopefully there will soon be some large scale trials here, with European bees and in the colder parts of the country.

The key point here is that now there's a viable and growing pool of unrelated, mite-resistant bee stocks and management techniques being used in the U.S. that all beekeepers can test, combine and utilize in their own locations and circumstances. All regions of the country should now be able to move toward really healthy bees, and long term solutions to our beekeeping problems. This is enormously good news.

My own approach over the last seven years has been to use breeding and management closely together. I tried to incorporate any and all points of leverage against *Varroa* into a system that could move as quickly as possible toward the elimination of all mite treatments. My apiary and my interest in bees has always been focused on bee breeding – finding the best of each generation, and then making them the parents of generations to come. Right now *Varroa* mite resistance is the most important characteristic we need to build into our stocks. Really stable, productive, mite-resistant bees will only emerge from a large number of colonies, untreated against *Varroa*, and constantly exposed to all the known and unknown factors in the total environment. But how to establish such a

scheme in the face of a pest as devastating as *Varroa*, and when you need to make a living from the bees? Again – breeding and management had to work closely together.

In order to move quickly to reduce treatments, it was essential to find some stock that already had some degree of *Varroa* resistance. There are not at least a few, and maybe several available stocks that qualify here; but for me the Russian bees imported and further developed by Tom Rinderer and his associates have been by far the most helpful. They are not perfect, but they have a solid and easily heritable mite resistance, a large gene pool, and are already very well adapted to the cold climate here and the system of beekeeping I use. They are also exceptional honey gatherers; and if it wasn't for their eagerness to swarm (their only major flaw), they would surpass all other bees in this respect. It took me awhile to get used to them, but now I consider the Russian bees to be far better than just an acceptable compromise.

These Russian bees were a godsend, but a good system of management was also required to keep improving them, and gradually eliminate all treatments. And this part of my apiary grew directly out of the initial struggle with tracheal mites. I needed a way to propagate new colonies faster – to replace the large Winter losses we all experienced at that time. Luckily, several years elapsed between the appearance of tracheal mites and the arrival of *Varroa*. By the time of that second invasion, I had a well established, productive apiary consisting of three parts; each supporting the others, and also producing products for sale. There were: Honey Production, Nuc Production and Queen Rearing.

When I first started experimenting with leaving colonies untreated against *Varroa*, it immediately became clear that my three apiary departments were very different in their susceptibility to *Varroa* damage. *Honey producing* colonies, with a large brood nest throughout the active season, were the most vulnerable, and were easily destroyed by the mites. Even now, after testing and recombining the Russian stock for three generations, colonies used for honey production are still at risk – though nowhere near as much as at the beginning.

Colonies devoted to *Nuc Production* were able to stay alive and healthy for a significantly longer time. Every year, a portion of the overwintered nucs are retained and allowed to grow onto 20-30 combs. Then, in June and July, each one of these large brood nests is broken up into from five to 10 four-frame nucs and provided with queens from the isolated mating yard. All of these nucs spend the following Winter outdoors on just four or eight combs. Once the Russian stock became available, and the new queens were mated with proven drone mothers, I was able to wean this part of the apiary off of all treatments in just one generation. Losses are higher than in the "good old days," but the enormous productivity of the system compensates for this, and now all the new queens are tested in the real world, and forced to sink or swim independent of half-baked theories, and the bias caused by counting mites.

In *Queen Rearing*, the colonies used as mating nucs have their brood cycle interrupted four times during the season. I use full-depth, half-length frames for mating and catching the queens, and Winter most of these nucs in single boxes. Four of these boxes are pushed together and then packed as a unit on pallets – the same way I now pack my nucs on standard combs. These queen mating nucs were able to become self-perpetuating without treatments even before some good resistant stock became available – though again, I had larger losses than in the past. I haven't treated any bees on these combs since 1998.

4-way 'baby' nucs used for mating and catching queens.

Honey Production – some swarms have come out.

With the Russian stock, and the three apiary sections working together, I was able to withdraw treatments gradually from each section, as they became able to stand on their own. The last mite treatment I used was applied to just a small part of the apiary in Spring of 2002. But . . . I am making this sound much too easy – many losses and setbacks occurred during this process. However, I considered it essential to move as fast as possible to the point where the entire apiary could be left untreated. This is the only way that a viable number of tested breeders could be generated each year, and progress maintained in the long run. The real key to this whole process is the rapid reproduction of nucs, with a new generation of queens, in the "middle" of my system. The new queens are tested on just four or eight combs, and a large number of colonies always stand ready to replace losses incurred in the honey producing yards. Despite occasional heavy losses, I have managed to sell some bees every year except one. If I have another very serious loss due to mites or freak weather conditions, (which I expect will occur sooner or later), I have the means to recover and quickly make use of the colonies that can withstand those conditions. My income was reduced as I invested my time and energy into the hope of a better future for my apiary. This may be an un-American stance to take . . . but I think it's essential if the next generation is going to enjoy keeping bees as much as we have. **BC**

Kirk Webster is a full-time, non-migratory commercial beekeeper living in Bridport, VT.

THE LIFE AND TIMES OF THREE BEEHIVE SPLITS

James E Tew

The Genesis of the Three Nucs

Last month I chronicled the acquisition of three nucs that I, as a new beekeeper, purchased from a neighboring beekeeper. In that discussion, I bought my first splits, moved them to my home location, transferred them to my permanent equipment, fed them, and released the queens in each. This was the first chapter in this new beekeeper's life. What follows is the second.

When and what to feed

Today I checked the Boardman feeder jars. All three were still full. Why are the bees not taking more syrup? It's still chilly – even cold at times, but Spring is clearly here. I thought they would be starving for sugar I sense that I have questions to which I don't know the answer I don't what to harm my new charges.

Who to contact? I try the county extension office. They send me to their web site where there is information for beginners. For this coolish weather, I may be using the wrong feeder – or maybe just not the best feeder I don't mean to be a pest, but I decide to phone my beehive provider. After all, he said he would answer questions.

Since I have no honey in combs, he would prefer that I use a top feeder and having no top feeders, he will loan me three of his. Back to his place I go and he has them ready for me. They look like mutant supers with attached bottoms. Even though plastic units are commercially available, he built these himself. He wants them back.

Upon my return to my hives, I decide to put on both styles of feeders. Anywhere my bees go, they should run into food, but I doubt that it is a general recommendation to feed with two styles of feeders. I would rather be doing things too right rather than too wrong. I can barely wait until the next day to have a look at the dramatic drop in the syrup level, but it's not to be. Still looks pretty much full to me. I don't know. Putting on a third feeder sounds even too much to me. Enough with the feeders. I have tried and I feel okay with my efforts. The bees frequently have periods when they can fly. Maybe they're getting enough to meet their needs from natural sources.

I consider getting some of the pollen substitute from a bee supply company, but discussions at the bee meeting didn't make the product sound useful at this early Spring date. Apparently I should have fed it earlier

A Neighborly Conversation

I had a "heads-up" conversation with my neighbor. Even though my hives are near my woodpile at the back of my property, I do have neighbors on both sides. I was restacking some punky firewood that should have been burned several seasons ago. Now, I have groundhog problems near the pile so I was doing general cleaning when she called me over. (I realize now that she was not going to come to me – too near the bees.) I don't know how to describe her concerns. She's allergic to beestings, and has to take something like Benedryl™ each time she is stung. My neighbor, who lives alone, doesn't seem to share my passion for the bee project. She's not negative, but she sure isn't positive either. I did my best to reassure her, but I'm new at this. What if a yellowjacket stings her? Is this going to be a problem for me and my bees? I guess I feel like I was given a polite warning, a notice as it were, that this thing has better go all right. I'm really off to a good start here.

A few days pass

A few days pass and syrup levels in the feeders are dropping some so they are taking the syrup. I just had too much on them for a small population. I know I probably shouldn't but I want to open the hives up. I suppose I could use the excuse that I am checking the queens' production *(with me being an expert and all).*

I suit up – a process that takes nearly 10 minutes. I light my new smoker. It goes out. I'm using wood shavings. I light it again. More fire this time. It smokes for a minute and goes out. I suppose this is normal. Make a mental note – smokers go out easily. On the third try, I get the smoker going and keep puffing it. It seems to work so long as I am puffing away.

Veil on? *Check.* Gloves on? *Check.* Hive tool? *Check.* Smoker fired? *Affirmative.* All systems are go. I am cleared to open my hives.

Continued on Next Page

Dressed like one going into deep space and carrying a small smoldering fire, I walk across my backyard. I sense that the entire neighborhood is watching. Maybe it's just me.

The opening

I've only done this a few times before. I'm sure it will get easier, but it is exciting. I puff the front entrance. How much is enough? Well, maybe a few more puffs. Bees are flying about and buzzing. Now I must deal with this top feeder It's right in the way. You know, increasingly I don't think the bees really need both the top feeder and the Boardman feeder. If they ever empty them, I'm taking the top feeders back home.

New wax

After removing the feeder, I expose the bee nest. The original four frames really stand out against the new frames. When I remove one of my new plastic frames that are positioned next to the original frame, I am excited to see that it has been about half filled on one side with new comb. This observation would tell a more experience beekeeper that either a nectar flow is ongoing or that the bees are taking the syrup more than I realize. But to me, at this point, it is an event in the hive that I can identify. *My bees are making wax!*

The queen

When someone shows me the queen, I can tell that she is different. But now, with the hive open, bees everywhere, I sense that my chances are not the greatest for seeing her After leaning the new frame against the hive body, I pull out one of the original frames. I can see big white larvae, and capped brood, but try as I might, I can't see eggs. Is this eggs or just a reflection on bottom of the combs? About 10 days ago, when I removed the queen cages, I was sure I could see eggs. Maybe, I jumped the gun then. I have read that if I can see eggs, then I have a queen in place. *Yeah, that has to be eggs I'm seeing but my, my, they are tiny.*

I don't see the queen, but I suppose my work in this hive is finished. New wax is being produced, some of the feed has been taken, brood is present, and eggs (I think) are present. The second hive was nearly a twin of the first one, but the third hive is noticeably smaller. There are not as many bees and the brood population seems to be smaller I was told that beehive splits are not exact things and some variation will occur Is that what this is? I suppose there is nothing I should do at this time. Maybe I should buy more bees to add to this colony. Can you do that? While I think the worst *(like I have some terrible unknown bee disease)*, I admonish myself to be patient. There's a runt in nearly every litter. Things will be okay here.

