WWW.BEECULTURE.COM

JUL 2008

Bee Culture

CATCH THE BUZZ

INSIDE IN JULY

CCD & PESTS & PESTICIDES
TRAPPING VARROA
NATURAL REMEDIES
DRONE PRODUCTION
GET READY – EXTRACT!

ROOT PUBLICATIONS
$4.99

7 35848 28163 9 07

Water, water . . . not everywhere with another dry Summer predicted, bee plants will again be stressed. But don't forget the bees because they need water too – a quart/colony/day for a regular sized colony. They will find it somewhere, and then they'll all belly up to the bar for a drink. Don't let it be your neighbors pool, pet dish or water faucet.

photo by Shane Gebaur

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

Malcolm T. Sanford • Steve Sheppard

Larry Connor • Connie Krochmal

Subscription Information

U.S., one year, $25; two years, $48. Newsstand price: $4.99. 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), July 2008, Volume 136, Issue 7, is published monthly by The A.I. Root Co., 623 W. Liberty Street, Medina, OH 44256. Periodicals Postage Paid at Medina, OH and additional mailing offices.

Contact Information

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

email: info@BeeCulture.com

Advertising

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

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

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

JULY 2008 VOLUME 136 NUMBER 7

FEATURES

DEPARTMENTS & COLUMNS

An Interesting Statement

This afternoon I was sitting on my favorite back yard bench reading the April 2008 *Bee Culture* magazine. Seems I have not had the time to read it all before the May issue arrived.

Anyway! I was on page 43, just down the first paragraph when a bee from one of my hives landed on the upper right corner of the page. I looked at it and asked if it wanted to read along with me. But apparently it had other ideas because it calmly took a poop on the page!

I said to the bee that it was very impolite to take a dump on my magazine! To which she just shook her butt and flew off! Now I am not casting any doubt into the quality of Jennifer Berry's article because after I cleaned up the mess, finished reading it through, I thoroughly enjoyed it!

What I think my bee was trying to tell me was, "Bill, you don't need any package bees! Not this year anyway!" And she was leaving her remark in the upper right corner!

And she is correct! I came through the winter with four great hives which I have split to eight and plan to raise that to 10 later on. All are going 'gangbusters.' And I am sure, that was the statement my female friend was making to me.

The possibilities of a great year wouldn't have happened without information from *Bee Culture* magazine! So I thank you and my bees, although some make deposit type statements, thank you! And Jennifer, I apologize for the lack of social graces of my bees!

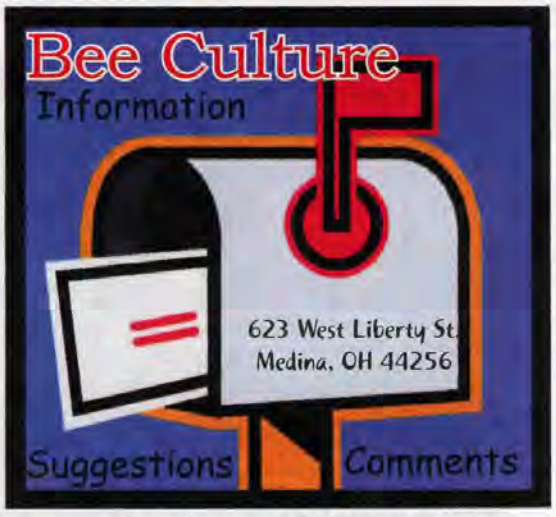
Bill Tompkin
Cuyahoga Falls, OH

Cheers For Gwen

Hooray for Gwen Rosenberg! (Wal-Mart Won't Sell My Honey, May 2008.) As a lucky man one who hasn't eaten strange-smelling factory bread for years, in a house where store-bought potatoes and tomatoes do not enter, I can say she's telling it like it is! She should feel incensed when her food is rated "restaurant quality " It's sad that many people have been conditioned to consider restaurant food something naturally better than home-cooked, but by this time they just don't have the wherewithal to know better. Genuine good food is, largely and very unfortunately, something of several generations past. So many now, though blessed to have some acres of land, keep with the Joneses in modern society by spending time and fuel on a roaring riding mower each week to keep the entire thing beat down bare, then put out more money and time laboring in a smelly gym or broiling on a ball field or golf course for exercise. They could be working and learning in a garden, with berries and fruit trees, or maybe even a hive or two of bees. (How gauche!) So many learn to "cook" by reading thawing and serving instructions, or by watching some TV personality throw together some silly little mixture they personally cannot taste or smell, rather than by apprenticing with experienced mothers and grandmothers.