There's not much else I can do

Well, I am the beekeeper and I have three small hives, but there's just not much for me to do right now. This is like waiting for my garden to grow. I have extra equipment assembled, but even I can tell that I don't need to put it on. Feeders are in place – in fact too many feeders are in place. I seem to have queens leading the colony and I seem to have a runt. Other than watching the bees fly and enjoy the buzzing, life in my apiary is quiet. So I will read.

What to read

I have several basic beekeeping books and several bee supply catalogs. Most give me too much information, but it is intriguing to read this stuff. There is an extractor in my not-to-distant future. They come in all sizes. You can even make your own beeswax foundation if you drop about $2,400 on the foundation mill. Should I buy some of these bee escapes and why would I want an entrance reducer? Should I be trapping propolis and pollen? I don't know. I will just keep reading and certainly I will be at the monthly bee meeting. I'm afraid to buy things whimsically without some idea what purpose they serve.

Speaking of money

I've got about $200 in the bees and queens and about $300 in equipment. The smoker alone was about $35.00. But I have been told that my bee hives are in good shape – equipment wise – for the next couple of years. *(I daydream)* Once these babies start making honey, I wonder if I can make money selling my products. I see it in stores everywhere. I don't know. Maybe in years to come, but right now, I'm still learning. This is only Chapter 2 of my beekeeping project.

Chapter 2

Whereas the beginning was exciting and unknown, the last two – three weeks have been somewhat slow. I'm getting better at lighting a smoker Things seem okay in the hives – even if one is runty. Wax is being produced and I have had feeders on. Brood is in the colonies and ***I think*** I have laying queens in all three units. My neighbors know what I am up to – for better or worse. I have kept myself busy playing with the hives and reading bee information, plus I returned the top feeders. I suppose this is what beekeepers do. 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/

Honey Plants

Connie Krochmal

Southwest Plants

Tough places call for tough plants. Extreme heat, drought, relentless sun, and poor soil – these are what the arid and semi-arid Southwest has to offer None of this stops native species like catclaw, mesquite, and cacti from producing a cornucopia of nectar and pollen.

CATCLAW (*Acacia spp.*)

In the Southwest, the common catclaw and the round-flowered catclaw are important honey plants. These can be trees or shrubs. They're named for the short, curved, claw-like spines at the base of the leaves. Catclaws have lacy, twice-compound foliage. Developing on crowded spikes, the tiny funnel-shaped blossoms have five fused petals. The typical bean-like pods are long and narrow. They're usually constricted between the seeds.

Catclaw (*Acacia greggii*)

This bee plant produces one of the best desert honeys, and is also a major source of pollen. Hardy in zones nine through 11 it occurs from Nevada and Utah to California, Arizona, and Texas. Favoring poor dry soils, catclaw inhabits dry sandy, and gravelly situations. It can be found on canyon slopes, mesas, washes, stream banks, and torrent beds to 5,000 feet elevation.

Typically, catclaw forms dense thickets. Preferring full sun, it tolerates the most adverse growing conditions.

In its tree form, catclaw has low spreading branches and an irregular crown. Around a foot in diameter, the straight trunk is 20 to 30 feet in height. As a bushy shrub, it is smaller with a dense, spreading shape. This slow-growing plant has pale brown branches. Its grayish-black bark is scaly and furrowed. The flattened pods are five inches long.

Several inches in length, the finely divided, alternate leaves are hairy. These give rise to several pairs of side branches with up to six sets of leaflets.

Catclaw usually blooms twice a year – in the Spring and later during the Summer or Fall. In Texas, the small, scented flowers open as early as March, while in Arizona this often begins several months later Held on 2½-inch-long flower spikes from the leaf axils, they're either white or yellow.

The nectar flow is affected by weather In warm dry seasons, it's especially heavy. The best flows follow a rainy Fall and Winter

Catclaw honey is either white, extra light amber or light amber Very heavy bodied, it has a mild, rich flavor This granulates to create smooth grains. Catclaw can produce 20 to 150 pounds or more per colony.

Round-flowered catclaw, Romer's acacia (*Acacia roemeriana*)

Also known as Roemer's acacia, round-flowered catclaw is native to New Mexico and Texas where it occurs in shrubby woodlands and hills. This evergreen to semi-evergreen species is less common than ordinary catclaw. Preferring alkaline and limestone-rich soils, it is found in well-drained, gravelly, sandy, or dry areas. Hardy to zone seven, the plant tolerates drought, and heat.

Catclaw (photo by Carolyn Merchant)

Mesquite (vernon.tamu.edu)

Under good growing conditions, round-flowered catclaw can reach 10 to 15 feet in height with an equal spread. A sun-loving species, this develops either as a wide-canopied tree with a rounded crown or a low shrub with numerous spreading branches. This plant has a slow to moderate growth rate. The unfurling foliage and new stems are dark red. So are the thorns and the somewhat twisted, bean-like pods.

In the Spring from April onwards, fluffy, creamy white to greenish-white blooms open in globe-like clusters before the new leaves develop. They have colorful reddish stamens.

The nectar flow is quite heavy, producing a clear, high quality honey. Round-flowered catclaw is a major source of surplus in the area.

MESQUITE (*Prosopis spp.*)

Mesquites are major Southwestern bee plants. They occur in both prairie and desert habitats. Though solitary plants are seen, they generally form dense stands or thickets. These spiny, slow-growing, woody species can be trees or low-growing shrubs. As much-branched deciduous trees, they have rounded crowns. Mesquites produce deep taproots – an asset in dry climates.

The alternate, feathery, hairy foliage is doubly compound with several sets of side branches, each with 12 to 21 leaflets. The pod-like fruits are cylindrical. Sometimes constricted between the seeds, these can be tightly coiled.

The cream or yellow-colored blossoms open in crowded heads or spikes. About ¼ inch long, each bloom has five petals and a five-lobed calyx. Initially opening from April to June, there's a second flush of flowers some weeks later

When the weather is favorable, the nectar flows are especially heavy. Sandy soils give the best yield.

The three species of mesquite discussed below are major sources of surplus in the Southwest.

Honey mesquite (*Prosopis glandulosa*)

Also known as honey pod and guajilla, this long-lived species is distributed from Nevada and California to Arizona, New Mexico, and Texas eastward to Oklahoma, southern Kansas, and western Louisiana.

Preferring full sun, honey mesquite is most common on light, sandy soils. It tolerates every soil type and pH. Inhabiting both dry and seasonally wet areas, this plant grows in canyons, shallows, and mesas as well as on hillsides. Honey mesquite does best in zones seven and above.

Armed with sharp spines, this very drought resistant plant is either a shrub or tree. In hospitable habitats, the multi-trunked, straggly tree can be 40 feet tall and wide. Slow growing, it has a broad, spreading crown and short trunk. When occurring as a shrub, honey mesquite displays low-growing, drooping branches. Reddish-brown, the bark is furrowed and rough.

Honey mesquite has smooth leaflets, while those of the ordinary mesquite are hairy. The bright green foliage is up to two inches long with seven to 18 uniformly sized leaflets.

The fragrant, yellowish-orange blossoms open on many-flowered spikes. Generally it blooms profusely when soil moisture is low. During rains, these will shed.

From 25 to 95 pounds or more of honey per colony are possible. Sandy soils usually produce the heaviest crops. This honey ranges from white or extra light amber to light amber with a mild, sweet flavor It has a tendency to granulate quickly.

Honey mesquite is an important source of pollen.

Mesquite (*Prosopis velutina*)

Mesquite is native to California and Arizona. Hardy in zones 8 through 11, it flourishes on rocky, sandy soils in bottomlands, canyons, and washes to 5,800 feet elevation.

This is the largest of the mesquites – up to 45 feet in height. It's thin, rough, reddish-brown bark separates in scales. Often crooked, the slender, spreading branches are hairy and brown. Its spines are a couple of inches long, and the pods are straight and narrow.

Crowded on the spur shoots, the compound leaves produce up to three side branches. Broadest at the middle, the individual leaflets are ½ inch in length.

The delicately scented, yellowish-green blossoms are borne on three-inch-long spikes. In desert areas, mesquite is a major nectar plant. Often yielding 60 pounds of honey per colony, it is very reliable. This is light amber with an excellent flavor It's quick to granulate.

Screwbean mesquite (*Prosopis pubescens*)

Also known as tornillo, this species is native to Utah, California, Arizona, New Mexico, and Texas

Continued on Next Page

where it commonly frequents moist areas along creeks, river bottoms, floodplains, irrigation ditches, and washes. Screwbean is adapted to a wide range of soils, including salty, alkaline ones. Tolerating some shade, this sometimes forms thickets. It is suited to zones six through 10.

As an erect tree, screwbean mesquite can be 30 feet in height, but shrub forms are also found. The trunk is about a foot in diameter. The slender branchlets are reddish-brown. Reddish-brown or gray, the smooth, thick bark splits into strips. At the base of the leaves are pairs of white, sharp-pointed spines.

Three inches in length, the foliage consists of five to eight pairs of leaflets – smaller and fewer in number than those of honey mesquite. True to its name, screwbean mesquite pods are spirally coiled like screws. Hairy when young, they're several inches long. These are either yellow or brown.

The greenish-white to yellow flowers open in cylindrical spikes, a few inches in length.

A major nectar source, screwbean mesquite is more reliable than the honey mesquite. This honey is light to amber in color.

CACTI

Cacti are among the most common native plants in the Southwest. The main nectar-producing species are the prickly pear and the saguaro.

Prickly pear (*Opuntia engelmannii*)

Though there are numerous kinds of prickly pears, this species is the most important so far as nectar and pollen are concerned. It's also known as Engelmann's prickly pear, cactus apple, and cow's tongue prickly pear

Hardy to zones eight through 11, prickly pear is becoming especially common in rangelands where the seeds are spread in manure after cattle graze on the plants. The plant's range extends from Nevada and Utah to California and Texas eastward to Missouri, Oklahoma, Louisiana, and Mississippi. In the Southwest, it grows to 4,500 feet elevation. Adapted to a range of soil types, prickly pear requires good drainage.

This segmented, upright, shrubby cactus reaches four feet in height. Eventually, it forms spreading clumps 10 to 15 feet wide. Oval to round, the broad, flat joints or pads are nearly a foot in length. Spaced about an inch apart, the spines are 1½ inches long.

The urn or egg-shaped fruits are about an inch wide and three inches in length. They ripen to purple in Summer and Fall. Due to the tiny, almost invisible spines on the skins, these edible fruits should be peeled before they're consumed.

About three inches long and equally wide, the funnel-shaped blossoms appear along the margins of the pads. These vary in color from yellow or orange-red to red. They're present any time from April to July.

The hotter the weather, the better the nectar flow. Even during droughts, this plant is a major nectar source. It yields around 60 to 80 pounds of honey per colony. Excellent crops occur about every five years.

Light amber to amber, this heavy-bodied honey has a good flavor. It is noted for two things – its stringy nature and the large crystals that become suspended in the liquid once granulation occurs.

Saguaro (*Carnegia gigantea*)

Living for several centuries, this plant is also called giant cactus, sahuara, common cactus, and pitahaya. In the deserts of California and Arizona, it is frequently found on slopes, flats, and rocky places.

Saguaro is adapted to a wide range of soil types provided they're well drained. Preferring a pH of seven to nine, this grows best in sandy soils.

Extremely drought tolerant, saguaro can survive on a couple inches of rainfall per year. It is most suited to zones nine and 10. This long-lived species is very slow-growing. A 30-foot-tall plant may be a hundred years old.

One of the largest cacti in the world, this fluted columnar plant has a tree-like shape. Around 1½ feet in diameter, it can eventually reach 60 feet in height. Typically, saguaros begin developing horizontal branches or arms when they're about 75 years of age.

With two inch spines, the thick, yellowish-green stem is waxy and smooth. There are 15 to 18 fluted, accordion-like pleats that expand to take up water during rains.

Its oval fruits are several inches long. Ripening in the late Summer to Fall, they turn from green to brown. Normally they split open to reveal the light red pulp.

Despite prolonged periods of drought, saguaros bloom in the spring around April or May. The creamy white blossoms with yellow or orange centers emerge along the ribs. Opening during the night, these close the following afternoon. About three inches wide and somewhat longer, these have lots of petals surrounding the floral tube. A typical plant can produce several hundred flowers over a period of a month.

Considered to be an excellent honey plant, saguaro produces a high quality, thick honey that rarely granulates. This species is a major pollen source. Each flower provides a dozen or more bee-loads. Cream colored, it is good quality.

The drought-prone Southwestern region is known for its excellent desert honeys. These come from indomitable, native plants that are adapted to extreme growing conditions. BC

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

THERE'S ALWAYS A FIRST TIME

Removing bees from a house wall

Gary Johns

There's ***always*** a first time...

and sooner or later if you keep bees you're going to be asked if you can remove some bees from someone's house, attic, stereo speaker, etc. Through some mystical sorcery the local fire or police dept. have discovered your ability to bewitch stinging insects and will give your name out as a problem solver (bees and wasps are usually covered by the "protect and serve" motto only in times of dire consequences). This is when you will face a true moral dilemma. Your ego will tell you that it's no big deal you can do it, while your common sense is yelling, "Uh Oh, here he/she/it goes again!" Then your intelligence kicks in its two cents worth. Most beekeepers have a bit of the carpenter in them so it naturally counts that we can do all types of woodwork. Add a wood framed box (house) and bees together and what you have is just a big hive, right? Let's face it, how hard is it really to get the little darlings to just vacate the premises? You show up with equipment in hand locate the entrance and start the Pied Piper routine and all of the royal court marches out and onward. What could possibly go wrong?

Now we've got the stage set so let's bring the players together As can be seen in the photo the entrance was fairly low to the ground. It had been foamed to prevent the bees from entering or leaving the nest by the house owners. Not a good idea as they soon learned. The bees, finding their normal entrance closed simply located a new one going into a nice larger room with bed, stereo and computer included. Poor forage capabilities though, mainly sugar and caffeine and little else. Shortly afterwards my phone starts ringing;

Occupant: **"ARE YOU THE BEE MAN?"**

Bee man: "Uh, I guess so."

Occupant: **"I'VE GOT BEES IN MY HOUSE!"**

Bee man. "Which in are you referring to?"

Occupant: **"HUH?!"**

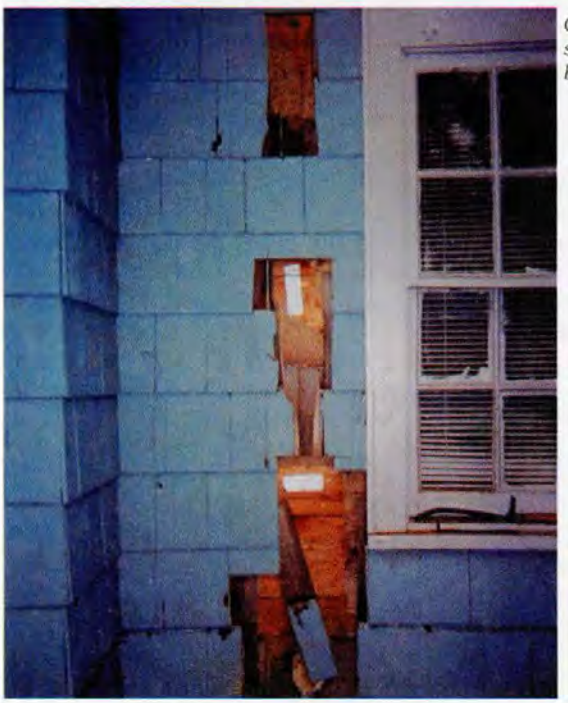
Bee man: "In the house or inside your house?"

Occupant:" **IN MY BEDROOM!"**

Bee man. "Oh, ***that*** in. Ok I'll come take a look."

Caution; never, never, never hold the phone to your ear when answering. Occupants always speak in a loud, booming or shrill piercing voice. Either way the ringing in your ears won't stop for at least five minutes and can lead to more permanent damage.

My first inspection was easy enough as the bees were fairly gentle and it was late evening. Up to this point I didn't suspect the ladies had been there much longer than three or four months. It was late September and my thoughts were they had probably swarmed back in May or June. Since the honey flow had been a poor one that year they couldn't have built very much comb and shouldn't be hard to remove. Attempts to let me relocate the nest next Spring were met with heated



Checking to see where the bees are.

Opening up the nest. The top was above the top of the window.

Continued on Next Page

When you start, ALWAYS *start at the top. What I did was way, way wrong.*

denials so the process for removal was started. Notes of the equipment needed to remove the shingles, siding, and bees were made and a date for removal was planned preferably when everyone was out of the house, including the dog.

The day arrived. Garbed for battle I began by using my trusty bit and brace. Holes were bored up the wall to see how far the comb went. First two feet then six, then 10....TEN FEET! Whoa, who agreed to *this* plan of action? I mean they weren't supposed to be any higher than two or three feet, right?

OK...think...how do you handle 10 feet or more of honey, wax and bees and still get out alive? Well first you get your cell phone (you ***do*** have a cell phone don't you?) and you call your best friend for help. After all it's his duty to help you because he's the one that got you started in beekeeping in the first place. Told you it would be easy, nothing to worry about and he'd be there whenever you needed help. Huh, funny that number was working just last night when you told him about this little project. *Note to self: Next time you start a simple project like this be sure to* ***NOT*** *tell your best friend or anyone else about it. That way they won't be able to come up with a good excuse or a disconnected number at the moment of truth.* In my case it was the Mrs. who saved the day, although reluctantly. It was even brought to my attention that this was a harebrained scheme, comparable to the "Guided Tour of The Honeybee's Hive" I had attempted several years ago. Large quantities of favors and honeydo's were exchanged before I was told that an equitable arrangement had been made. Her arrival with extra buckets, trash bags, bee garb and camera made me feel so much more confident:

Me: "What's the camera for?"

Mrs.. "Insurance."

Me: "Insurance?"

Mrs.. "Yeah, so when you fall off the ladder and break ***your*** neck, they won't blame me!"

Me: "I never..."

Mrs.. "You ***always*** fall off the ladder! The only thing in question is how high you bounce when you do." Hmmm, maybe this wasn't so great of a way to earn extra money after all. But no matter, an agreement is an agreement. Forging on, the shingles were removed and the first cuts into the sheathing revealed the main brood nest. Yep, lots of bees wax and honey. Dang, look at the way that comb just sorta folds over when it hits the outer wall. Must be five separate combs there over 10 feet deep! Obviously this particular hive had been active for more than just the one season. My best guess is that they had been there for at least a couple years. There was very little chalkbrood at the bottom and only a couple of wax moth cocoons so it was obviously a healthy hive. I would have liked to study them to see how they were handling *Varroa* mites but due to the lateness of the year and the fact that the occupants absolutely refused to live with bees in the house for the Winter it was out of the question.

Continuing the cuts up the wall produced still more bees, comb and honey until finally the top was reached. Ok, now we're 12 feet off the ground and a whole lot of work left to be done. Nothing to do but start getting REALLY messy. The line of demarcation between the brood nest and the newly stored honey was fairly obvious so that's where the first cuts were made. *Note no. 2 to self; never, never, never start anywhere but at the top of the cavity when removing honey comb.* It is truly amazing just how easily honey can get in your hair, coveralls, gloves, shoes and other places that shall remain unnamed. I wasn't just smeared with honey...I had literally taken a bath in it!

Removing the comb and honey at the top was one of the scariest moments I had since I was at the top of the ladder – eight to 12 feet off the ground. And to be sure – my wife had predicted what came next. While climbing up to work on the top layers of the nest, I managed to prove Newton's third law of gravity: A beekeeper smeared in honey ***always*** falls off of the ladder! GREAT, now I'm not only sticky and gooey, I look like I've been tarred and feathered and I think I've just set a new bounce-height record! Finally with the help of the Mrs., several five gallon buckets were removed and bottled later for home consumption. *Note no. 3 to self; must find better way of extracting honey from loose comb. Squishing doesn't work!*

After loading the gooey remains there was nothing left to do but take care of the hole in the wall and that was easily handled with a plastic drop cloth and staple gun. Arrangements had been made before hand for a carpenter (not that I don't count myself as one, it's just not my true avocation) to fill close, fill and suture. Cleanup at home was easy as pie. I placed everything in front of the hive in my backyard for a couple of days. Voila! Spick and spanking clean. I had originally intended to just stop at the car wash and hose myself off but the Mrs. was adamant in her refusal to be seen in public with a honey-dripping, tarred and feathered spook. Kept mumbling something about grownups and Halloween but I still couldn't hear too good as I had put the phone up to my ear earlier that day while trying to coerce...uh, convince the Mrs. to come help.