Gwen has every right to brag a little, as does my own country wife. Though we can no longer raise our own poultry, she retains pride enough to demand whole Amish-raised chickens to cut up properly rather than accept the common axe-murdered variety with the bowed leg bones. She also knows the best way to fry chicken is on a hot wood fire, and fine biscuits are quick to make but don't come from whacking a tube on the bench. Her sweetening is crystallized raw honey scooped out like lard. (Yes, she's had a full-time professional job as well.)

Bob Evans has its place for busy, traveling folks and others who can't do better Their strength lies in the fact that they always provide the same reasonably acceptable meal along any interstate you travel. No restaurant roulette. But they cannot have real home quality, nor can they have variety Sure, they have fried okra, but never fried dandelion blossoms in season, or fresh garden rabbit! And we back-yarders all snicker at their hyperprocessed "clover" honey One would think the whole nation was covered with clover! I don't believe so. Yes, home-produced raw honey is a food still sometimes obtainable with its own inherent personality



and goodness, and I hope not to be here when it all has been improved to death.

Lew Diehl
Houston, OH

•

Hooray For Gwen Rosenberg's Article.

I am pleased to see this article in your publication. This type of article is one of the primary reasons that I take your journal. Having said that it is troubling that neither this article, the articles on bee pollen (Spring 2003) or the articles on other sweeteners (high fructose corn syrup etc) (Jun 2003 &Sep 2003) can be found in archived articles. It is this type information(advocacy) that reinforces those of us who are trying to serve I think that there are more of us hobbyists who read the journal for this type of article than there are those U.S. producers that sell processed honey to restaurants and supermarkets.

In a world where it's okay to spend three hours commuting and no family dinners and franchise's to precook then freeze meals shipping them to their restaurants world wide to insure conformity (mediocrity.) Eatables that are legally sanctioned, chemically altered and/or require massive amounts of industrially produced fertilizer is what I am trying to get away from. Healthy non processed food is one of the reasons that I have a large garden and keep honey bees. As a hobbyist and reluctant professional (not Beekeeper) I look forward to one day being able to pay the bills by selling honey I take from my bees and what I can grow in my

yard. This type of article not only provides motivation for me to do so but a rationale for me to use to encourage others to purchase what I want to sell.

Steve Vernon
Tonganoxie, KS

Converting To OBB

I have become a real fan of open bottom boards ever since trying a prototype sent to me by John Hoffman last Spring. Though I can not attribute all of my recent successes to the OBB system, my survival rate this Winter is 66% so far (six out of nine) whereas last year it was 20% (two out of eight).

The thing I have done to avoid cost and waste is "open" all of my old closed bottom boards. Very carefully place the intact old board on a running table saw with the edge guide set so as to cut out part of a 13-17 inch rectangle. Finish the corners off with a hand saw and then staple 1/2 inch hardware cloth on top of the remaining inner edge of the old board. Some bottom boards that are made of several boards rather than plywood may need to be slightly reinforced with additional wood strips along the edge on the bottom before you make the cuts, or all the pieces fall out.

One additional nice feature about these converted boards is that they preserve the landing pad front porch - an added place for bees to enjoy the sun and for us to enjoy watching them come home with pollen.

Kees Kolff
Port Townsend, WA

New Beekeepers

Not to worry, James Tew (May, 2008). We've got the opposite problem here, plenty of new beekeepers and not enough bees.

Back in February the Virginia Agriculture Extension Service in Suffolk, VA., held a two night beginning beekeeping class. The class was slated for a maximum of 75 beginning beekeepers, but demand was so great that the class was moved to the National Guard Armory and was attended by over 300 people.