Now all I had to do was sit back and dream about how to spend all that money coming in for the job. Let's see; cost of gas $10, cost of helper (Mrs.) $100, cost of five plastic buckets $17.50, cost of new saw blade to replace blade trashed by old nails $22.50, cost of new coveralls, hats, veils and gloves $110, cost of trip to Voodoo Doctor to get sprained ankle poked and prodded $65. Actual payment for services rendered $100. Satisfaction quotient: **Priceless.** BC

Gary Johns is a hobby beekeeper and removes bees from buildings near his home in Stillwater, Oklahoma.

MEET JANE WORKER BEE

Larry Connor

We tend to think of bees gathering nectar as instinctive and completely predictable. The reality is much more complicated. As we observe different colonies "perform" in our apiary, we see that not all are equal – some colonies seem to be just making do while others are piling up nectar in supers. What is going on here?

Meet Jane worker bee

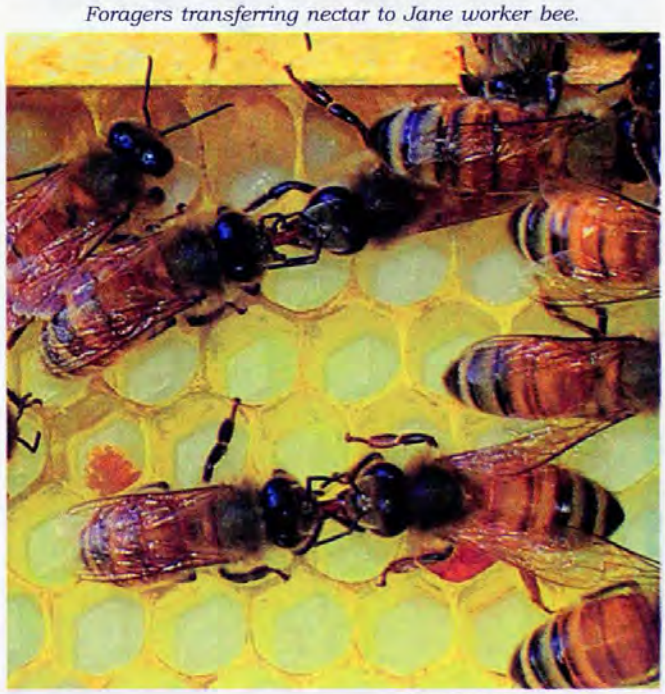
While I have yet to hear of anyone who communicates directly in a two-way discussion with worker honey bees (stings do not count), I often feel that the average Jane worker bee is in the hive just doing what she is told to do. If nobody tells her what to do, she just hangs out on the comb and waits, ready for action. In a strong hive, of course, she will not have to wait long.

The "boss" in the beehive, the force that gets Jane worker bee away from the "nectar" cooler, is really the rest of the workers in the hive, with a few brief but over-riding pheromonal encounters with the queen. The bees respond to colony "needs" and Jane responds to the stimuli of the other workers in the hive – tens of thousands of other Janes in the hive making demands on their sisters (and half-sisters) to get to work. In that regard, the nectar story is a good one, because it shows how the right stimulus will result in a positive work response by Jane.

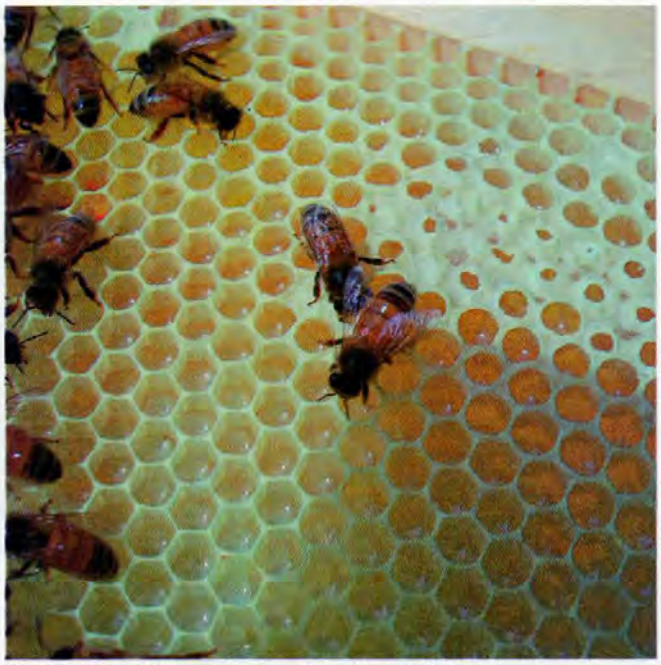
When a forager returns to the hive with nectar in her honey stomach – a pre-digestive region of the alimentary tract – she searches for a waiting Jane worker bee to pass off the nectar to. The forager has added enzymes to the nectar to start the conversion of the primary nectar sugar sucrose, into dextrose and glucose (complex sugars broken into simple sugars), and in order for the forager to return to the flowers, she must find a Jane to take the nectar She may give this nectar to one waiting Jane, or to several. As the forager regurgitates the nectar, the Janes of the hive drink it into their own honey stomachs and continue the conversion of nectar to honey.

Jane will find a relatively quiet corner and slowly expose part of the nectar in her honey stomach to the air of the hive. She does this by manipulating her tongue and other mouth parts to expose a thin bubble of nectar to the warm air of the hive. Somewhere, other worker bees are moving air into and out of the hive with their wings by fanning. This sets up an air movement that moves heated air over the exposed nectar and reduces the moisture content by as much as 15% in 20 minutes or so. Jane will make this thin bubble of nectar larger and larger as the sugar concentration increases and

Foragers transferring nectar to Jane worker bee.



Continued on Next Page



Nectar stored in cells before turning into honey.

the water concentration decreases.

Once the nectar has been reduced in moisture content by Jane, she will find an empty drawn cell to store the ripening honey She will often deposit the droplet of nectar on the top of the cell, where the moving air will continue to remove moisture. If there are too few open cells, the nectar may be temporarily stored at the top of cells containing eggs and small larvae. The will be removed during the evening hours as the colony works to process the day's successful foraging.

This is the point when a visiting beekeeper will get his or her shoes wet if the combs are handled roughly. Nectar will drop out of the combs with the least amount of movement, and it is best to keep the frames upright rather than roll them over bottom to top as we might ordinarily do. Pollen pellets will also fall out of the cells, wasting more of the bees' labor

Nectar that is reduced sufficiently to become honey is capped with sparkling white, brand new wax capping.

Now, what happens when a forager returns from the field and is unable to find an available Jane to take her nectar? At this point the forager must either process her own nectar or wait for a Jane to become free, and this will delay the forager's return to the field. If the colony is small, this will interfere with its ability to store as much nectar as a strong colony. More on that below.

Jane receives a stimulus when a forager returns to the hive and offers her nectar to process. Then she will be on task and not willing to take additional nectar while she is processing the first load. Once the nectar is in the comb, she will be available to be recruited again.

The forager receives a stimulus from Jane when the nectar is exchanged. She is then able to respond to other stimuli (dancing bees calling foragers to the field, prior foraging experience, or even her own scouting experience) and will be free to return to the field if both daylight and the nectar source continue.

When I was instrumentally inseminating queens in Florida I observed that during the strong orange flow that the drones were filled with nectar Since drones do not forage, I suspected that they served as a secondary depository for incoming nectar; that as foragers returned to the colony, and all the Janes were busy processing nectar, the available drones were given a load of nectar This kept them fed for mating flights, and may be part of a stimulus-response mechanism. I do not know if drones are able to control regurgitation as workers do.

I recall that as we harvested semen from these drones, our hands became covered in orange blossom nectar as the drones' abdomens contracted during ejaculation and the contents of their stomach's were on our hands. It was sticky work.

Working the percentages

Research shows that larger colonies have more forager bees than small colonies. Larger colonies undoubtedly have more Jane worker bees waiting to take the nectar as well. More important the *percentage* of bees focused on nectar gathering and process increases as a colony increases.

In other words, one colony of 60,000 worker bees will have a larger percentage (thus actual number) of forager bees than three colonies of 20,000 bees each. Same number of bees, (plus two more queens), but the division of labor is very different. When a beekeeper understands this fact, he or she will finally learn the secret of making a large honey crop. Big colony populations produce more honey than a bunch of little ones.

Every colony needs a certain number of bees to attend to nurse bee and house bee duties. In a nucleus colony, a very large percentage of bees are concentrating on brood development and expanding the colony population. Foraging is to meet needs at this point, and to gather enough food to survive a cold snap. Small colonies do not have a great deal of long-term security

unless they grow to a size adequate to survive the winter with honey reserves to keep them alive. The emphasis is on growing the size of the colony. They need pollen for this more than nectar, and are thus good pollination units.

Research on honey production indicates a few remarkable facts. First, no geneticist has been able to find a single honey production gene – apparently no single or small group of such genes exist that control honey production. Instead, a breeder must select for a wide range of characteristics which add up (as additive genes) to an increased bee population, available to collect the nectar when the plants make it available. I would want a set of genes that contribute to good over wintering behaviors (especially conservative honey consumption), rapid Spring buildup, high hygienic behavior, low swarming instinct, and high pollen collection, just for starters. I would not mind genes that allow mother and daughter queens to lay side by side during the spring of the year (supersedure strains), low propolis collection, good wax building skills (especially on plastic combs), and no temper and good temperament (quiet on combs). The first set are for high honey production, while the second set are more for the beekeeper trying to manage such colonies.

Increasing colony size

Every beekeeper should keep the percentage game in mind while planning for the upcoming season. When will you likely have a nectar flow (how often does this nectar source produce a surplus crop?). Are you working from over wintered colonies, nuclei, packages or full colony increase colonies? What limitations do you have in terms of equipment and locations.

Beekeeping friends who get most of their surplus honey from tulip popular trees frequently lament that their season is over before other beekeeper's honey season has even started. For such beekeepers, from the Carolinas to lower New Jersey and Pennsylvania, the crop comes very early, and the colonies must build very rapidly in the Spring. Thus, supplemental feeding in late Winter will pay back with a larger honey crop. The weather will cause problems on some years, killing fruit bloom and even tulip flower buds. It is an area requiring special management. After the tulip is finished, there may not be another nectar flow until Fall flowers. Months must be spent with the bees in a holding pattern. Some beekeepers make up full colony increase units during the Summer since it is when they have the time to build up new colonies for the next season.

Compare that with the clover crop from sweet clover. Colonies from overwintered stands, packages, nuclei and full colony increase are all able to reach high forager percentages when the clover bloom starts in most areas. The primary threat to this is the swarming instinct, and beekeepers must have a swarm prevention plan in place for overwintered colonies and for rapidly growing increase colonies that may become crowded during buildup.

For well over 100 years, beekeepers have used the practice of moving frames of brood from strong colonies and adding these frames to weaker colonies as a means of equalizing the strength of all colonies in an apiary as well as reduce the swarming instinct in the strong units. They have also moved frames of emerging bees and brood plus attendant nurse bees into make increase nuclei colonies or full colony increase. One specialization of this manipulation is to run a two queen system.

Two queen systems use a special screened board (adapted inner cover or special piece called a double screen) to allow heat from the unit below to support the development of the colony above. Frames of emerging brood and bees are placed *over* the double screen and given a very small opening located at the back of the parent colony (180 degrees different). Depending on the time of the year the new colony is then given a queen cell, a virgin queen, or a mated queen. Such colonies are made up in late April to early may in northern states, and allowed to grow rapidly.

When the clover bloom is about to begin (or whatever the primary flow seems to be for the year) the double screen is removed and the colonies combined via a sheet of newspaper. A single queen – usually the new one – is allowed to live while the old queen is removed and killed. Some beekeepers let the two queens figure this out by themselves.

The advantage to the beekeeper and the bees is the combined population from two brood nests are now working to collect one very large honey crop. This method works well when a beekeeper has plenty of equipment, a relatively sure honey crop, and able to stack equipment quite high on a hive stand.

Such a huge population will forage wide and find nectar smaller colonies will not, and will often produce a super or two of honey when others are hand-to-mouth. Unfortunately, in a complete Summer dearth, this is a lot of bees to feed!

Hoarding by bees

When we think about Jane worker bee, we know she stores nectar in empty drawn cells. While conventional wisdom still seems to be to provide supers to hives as they need them, there is strong evidence that this is not the best way to super colonies, especially strong ones.

Several years ago Dr Tom Rinderer published papers on the hoarding behavior of bees, with a practical twist. He found that bees responded to empty drawn comb as a stimulus, providing them with some incentive to get out and forage for nectar and fill those drawn cells with honey. This was compared to sequential supering, where supers are added as the ones on the colony are filled.

Whatever the stimulus may be, pheromone, volume of empty wax, or whatever, this is a good lesson for beekeepers to remember when they place supers on the colony. As the flow begins, get all the supers of drawn comb you have, and let those hard working Jane worker bees fill them with nectar as they ripen the honey from the foragers.

Unfortunately, this stimulus is not found in foundation. 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.

THE PROPER FOUNDATION FOR THE APPROPRIATE FRAME

James E Tew

For the new and even the experienced beekeeper this is a confusing process.

Making it all fit

After all my years in beekeeping, selecting frames for specific sized equipment and the necessary beeswax foundation needed to fill the frames is still a cumbersome task. In fact, the tedium surrounding this subject is only surpassed by that surrounding a comprehensive discussion of the mixing rates of antibiotics for treating beehives. Both topics can be maddening.

Interchangeable equipment - somewhat of a myth

My computer and I are presently surrounded by beekeeping catalogs from various companies. Interestingly, in some the wording has not changed in all the years of my beekeeping. For that fact I am appreciative. If the instructions changed I would have to relearn the entire process of buying frames and foundation. Why should it be a problem? U.S. beekeeping equipment is interchangeable – right?

I have been party to the process of perpetrating that universal myth for a long time. To a large extent, the equipment from one manufacturer *does* fit the equipment from another company, but not always perfectly. Certainly, when it comes to buying frames and foundation, any particular company would prefer that you bought both items from them rather than bouncing around from one supplier to another So, would a 9-1/8" frame (a deep frame) from, say, Mann-Lake accommodate Dadant crimp-wired foundation (8 ½" x 16 ¾")? The answer is probably yes, it would fit well enough. But would a Mann-Lake deep frame, having Dadant crimp-wired foundation fit into a Walter T Kelley deep hive body having a 5/8" frame rest? Again, the answer is probably yes, but you can see that there is clearly easy opportunity for confusion here. Rest assured that if you keep bees more than a couple years, you will mix equipment. There's nothing wrong with that.

Catalog descriptions

Different catalogs describe similar products in different ways. It is as though they all speak English but with different dialects. Different terms and different dimensions are used to describe both the foundation and the frames. Foundation listings are a combination of trade names mixed with traditional names. An example would be Duragilt (trade name) listed along side Medium brood (traditional name). Some discussion might help.

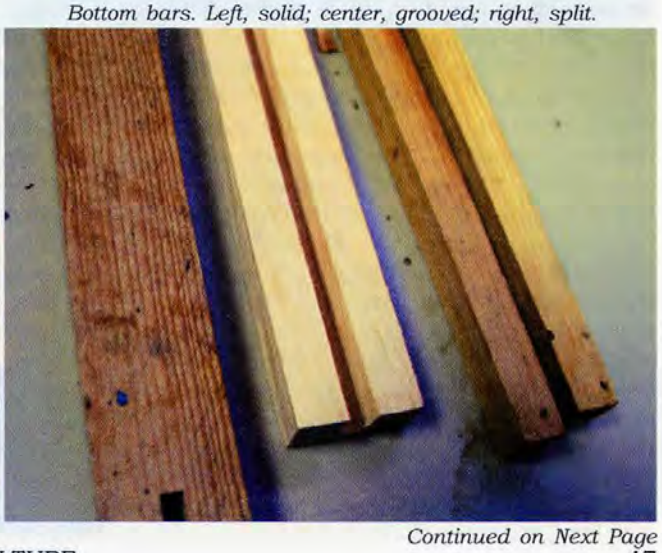
Medium brood foundation

Medium brood foundation is made only of beeswax, and refers to the thickness of the wax foundation sheet, *not* the dimensions of the wax sheet. In years past the A.I. Root Company made medium brood foundation in laminate layers, like plywood, but that product is no longer available. So today's medium brood has no plastic, no wires or no other integral way to support the foundation. The frame accepting medium brood foundation must have support wires installed. For those of you in the know, "support pins" can be used in place of wiring, but nine times out of 10 this is a bad idea and results in poorly formed combs.

And what's with this "medium brood" term? The

Left, grooved; right, wedge, with the wedge partially removed.

Bottom bars. Left, solid; center, grooved; right, split.



Continued on Next Page

name is a throwback to our days past when a beekeeper could choose from *heavy* brood foundation, *medium* brood foundation or *light* brood foundation. Today, only medium brood remains as a catalog choice, in any bee supply catalog, along with the archaic name. You'd think they'd notice.

Wired foundation (Crimp wired)

Wired foundation is beeswax medium brood foundation that has several vertical support wires imbedded into the wax by the manufacturer. These *vertical* wires are "crimped" to help them resist slipping in the foundation at times when the foundation is warm. Horizontal support wires, however, are placed in the frame by the beekeeper. When the horizontal wires are embedded in the wax with a "wire embedder" the wired foundation forms a strong midrib for the comb the bees will build; the foundation thus resists warping while hanging in a super, and will be better able to withstand stresses in the honey extractor Yes, support pins can be used in lieu of adding horizontal wiring, but this is far, far less than a good idea. The unsupported center of the foundation sheet can and will distort. (As you can tell, I don't particularly like support pins.)

Wired foundation comes with the vertical wire having hooks or no hooks on one long side. Essentially, the *top* of the foundation sheet has the wire extending past the edge of the wax sheet, but bent at a right angle from the surface of the sheet, forming an 'L' shape, thus the 'hook.' On the opposite edge of the foundation sheet the wires are flush with the edge and unhooked. For foundation with hooks, use wedge top bars. For foundation without hooks, use grooved top and split bottom bars. More about frames later.

Plastic center foundation

For years bee supply companies have had various plastic foundation sheets available. These are embossed with the same outline of cell bases as traditional beeswax sheets, then had a thin layer of beeswax applied. These ridged sheets of foundation do not need wiring and are quicker to install in frames. Duragilt and Plasticell are two examples of trade names of this type of foundation. Since there are no wires in the sheets there are no hooks, allowing this foundation to be used in either grooved or wedge top bars. Duragilt has metal edges on the short sides to give support to the foundation sheet, while Duracomb doesn't strips.

To the best of my knowledge no plastic frame or plastic foundation on the market today is preferred by the bees more than beeswax. But – and it's a very big but – plastic frames and foundation are seemingly here to stay. The time and effort required to wire and embed foundation is significant. Plastic foundation is strong, easy to install, and in nearly the same price as beeswax foundation – maybe even cheaper when you consider your time. Wax-coated plastic foundation is far more readily accepted by the bees than uncoated plastic foundation. Beeswax coating increases the cost by about 10¢ per sheet for wax and application. But, plastic foundation (and frames) come in colors – black or white or green. Black foundation makes seeing eggs and small larvae easier than when on white plastic.

"Support pins can be used in place of wiring, but nine times out of 10 this is a bad idea, and results in poorly formed combs."

Specialty Foundations

In general, specialty foundations are edible. Obviously, you wouldn't want to eat wired foundation in your comb honey and cutting plastic foundation for cut comb or chunk honey is silly. Comb honey, cut comb honey, and chunk honey frames are made using chunk foundation or thin surplus foundation.