Many of us "graduates" are all primed to go, but we were too late getting started to order any boxed bees and missed the Tidewater Beekeepers group order as well. So, at least at our house we've got a hive ready to go and we're waiting for a swarm, while periodically bothering the boxed bee ranchers for a last minute slotting for a canceled shipment.

Rick Kennerly
Virginia Beach, VA

Gwen vs. Codex

Concerning the article in May 2008 *Bee Culture* "Wal-Mart Won't Sell My Honey" by Gwen Rosenberg, it sounds to me that she is against the Codex Standard that Florida has excepted. I am sure that *Bee Culture* knows the need for all of the United States to except the Codex Standard – To keep unethical Honey Importers, Wholesalers and Retailers from passing off adulterated honey as pure honey And deceiving the consumer, and destroying the honey market.

I really enjoy *Bee Culture* and I find it very informative.

Don Frisch
Pensacola, FL

Caste Determination

Dr Malcolm Sanford's column on epigenetics (May, 2008) reflects some of the latest results on caste determination. As part of the honey bee genome project, a group of labs at Illinois and in Spain and Australia discovered that the honey bee has a fully functional, "vertebrate-like" system of methylation. This was the first such finding for the insects, and the manner in which it was made demonstrated the power of discovering new knowledge by using a genome sequence. In this case, we reasoned that if honey bees have a methylation system they must have the gene that encodes an enzyme that is essential for methylation.

We scanned the genome with success. This provided support and impetus for "more traditional" biochemical and molecular analyses, and was published in Science in Fall 2006. Armed with this information, the laboratory of Dr Ryszard Maleszka in Australia then went on to show that methylation is involved in caste determination. Knocking down methylation activity results in an increase in the number of queens. Their paper was just published in *Science* (April 2008).

Gene Robinson
Urbana, IL

Magic Splits

I'd like to pass on a positive experience with queenless splits.

We all know about the many problems with ordering queens in the Spring these days, and there is also the problem of poor queen acceptance.

Last March I tried a queenless split using four frames of eggs, brood and bees from two strong colonies. I carefully searched for a possible queen before installing the bees and brood in a five-frame nuc with a frame of honey thrown in and hive-top feeder I placed it two miles away and fed a gallon of sugar syrup a week. Sure enough, four weeks later there was a good laying queen with plenty of sealed brood. Seemed like magic.

The bees were returned to the apiary and given a 10-frame box with plastic foundation. They deserved a second deep in four weeks. These bees out performed a typical April split with a store-bought queen.

On March 28th of this year, I did the same thing with two more queenless splits and have had the same good result.

I conclude that this age-old technique of great simplicity holds excellent promise for my operation, and perhaps yours. Also, it seems like magic.

Richard House
Goldsboro, NC

Hive Temperature

I read with interest the article "Use Temperature to Monitor Hive Health" by Frank Linton in the May 2008 issue of *Bee Culture*. It re-

minded me of a project I conducted as Mechanical Engineering student at the University of Maine during the winter of 1967 Under Dr Leo Boulinger of the Univ of Maine Entomology Department, I placed 96 thermocouples throughout a 1 and 1/2 story standard Langstroth hive. The goal of the project was to "Determine the Coefficient of Conductivity through the Insulation Shell of a Honey Bee Colony," or how good (R- value) was the insulation shell.

While the ambient temperature was around 30°F, the highest reading in the hive was 88°F, but this was early in February and hopefully not during brood reading. I used isotherms (constant temperature gradients) to depict the location and size of the cluster, and made a half size model of the cluster using window glass pains to sketch the isotherms (see photo below). It can be seen, hopefully, in the photo the cluster was at the top of the hive and formed an ellipsoid, not a nice sphere.

Oh, yes I did calculate the coefficient and it came to approximately the same as Gypsum or a R-value of about 1 for a two inch thick insulation shell of honey bees.