Like brood foundation, there is also some history in comb foundations. Comb honey perfectionists desired beeswax foundation so thin and clear that a newspaper could be read through a sheet. When eating comb honey built on this extremely lightweight foundation the supporting comb midrib will be undetectable to the eater. As for the name of the foundation – thin surplus – the comb honey was to be removed from the colony, and the foundation was thin; hence the name thin *surplus* foundation. In some catalogs today this product is named, "thin super foundation."

The W T. Kelley Company manufactures Special 7-11 foundation. This has embossed cells that are neither worker or drone sized cells, but rather they are made *between* the two sizes. Queens are not eager to lay either drone or worker eggs in these cells making it a good choice for cut comb or comb honey production, since it keeps the queen out of these supers. However, if left on long enough, the bees will restructure it and will probably use it for only drone production.

Drone cell foundation is a special product used by queen producers wanting to produce a large number of drones or in honey supers. Drone foundation, drawn by the bees into drone comb uses less wax than worker comb, meaning more honey is stored. And, honey can be removed from the larger drone cell easier than the smaller worker cell size, especially if the honey is cold. Drone cell foundation is available in wax or plastic sheets.

Wax exchange or wax working

Sometimes the price of foundation can be reduced if you take rough-rendered wax to a bee supply company. Essentially, you are paying to have your wax converted into foundation. You don't actually get *your* wax back but you do get a reduced price on the cost of the foundation you buy if you have wax to exchange.

Plastic frames

One piece plastic frames with plastic foundation combined are steadily growing in popularity. Not only do they require less time and effort to get onto the bees, but these inventory listings in catalogs do not have the complexity that wood frames and foundation have. Essentially, a beekeeper purchases the proper size frame for the super or brood chamber you need frames for; choose a color (black, white or green) and

choose either waxed or unwaxed. Buying plastic frames is a lot simpler than buying wood frames. The only problem is that the bees are not as happy on plastic as they are on wood and wax, but they generally grow accustomed to this new medium.

Wood frames

Wood frames (both those you assemble, and those that arrive already all together), are alike in all ways except sizes and how the foundation is attached. While end bars are essentially the same from all manufacturers; some simple choices must be made on the style of the *top* bar and the *bottom* bar

Top bars

In our beekeeping past top bars were either thick or thin. Thick was ¾" thick while thin was 3/8" thick. Thin top bars were slotted, grooved or solid and used on frames for producing comb honey. The thinner top bar allowed more surface area for cell building and honey storage. Thin top bars are essentially gone from today's market.

Thick top bars are either grooved or have a wedge top. On rare occasions you may see solid thick top bars, but these old frames are antiques. Wedges are useful when using hooked, crimp wired foundation. The wedge is removed. The foundation is laid in the frame such that the hooks are flat side down on the top bar, with the hooks pointing up. The hooks, then, are trapped beneath the wedge on the top bar when the wedge is replaced, holding the foundation firmly in place. A grooved top bar could be used, but the foundation should not have hooks or should be one of the plastic styles of foundation. Commonly, grooved top bar frames are first assembled and then the plastic center foundation is snapped in place. However, try a few first. It may be that the frame should be assembled *around* the plastic foundation rather than snapping it into place later

Bottom bars

Bottom bar styles are: solid, grooved, or split (two-piece). Split bottom bars are the most common. If you are using grooved top bars, you should also use grooved bottom bars. Solid bottom bars are increasingly difficult to find.

Myth or not?

So, I ask the question again, "Is all our beehive equipment universally interchangeable?" And the answer is still, 'mostly.' If you are still new to beekeeping, I would suggest staying with one company to provide your frames and foundation. As you become more experienced you may want to mix manufacturers, and potentially make more mistakes. But you can always improvise. That's beekeeping. BC

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

When Bees Become More Than A Hobby

Peter Hildebrandt

Though South Carolina beekeeper Archie Biering doesn't commute to Charleston anymore, he still lives across the street from a "city" of over a million. However, this city's population sign refers to the bees at a place called *Bee City* that is now one of the most important parts of Biering's life.

Archie Biering did have "regular" work for over three decades. But he admits he would have done things a little differently. "If I could go back and change things I wouldn't have worked for the federal government for 32 years. Instead, I would have been here doing what I'm doing now, doing what I love – beekeeping and informing the public about bees."

For all those years that Biering worked for the U.S. government he commuted over an hour – each way – to Charleston, where he worked as a welder at the U.S. Navy Shipyard. But even before he had that job, Biering kept bees, as did his father before him.

Archie Biering first started out with five hives. But over 10 years ago, he started to sell his tupelo honey from his house near the Edisto River. As more people came out, Biering and his wife Diane, would decorate empty hives to give his customers something to look at. Eventually, as their hive collection grew and the Bierings saw the need, they built a snack bar and gift shop. With time, as groups grew in size, *Bee City* grew to five acres and included both a small petting zoo and an education building for school groups.

Now, 45 years later, he has 162 hives, all within 10 miles of his Cottageville, South Carolina, tourist attraction. *Bee City* grew from Biering's beekeeping hobby This "hobby" now provides fulltime work for Archie and his wife Diane. What started out as a few unused hives painted to look like village businesses, (with names like *Bee P Gas*, *Buzz-Cut Barber Shop* and *AppleBee's*), has grown into an educational/tourist destination for numerous school groups as well as anyone looking for a delicious lunch in the 50s café or a jar of Biering's own award-winning tupelo honey from *Bee City*'s well-stocked gift shop. Biering's honey has won ribbons in both the South Carolina State Fair in Columbia and the Coastal Carolina Fair in Charleston. For the past two years it has won more ribbons than any other honeys entered in the South Carolina State Fair

Archie thinks there may be some things different about how he runs his bee operations, compared to other beekeepers. "We all have our own procedures that we go by," says Biering, "Of course I have mine. Everything is unique about it, I feel. I run three different bee yards within a 10-mile distance of *Bee City*. I work my bees in the tupelo tree swamps in this area. I never rent my bees out to farmers for pollination."

Biering specializes in tupelo honey "One thing unique about this type of honey," according to Biering, "is that it is the only honey produced that can be chemically proven where it comes from. The agriculture department can walk into a store where my honey's being sold, take a jar to the counter and with a few drops of solution in a cap, read my product like a book."

This test can show if the honey is diluted or pure and nearly anything else about it. Any of the other honeys produced that have to be tested, must be sent to a Beltsville, Maryland, lab for a rigorous and expensive test. "Because the government does not like to spend money," says Biering, "the tests are not often done as a rule. Tupelo honey is tested every time that they see it. If you put that word on your jar, anyone who knows anything about honey, knows they've a pure product." Biering also likes to work with tupelo because it produces a steady product for him every year.

Perhaps the most rewarding aspect for Archie Biering since his beekeeping operations have expanded, is the fact that he and his wife Diane have the opportunity to raise awareness of the importance of bees and the work of beekeepers. One of the most prominent features of *Bee City* is the interactive classroom. In this area, with its seating capacity of 100, students on field trips can view a number of bee displays including an actual working hive. The Bierings point out the queen and workers, what they're doing and the workings of the hive.

A *Bee City*-style attraction is not for all beekeepers. It is an all-consuming job. In addition to their café and gift shop operations, the Bierings have added a petting zoo with monkeys, pigs, goats, peacocks, llamas, turkeys, a donkey, chickens, sheep and fallow deer. "My advice to anyone starting out in this kind of operation," says Archie, "is for you to do as much of the work as you can up front, by yourself. Things get very expensive when you start hiring other people. There isn't that much money involved when you can do it yourself." It helps to have a wife as dedicated as Diane Biering is to the operations, too.

Archie Biering's second career does show signs of slowing down. "I retired 11 years ago. I am not looking to retire from *Bee City* anytime soon – until I absolutely have to." BC

APITHERAPY

Ann Harman

Uses Here and Now, and Yet To Come

Arthritis can be a very debilitating disease. Charles Mraz felt that an answer to its cure, or at least alleviation, could come from bee venom. It had certainly helped him lead a life free from pain and immobility. Since Charlie had provided the bee venom for the studies by James Vick on arthritic beagles he was particularly enthusiastic about interesting more researchers into investigating venom's use.

The studies in animals and the continued anecdotal reports of the use of bee venom in humans encouraged Vick and his associates to bring everyone together for discussions. The initial group meeting in 1977 was initiated by Vick and Jurgen von Bredow, another pharmacologist interested in the effects of bee venom. At their next meeting in 1978 the North American Apiotherapy Society (NAAS) was formed. The purpose of the group was to encourage scientific research into the effects of bee venom. Glenn Warren, whose family suffered from the devastating effects of arthritis, funded bee venom studies, including those of Vick. Glenn's son, David Warren, took an active part in the group, since he also was afflicted with the familial severe arthritis.

The North American Apiotherapy Society was active during the 1980s and held yearly symposia in the Washington, DC/Baltimore, MD, area. I was an apiculture student studying under Dr Dewey Caron, volunteered her arthritic horse for bee venom trials and thus became involved with bee venom therapy and the organization. I became president of NAAS. Speakers for the symposia were sought from around the United States and Canada. Few scientists were involved in any form of venom research, but those that were presented the results of their research and were glad for the opportunity to share information.

Bee venom has been a part of the Homeopathic Pharmacopoeia for 200 years. Therefore several homeopathic physicians were active members of NAAS and contributed their views on the effects of bee venom in their practices. Charlie always participated in each symposium, giving the latest accounts of his visits with apitherapists in a number of foreign countries and urging true research into the effects of bee venom. Charlie was enthusiastic about the apitherapy being done in Europe and its acceptance by physicians there. His hope was that the doctors of the U.S. would be allowed the use of bee venom as an important part of arthritis therapy.

NAAS also acted as a source of information. Queries came from all over the United States from people searching for treatment for a number of problems and diseases. Since treatment was not part of the purpose of NAAS the caller was referred to an appropriate physician who had offered to respond.

Unfortunately the North American Apiotherapy Society simply ran out of possible speakers. Research into venoms, particularly bee venom, was becoming scarce. Research funds were being used elsewhere. Outside of venom used for desensitization of those persons truly allergic to bee stings, no medical interest was taking place. And so NAAS brought its activities to a close.

But the interest in bee venom and other products of the hive did not stop. Charlie continued his work in collecting venom and encouraged others to use live bees for stings for both arthritis and Multiple Sclerosis. Taking up where NAAS had left off, the American Apitherapy Society (AAS) was formed with its initial membership taken from the members of NAAS.