Bill Scott
Aston, PA

Bad Bee Publicity

I think as one of the leading magazines on beekeeping it is time you take a public stand about what is happening on the discovery channel. A pest control show called verminators is regularly killing honey bees (twice in two weeks) and relating it to AHBs. This week they showed a clip about a man who had been stung hundreds of times then faded back as they killed a nest. Any beekeeper on either show knew these were not AHB or at least they did not act as such. If you read the forums about beekeeping you will see that more and more keepers are being confronted by neighbors and more and more places are passing restrictive laws. I believe it is time to take action.

Bob Peckham
Dartmouth, MA

Defending Chemicals

I'll preface this by saying that I am a first-year beekeeper, and quite possibly, very naive when it comes to the long-term issues regarding the use of chemical treatments. I'm also a hobby beekeeper which means that my two hives aren't going to break me financially if things go bad. That being said, I'm simply astonished by the overwhelming 'hysteria' and negative stigma that chemical treatments get. Those who decry treating with anything less than a full 'organic' or mechanical means must surely know that hiving bees in wooden boxes is just as 'unnatural' Has the global warming fervor of 'natural at all costs' despite proof spilled over into beekeeping as well? Or perhaps a better analogy would be those who don't believe in inoculating humans against diseases such as smallpox, measles, etc. because it too is unnatural. As a beginning beekeeper with numerous questions about how to keep healthy bees, I implore those who truly know the science to step forward and raise up the knowledge base of the next generation of beekeepers.

Darcy Pach
Burlington, KY

Plastic Convert

A couple of years ago I abandoned the use of plastic foundation. When using the 'factory coated' stuff, even during a nectar flow my bees would often refuse to draw comb. I went back to wax foundation with its added assembly and handling problems. At least the girls would reliably draw it out.

In the February 2008 edition on *Bee Culture* I read Roy Hendrickson's piece on adding wax to plastic foundation. Having several hundred unused sheets stored and a few remaining blocks of my last season's beeswax, I decided to give it a try The first 40 of 50 sheets I installed seemed to be well accepted. I decided to conduct an informal experiment (I'm weird that way).

I took 10 medium frames with plastic and coated all except one side of one frame. I placed that frame near the center of the super along with the other nine. During a moderate nectar flow in early May, I put the super on one of my hives. Two weeks later I took a look. Nine and a half frames were substantially drawn and filling with honey The uncoated side was untouched.

I think my photos tell the story. I am a convert.

Dan Harris
Athens, GA

unwaxed

waxed

INNER COVER

Have you taken the time to watch one of the fund drives on Public Television lately? If you have it was probably one that brings together a whole bandstand full of music groups from the 50s and 60s, each playing one, maybe two of their forever songs you know, the ones you still know the words to.

When one group finishes, and over the screaming applause of the audience the announcer tells us just a tiny bit about the next group. As he yells out the name of the group a cover from one of their best known albums comes on screen showing a group of three or four or even more well dressed youngsters singing, or getting ready to sing, or just looking cool (You remember albums, right? Vinyl discs with scratches and hisses and bops that you put on a turntable, drop a needle and music happens?).

I've watched a few of these shows. There are different styles of music featured in each early rock 'n roll, Doo-Wop, R&B, soloists, groups, pairs and when the album cover comes up, no matter who is singing they look just the way I remember colorful suits, or short, neat hair, sport coats and ties, classy dresses with styled hairdos...these are the musical heroes of my youth, heard on my first transistor radio, a time even before the Beatles and the Rolling Stones.

And then the camera fades to a long shot of the stage and the first beat and the first note of that group's most famous song begins and I know all the rest of the notes and the words and the bass and the harmony and the rhythm and then the camera closes in and *Who are all those old people?*

They sound kind of the same, the actual music is usually better because now they have a backup orchestra instead of four or five studio musicians. But look at them! Gray hair, or, like me, no hair They're no longer thin and vibrant and ready to conquer the world. And they're not quite hitting the high notes, some aren't even close to the high notes and the harmonies are bit flat or off key But the dances and struts are slower now, smoother, less hurried, more practiced than when first performed 50 or more years ago.

I have to hand it to the genius that thought about doing all these concerts.

"Bring on the music of the 50s and 60s", thought this marketing genius, "and who will come and see them old people (old people just like me, by the way). What demographic has the most money and is the most generous when it comes to charitable donations old people. Who will watch these shows on television old people."