The Mraz family was, of course, an enthusiastic supporter of AAS and contributed much to its success. One monumental task begun by AAS was to encourage those people using not only bee venom, but also other hive products, to report on the use and the results. The compilation of these reports is serving to give a good overall picture of the status of apitherapy today.

For many years the leadership of AAS was in the capable hands of Dr Theo Cherbuliez. However in 2004 he stepped down and Dr. Andrew Kochan of California is now the current president. Dr. Cherbuliez stated that "one of the major tasks of AAS is to put apitherapy on the map in the U.S. – it has achieved some legitimacy here, but no legal standing."

The AAS has a large membership not only from the U.S. but also from around the world. Their Journal is published quarterly and contains articles from physicians and from those giving and receiving apitherapy You can view the website of AAS at apitherapy.org and reach the organization at aasoffice@apitherapy.org. Dr Cherbuliez initiated the Charles Mraz Apitherapy Course usually given once a year in different parts of the country. The course is designed to give the lay-person a sound knowledge of apitherapy and includes practical training. Those members who wish can join the AAS Network as a means of contacting others interested in apitherapy. The society and its journal are definitely of great value for those interested in all forms of apitherapy.

Here in the U.S. The National Honey Board is giving grants to researchers in the health field to study the benefits of honey in the human diet and in other areas such as dental health. Honey as wound treatment has been encouraged by the work of Dr. Peter Molan in New

Zealand. Ongoing studies here in the U.S. are focusing on what U.S. honeys give results comparable to those of New Zealand's manuka honey One holistic large animal veterinarian is promoting the use of honey to treat wounds and skin conditions.

Bee sting therapy has spawned a new market for bees. Several beekeepers throughout the U.S. have designed shipping containers for live bees that will allow the bees to live for several weeks. These bees are used primarily for Multiple Sclerosis sufferers. Having a several-week supply of bees means that the patients do not have to rely on searching for a few bees in a jar.

In British Columbia, Canada, Michael Simics has been an enthusiastic supporter and promoter of apitherapy. His company, Apitronic Services, has been in business there for 13 years. Simics distributes several catalogs including one for venom collection devices. He is continually expanding his number of products. Information can be found on his web site: www.beevenom.com.

What is going on in the rest of the world? The international beekeeping organization, Apimondia, has a congress every two years. There is a permanent standing commission on apitherapy whose president is, not surprisingly, Dr Theo Cherbuliez. At each congress speakers from around the world give presentations on the use of and treatment with all of the hive products. This year, 2005, the Apimondia congress will be in Dublin, Ireland, August 21-26 (see www.apimondia2005.com)

Research is taking place at the University of Wales, United Kingdom, on the use of honey in fighting serious bacterial infections. These researchers feel that honey would be of great benefit in developing countries where modern antibiotics are either unavailable or are too expensive.

In Kathmandu, Nepal, one doctor has an apitherapy clinic. His patients come from all around the country His clinic is always crowded with people waiting for treatment. This clinic is unusual in that he also has a classroom where he teaches about bees and beekeeping. He also gives lectures on apitherapy in nearby countries.

A doctor in Lviv, Ukraine, makes house visits with his traveling kit full of live bees. He does treat with bee stings at his clinic but many of his patients are elderly and arthritic and find it difficult to travel to his clinic. He maintains a number of hives in the city for his bee supply and moves some hives to the country during Spring and Summer to build the population for use during the Winter.

As a continuation of Dr Peter Molan's work, a wound dressing using manuka honey is now available in New Zealand and is being registered in the UK. Certainly more such research and development will continue.

Will the United States catch up with the rest of the world? Perhaps not immediately In the United States Complimentary and Alternative Medicine (CAM) has increasing interest and usage. CAM encompasses many therapies including acupuncture, therapeutic massage and herbals. The public is becoming more aware of health – "wellness" is a current buzzword. The merits of various diets are daily news. Will apitherapy benefit from the rising interest in CAM? Apitherapy certainly fits into CAM. Bee stings are frequently given on acupuncture points. And like other therapies of CAM, anecdotal evidence is increasing.

What about other hive products? Pollen was of great interest during Ronald Regan's presidency but interest dwindled. Royal jelly will continue to be popular with Asians but its use will probably not be widespread in the U.S. Beeswax seems to have limited medical uses.

However propolis is being investigated because of its antibiotic properties. Is propolis next in line after honey for therapeutic use? Very possibly. The situation we are facing with antibiotics and resistance to them is being addressed. A "commercial" heard on radio recently discouraged people with the common cold to ask for an antibiotic "to cure the cold." Since antibiotics do not affect viruses in general, antibiotics are useless against the common cold.

Propolis is not going to cure the common cold either but its use against bacteria is promising.

Fortunately around the globe good research is increasing on hive products. Doctors are becoming more accepting of alternative therapies. Pressure from them and from the public can only increase research and only research can lead the way for increased use of hive products – for apitherapy. BC

Ann Harman takes care of her unarthritic horse on her farm in Flint Hill, VA.

? DO YOU KNOW ?

Science of Beekeeping

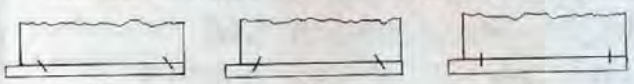
Clarence **Collison**
Mississippi State University

Keeping and managing honey bees requires extensive knowledge on many different topics. While there are some common basic biological principles specifically associated with *Apis mellifera*, the European or western honey bee, there is still tremendous variability between individual colonies, associated with the queens genetic background, local environmental conditions, food sources, equipment used, and management practices the colony has previously received. This variability is one of the reasons why there is "no one right way to manage bees." Attempting to understand this variability and explaining the factors that contribute to it is what the science of apiculture or the art or business of beekeeping is all about.

Take a few minutes and answer the questions to see where you are in your beekeeping knowledge.

Level 1 Beekeeping

1. ____ Name the resinous material collected by foraging honey bees from a variety of plants, especially the buds of trees.
2. ____ A colony will starve in mid-Winter, early-Spring even though there is plenty of honey below the Winter cluster in lower brood-food chambers but is lacking in the upper chamber where the cluster is located. (True or False)
3. *Clostridium botulinum* is the causative organism of _____.
4. ____ Beekeeping pest associated with fermented honey within the hive.
   A. Greater wax moth larvae
   B. Bee lice
   C. Small hive beetle larvae
   D. *Varroa* mite
   E. Lesser wax moth larvae
5. ____ Fertilization of the queen's eggs occurs while they are still in the ovarioles that make up the ovary. (True or False)
6. ____ When a queen has been caged and held in a queen bank for some time, the eggs are reabsorbed and the ovaries shrink. (True or False)
7. ____ Until a drone mates with a queen, the sperm are stored in the testes.
8. ____ Throughout the world, finely crystallized or creamed honey is consumed in much larger quantities in homes by individuals than is liquid honey. (True or False)
9. ____ Well ventilated combs stored in the light deters wax moth infestations. (True or False)
10. ____ Recent research has shown that the fungus *Metarhizium anisopliae* is deadly to:
    A. Tracheal mites; B. *Varroa* mites; C. Small hive beetles; D. Greater wax moth; E. Bee lice
11. ____ Below are three diagrams indicating different approaches to using hive staples. Please indicate the preferred way to use hive staples. (1 point)



A. B. C.

12. ____ *Varroa* mites that spend some time on adult bees have an increased reproductive rate. (True or False)
13. ____ Honeydew in comparison to honey is generally considered inferior to honey in flavor and quality in the United States. (True or False)

Advanced Beekeeping

14. ____ *Pseudomonas aeruginosa* is the causative agent for:
    A. Powdery Scale Disease; B. Stonebrood Disease; C. Septicemia Disease; D. Spiroplasmosis
    E. Amoeba Disease

Body shape and form are specific to the various genera of parasitic mites that attack honey bees. Please match the appropriate illustrated mite to the correct genus. (3 points)

A. *Euvarroa* B. *Varroa* C. *Tropilaelaps*

15. 16. 17.

18. ____ The two largest chemical components found in bee-collected pollen are:
    A. Carbohydrates; B. Fats (lipids); C. Ash; D. Protein; E. Potassium
19. Name the three sources of funding for the National Honey Board. (3 points)
20. ____ Chloramphenicol is:
    A. An antimicrobial component of propolis
    B. An antibiotic that is being tested against *Melissococcus pluton*
    C. A chemical attractant found in pollen
    D. Fungicide currently being tested against chalkbrood
    E. An antibiotic that was recently found in Chinese honey being imported into the United States.
21. Naturally occurring levels of 5-hydroxymethylfurfuraldehyde (HMF) in honey are about _____ mg/kg.
    A. 2; B. 65; C. 40; D. 25; E. 10
22. ____ Yeasts that cause honey to ferment are unable to grow at temperatures below 60° F. (True or False)
23. ____ Female wax moths unusual because they search for males rather than males being attracted to females. (True or False)