It's a win:win for everybody went the thinking and that marketing genius nailed it. PBS shows those concerts dozens of times each year and different versions are still being filmed in cities all over the U.S. bringing in standing (and dancing) room only crowds. It's probably the best cash cow PBS has had since Monty Python.

So on a recent Saturday evening I'm sitting at home listening to one of these concerts and casually reading a newsletter from a nearby beekeeping association. They're having their beginner's class and the first thing on the schedule Constructing equipment. The noise on the TV changed and I looked up, and what's there? a whole auditorium full of old people, jumping up and down and screaming and clapping, and for what an old guy singing.

Perhaps my point could have been finer, but here it is in plain language. As an industry we continuously lament that there are too few people getting into beekeeping. That there is a dearth of young people taking up the cause and moving us on. That we shall certainly perish unless we get that youthful transfusion of energy, of vitality, of drive.

So what do we teach those few who do come on board? And this year has been much better than most we teach them the same things we learned 50, even 100 years ago, right? Nothing new, well, hardly anything new, because we are so tied to the past that it leaves so little room for what little new there is.

Those people on the stage aren't playing rap music or what ever it is that young people are listening to because they don't know that music. You want young people, you play young music. You want old people, you play old music.

I recently took part in a beekeeper certification course with lectures by resident and brought-in instructors. Later there were written, field and lab exams. One question on the written exam was...how many nails should be used when putting together a frame? To my way of thinking this has the same relevance as how many spot welds hold the frame of a Model-T together

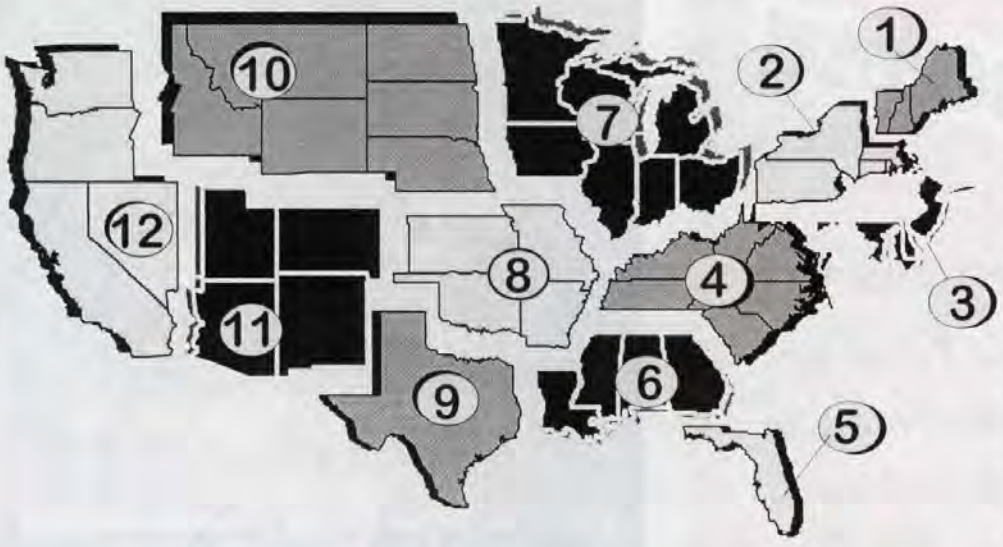
My point we don't use Model-Ts any more, and we shouldn't be spending valuable time teaching people who don't put frames together anymore how to put frames together We are teaching new dogs old tricks, and we are wasting our time. Ask any supplier about preassembled equipment If you want young people to take up *and stay* in beekeeping you have to teach them relevant technology and techniques and give them meaningful information. The art and the science of our craft have moved on friends, and we don't need to teach things that aren't happening anymore just because that's what we were taught and that's all we know. That information is interesting and has a value but why spend time on it for a beginner, other than in the context of "The History Of Beekeeping"

After 20 years with *Varroa* we do have some tools to control their population in a beehive, and that's new information we should be focusing on half, maybe more than half of what we do in a beginner's class should be focusing on controlling *Varroa* because half of those begin-

Continued on Page 11

Who Are All Those Old People

JULY – REGIONAL HONEY PRICE REPORT



World honey prices have been quite volatile in the last 12 months, so we wanted to compare our reporter's prices from a year ago to this month. Here's what we found overall, and then by each region. The numbers are telling overall, and especially for some regions. Check out yours to make sure you are going the right direction.

Overall Prices. One thing to keep in mind is that overall inflation for the last 12 months has been right about 4%. But the most recent increases in fuel have spurred even higher production costs, and, if you are looking ahead, you have to have money to spend money so your prices now should reflect anticipated price increases you will have to make up. Thus, your price increases now over a year ago that are 4% or less are actually losing money.

Bulk honey, that is in drums, is up 32% over last year. Pails however, are up only 4.7%. As a group, wholesale prices rose 7.6%, and as a group, retail honey prices rose only 6.0% since last year. The eye opener is beeswax, up 42.7% overall in the last 12 months. How come?

Region 1
Bulk up 32%, pails up 14%, wholesale up 11%, retail up 7%, but wax, interestingly, flat.

Region 2
Bulk up 9%, pails up only 1%, wholesale up 13%, retail up 12%, and wax wow, wax up 43%.

Region 3
Bulk up 32%, pails only up 3%, wholesale up 10%, but retail down 2%, wax up 16%.

Region 4
Bulk up 27%, pails only up 9%, wholesale up only 5%, and the same for retail, but wax only saw a 1% increase.

Region 5
Bulk up 68%, but pails not up at all, wholesale up 19% but retail down 4%, and wax up 9%.

Region 6
Bulk up 17%, but pails, wow, pails down a whopping 22%, wholesale not up at all, retail up only 9%, but wax up 24%.

Region 7
Bulk up 34%, pails up 30%, but wholesale only up 3% and retail up 7%, but wax is not up at all.

Region 8
Bulk up 42%, pails up 4%, wholesale only up 3%, but retail up 7%. But wax, wax is up 93% since last June.

Region 9
Bulk up 42%, pails up only 3%, but wholesale down 8% and retail up only 3%. Wax up 37%.

Region 10
Bulk up 49%, but pails not up even a penny since last year. Wholesale up 9%, retail up only 2% but wax way up at 120% over last year.

Region 11
Bulk up 35%, but pails actually down 2%. Wholesale up 11%, retail a healthy 19% and wax a respectable 28%.

Region 12
Bulk up 14%, pails up 11%, wholesale up 16%, and retail up 8%. Wax up a full 87% for the year to date.