ANSWERS ON NEXT PAGE

?Do You Know? Answers

1. Propolis
2. **True** A colony will starve in mid-Winter, early Spring even though there is plenty of honey in the lower brood-food chambers. During the Winter the Winter cluster slowly eats its way upward and ultimately ends up in the upper most hive body. Since heat rises, this is the warmest part of the hive. Once the Winter cluster has reached the upper hive body, it is unlikely to break cluster and go down to get food, even if the upper hive body is lacking food stores.
3. Infant botulism
4. C) Small hive beetle
5. **False** The eggs in a queen's ovaries are not yet fertilized by sperm. When an egg in the ovary's ovariole is ready to be discharged, the lower end of its follicle opens and the egg passes down the lateral oviduct into the common oviduct and then into the vagina. Following two meiotic divisions, the egg is now ready for fertilization by spermatozoa which are discharged upon them from the spermatheca.
6. **True** When a queen has been caged and held in a queen bank for some time, the eggs within the ovaries are reabsorbed and the ovaries shrink.
7. **False** When an adult drone first emerges he has a very large pair of testes, full of immature sperm. Over the first few days of his life, the sperm become more mature, growing closer to their ability to fertilize an egg. Once they are mature, the sperm migrate to paired storage organs, the seminal vesicles, and the testes shrink.
8. **True** Most of the world's people consume honey in the crystallized state (creamed honey), not in the liquid state.
9. **True** Keeping wax combs in the light and well ventilated will discourage wax moths from infesting stored comb, especially honey supers. Wax moths like to lay eggs in warm, dark, and poorly ventilated places. These are also ideal conditions for wax moth larval development.
10. B) *Varroa* mites
11. B) This is the best way In a sense, each staple is holding and pulling against the other staple. This helps to keep the bottom board tight to the hive body regardless of the direction force is applied.
12. **True** Mites artificially transferred from one cell to another, without passing any time on the adult bee are able to reproduce, although at a reduced rate when compared with mites that have spent some time on an adult bee. Under natural conditions, however, mites need only a short time on the adult bee, less than one day, for their subsequent reproductive ability to be unimpaired. This minimum necessary phoretic period on the adult bee is probably linked to maturation of the sperm within the female mite.
13. **True** In the U.S. honeydew is generally considered to be inferior to honey in flavor and quality. Europeans, however, regard certain types of honeydews as delicacies.
14. C) Septicemia Disease
15. B) *Varroa*
16. A) *Euvarroa*
17. C) *Tropilaelaps*
18. A) Carbohydrates, D) Protein
19. Honey Importers, Commercial Beekeepers and Federal Grants.
20. E) An antibiotic that was recently found in Chinese honey being imported into the U.S.
21. E) 10
22. ***False*** *Yeasts that are responsible for causing fermentation of honey are unable to grow at temperatures below 52°F.*
23. **True** Compared to the mating system of other moths, wax moths are unusual because the females search for the males. The males emit a sex pheromone and short pulses of ultrasonic sound that attracts females.

There were 13 points in each level this month. Check below to see how you did. If you scored less than six, do not be discouraged. Keep 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, Miss. State, MS.

GLEANINGS

MARCH, 2005 • ALL THE NEWS THAT FITS

LOCAL STILL MORE POPULAR THAN ORGANIC

Ohioans' support for local and organic foods reaches into their wallet – at least sometimes.

According to a recent survey, 59 percent of respondents said they would be willing to pay at least 10 percent more for locally grown foods, and 39 percent said they would do so for organically grown foods.

"We're seeing quite a lot of enthusiasm among consumers for locally grown foods, and more modest interest in organically grown foods," said Jeff Sharp, rural sociologist with the Ohio Agricultural Research and Development Center (OARDC) and Ohio State University Extension.

"Historically, the marketing of organic and locally grown foods overlapped quite a bit. Now, foods labeled 'organic' are widely available but not necessarily locally grown. Yet a subset of people exists who are even more interested in locally grown foods. I think we're seeing growing diversity in the attributes consumers are looking for in the alternative food system."

But interest in local and organic foods also is strong. In the survey, conducted last summer, 89 percent of respondents said they frequently or occasionally buy locally grown foods, and 40 percent said they frequently or occasionally buy organic foods. For locally grown foods, 50 percent said they would be willing to pay 10 percent more; 8 percent said they would pay 25 percent more, and 1 percent said they would pay 50 percent more. For organic foods, 32 percent said they would pay 10 percent more; 6 percent said they would pay 25 percent more; and 1 percent said they would pay 50 percent more.

In doing further analysis of respondents, Smith found that those more interested in locally produced foods were also more interested in the well-being of farmers; more supportive of farming and farmland preservation; and significantly more inclined to trust farmers than those more interested in organic foods. On the other hand, those more interested in organic foods tended to be more concerned about water quality, global warming and animal welfare issues.

ABF RE-ELECTS ELLINGSON, WEAVER FOR 2005

David Ellingson and Danny Weaver were re-elected to second terms as president and vice president at the American Beekeeping Federation's 2005 convention in Reno. Nearly 500 beekeepers braved Reno's heaviest snowfall in 90 years to attend the convention.

Ellingson runs bees in Minnesota and Texas from his Odessa, MN headquarters, where he also operates DDD Wax Works. Weaver produces queens and package bees in Texas and honey in North Dakota and Montana.

In a major change to its organizational structure, the ABF Board of Directors authorized the Hobbyist-Sideliner Special Interest Group to elect two representatives to the Board, as do the Package Bee and Queen Breeders SIG, the Honey Producer-Packer SIG, and the Commercial Beekeepers SIG. Elected to the Directors by the Hobbyist-Sideliner SIG were John Talbert of Josephine, Texas and Tim Tucker of Niotaze, Kansas.

Other new members of the ABF Directors are Reg Wilbanks, Claxton, GA and Dwight Gunter, Towner, ND.

NEW HONEY BOARD LOGO PROJECTS HONEY'S ESSENCE

January 1, 2005, food manufacturers, foodservice operators and consumers saw a new logo on the National Honey Board's materials. The new identity is the result of the Board's initiative to phase out its dated "honey bear" imagery, and replace it with a logo that displays honey's natural qualities and speaks to contemporary consumers.

The logo's creative team faced high expectations. The result is a striking design, topped with a characteristic hexagon comb and a glistening drop of honey, that reflects honey's unique attributes – unspoiled quality and purity across millennia of human development and consumption.

"We wanted the Honey Board's new logo to accomplish multiple communications objectives," explains Bruce Boynton, CEO. "We were looking for an image that could convey the natural purity of honey at a glance. It's consistent with the industry's desire to protect the pure wholesome image of honey, industry efforts to establish a national standard of identity for honey, and the pursuit of domestic quality assurance programs and labeling requirements."

NATIONAL HONEY BOARD

Display Advertisers

Much of what we know about the honey bee's communication dance has been attributed to Karl von Frisch. Through careful observation and testing, he defined their mystical behavior patterns in logical and predictable terms. Throughout history, dancing has also been a form of human communication and most everyone, from starry-eyed sweethearts to rebellious hooligans, has had their message immortalized in some sort of kinetic manner.

I was raised in a rather conservative denomination and dancing was strictly forbidden. It was said that dancing could lead to "other things," but in the back of my mind I always wondered why married folk were not allowed to dance. They certainly did the "other things," so how much worse could it get? As a kid, I never pushed the issue and, hence, I am still without a solid answer to this very day.

Early one Spring, I got the sudden urge to visit the beeyard. Winter's final thaw had been upon us and it was the kind of day that lured a beekeeper to poke around the hives while the bees would rather stay snug inside. Spring feeding was a priority on my list that afternoon, and since it was a touch on the cooler side, I decided to leave my bee suit in the barn.

My daughter Sara was my assistant for the task, and her job was to keep a brief record of each colony's status. She's the administrative type, and with her blonde hair neatly tucked under her stocking cap, her wire rim glasses gave her a very sophisticated look for an 11 year-old. After a quick stop by the barn for supplies, we set out for the beeyard. Traveling light, I went armed only with a hive tool and pollen patties while Sara was outfitted with a pen and a clipboard.

Most of the colonies were good-natured after their long Winter's rest, and we progressed rapidly through the yard. The bees looked great and it was good to know that they were off to such a strong start. Sara did a wonderful job of keeping notes, stopping every once in a while to brush back a wisp of hair that had slipped down onto her face.

With one more colony to finish, I made a quick assessment around the hive before cracking open the top. Somehow, there was a strange hush around this hive and I sensed a conspiracy of unparalleled proportions. As the top came off, I was given a very cordial greeting by several bees. It was almost as if they knew I was two-step illiterate a non-dancer desperately in need of lessons. Pressing on, I lifted the inner cover to place the pollen patty when one sleepy little bee flew up and positioned herself on my left cheek. Resisting the urge for flight, she trekked around my facial features for a brief moment and then sought refuge under my glasses. After several attempts to gently brush her away, I began swatting. Sara's giggles became more pronounced as I tried to direct the bee back to the hive. The bee's persistence to remain flightless began to concern me as she made her way out from under my glasses, back-tracking her original path and heading for my left temple. Fearing that she might scurry under my stocking cap, I began to swat even harder. And that's when it happened.

Now, I had never really considered my left ear as perfect "bee space," but before I could swat one more time, she disappeared and I entered a new state of consciousness. Poking and prodding, I soon discovered that I was only driving the bee deeper into my ear. I tugged at my ear lobe hoping to create an opening large enough for her to back out, but she continued forward. By that time, I became more than concerned and shook my head frantically hoping to dislodge my unwelcome tenant. At that moment I asked Sara to switch jobs.

"Use your pen and see if you can dig her out" I said.

Upon inspecting my ear, her reply was painfully quick and to the point. "I can't see anything, are you sure there's really a bee in your ear?" she chimed, trying to hide half a grin.

Unable to draw upon Sara's assistance *or* sympathy, I tried to use centrifugal force as I wildly hopped and pirouetted among the hives, holding my arms out wide to give myself extra momentum. After a brief pause, I spun in the opposite direction hoping to equalize the dizziness just long enough to come up with another plan of attack. Leaning my head to the left, I stomped up and down, writhing in every direction imaginable. By this time, the bee was beginning to feel the effects of my antics and although she was in cramped quarters, she still had enough room to move her wings slightly and began to buzz impatiently. As I entered the third state of consciousness, I imagined a stray chain saw headed for my tonsils. I coughed and hacked with reckless abandon hoping the bee would somehow change direction, but she continued her descent until she finally came to a dead end. Her legs and antennae brushed gently against my eardrum with a low crackling sound accompanied by an occasional buzz and this launched me into a fourth level of awareness unlike anything I had ever experienced.

Exhausting all my dance moves, I blazed a trail for the house leaving Sara in the midst of hysterical laughter Surely a pair of tweezers and my wife's steady hand would be able to set the captive free, but first I wanted to try it myself. Locking myself in the bathroom, I peered into the mirror and tugged at my ear lobe for a better look. The buzzing had subsided briefly, but the eerie feeling deep . very deep within my head was almost sickening. Staring at the man in the mirror, I comforted myself with the fact that both of us were in this thing together. I was glad he was there to help me out, but somehow his face seemed to reflect a little more stress and bewilderment than mine.

At his suggestion, I held my ear up to the light. Like magic, out came the bee just as though nothing had happened. I was quick with an interrogation but she remained calm and speechless. She did a few circles around my outer ear and then flexed her little abdomen. With a quick jab, she deposited a parting love gift and then flew away.

"Hey honey, where's the tweezers"?

James Littley

Spring Dances, With Bees

BOTTOM BOARD