	REPORTING REGIONS												SUMMARY		History	
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	2.67	1.35	1.44	1.52	1.45	1.34	1.50	1.44	1.45	1.62	1.33	1.32	1.32-2.67	1.53	1.34	1.08
55 Gal. Drum, Ambr	1.23	1.25	1.23	1.32	1.35	1 15	1.48	1.25	1.23	1.23	1.23	1.20	1.15-1.48	1.26	1.13	0.97
60# Light (retail)	120.00	122.00	123.00	112.33	110.00	111.67	132.20	113.33	130.90	130.90	128.92	143.33	110.00-143.33	123.22	121.26	117.32
60# Amber (retail)	120.00	113.33	123.00	110.33	110.00	106.25	129.00	107.50	103.33	124.80	126.80	150.67	103.33-150.67	118.75	114.84	113.82
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	51.84	60.65	42.00	44.03	62.14	42.80	44.04	62.14	62.14	45.90	41.40	88.50	41.40-88.50	53.96	56.23	48.47
1# 24/case	66.48	76.82	71.40	62.30	82.20	70.40	68.00	70.40	54.72	87.00	84.80	97.50	54.72-97.50	74.33	71.64	71.65
2# 12/case	61.86	63.72	64.20	56.93	60.00	53.60	63.81	78.00	48.87	57.84	53.35	84.00	48.87-84.00	62.18	63.68	59.99
12.oz. Plas. 24/cs	60.36	68.54	51.00	60.69	75.00	64.00	60.04	56.80	45.84	47.28	61.28	74.67	45.84-75.00	60.46	57.35	57.64
5# 6/case	69.77	71.74	75.00	64.50	91.72	71.00	73.86	77.40	63.00	61.86	90.75	84.00	61.86-91.72	74.55	71.24	71.30
Quarts 12/case	110.26	125.18	66.00	88.50	78.00	79.58	86.00	85.00	102.00	120.00	80.00	130.00	66.00-130.00	95.88	95.25	89.51
Pints 12/case	68.92	63.48	112.20	60.36	58.00	51.83	71.45	51.00	51.90	69.00	55.75	67.00	51.00-112.20	65.07	55.11	55.35
RETAIL SHELF PRICES																
1/2#	2.88	3.01	2.27	2.96	2.19	3.25	2.90	2.04	2.29	2.44	2.62	5.62	2.04-5.62	2.87	2.57	3.04
12 oz. Plastic	3.50	4.07	3.36	3.46	3.99	3.70	3.38	3.54	3.39	2.88	3.29	4.59	2.88-4.59	3.59	3.51	3.28
1# Glass/Plastic	3.81	4.67	4.53	4.48	4.62	4.35	4.03	4.42	5.93	4.07	4.80	6.15	3.81-6.15	4.65	4.42	4.06
2# Glass/Plastic	7.75	8.03	5.53	6.97	6.65	6.69	7.88	8.25	6.36	6.47	7.40	9.66	5.53-9.66	7.30	7.37	6.74
Pint	8.39	8.08	6.50	5.89	5.63	6.07	6.88	6.28	6.50	7.40	6.05	9.50	5.63-9.50	6.93	6.37	6.34
Quart	12.29	12.32	11.00	9.62	7.92	9.81	11.52	10.49	9.50	13.62	9.77	8.25	7.92-13.62	10.51	10.92	10.37
5# Glass/Plastic	15.50	14.66	16.45	14.00	18.00	15.00	18.48	17.50	15.35	13.06	17.42	19.99	13.06-19.99	16.28	16.54	14.82
1# Cream	4.75	5.64	5.48	4.95	5.48	4.00	4.82	5.09	3.99	5.04	5.64	7.00	3.99-7.00	5.16	5.14	5.43
1# Cut Comb	5.50	5.08	5.49	4.44	7.02	4.88	7 12	5.25	7.02	8.00	7.50	8.50	4.44-8.50	6.32	5.93	5.96
Ross Round	6.74	3.97	5.49	4.92	1.90	5.50	7.45	6.50	6.74	6.74	7.58	8.33	1.90-8.33	5.99	6.09	5.66
Wholesale Wax (Lt)	2.00	3.36	3.25	2.55	1.90	4.00	2.19	3.75	3.25	4.75	3.64	3.44	1.90-4.75	3.17	2.91	2.34
Wholesale Wax (Dk)	2.00	2.85	3.25	2.38	2.15	2.75	2.65	3.00	1.95	5.00	2.13	3.00	1.95-5.00	2.76	2.41	1.84
Pollination Fee/Col.	75.00	79.33	64.00	44.17	155.00	57.00	63.00	60.00	125.00	87.24	62.50	101.25	44.17-155.00	81.12	80.67	64.46

RESEARCH REVIEWED

The Latest In Honey Bee Research

Steve Sheppard

" as beekeepers we might reconsider our inputs regarding nutrition, chemicals and management with the idea to provide a "quality of life" for the colony that maximizes the chance that foragers will be healthy and able to reach ripe old ages."

As a nation, the average age of our human population has increased over historical time due to demographic effects of the baby boom, safer work environments and improvements in medical care. However, as individuals, we inevitably face diminishment in our physical prowess as we continue to age. With luck, as we live to ripe old ages, we can rely on family, social security, savings and 401k plans to help with provisioning and quality of life. For individual honey bees, of course, the story is simpler (at least as regards 401k plans). We may be tempted to think that the mortality of honey bee foragers derives primarily from "bad luck", when they are eaten by a spider or bird or from other external events, such as bad weather However, a Canadian researcher recently reported that old age and declining performance in the honey bee is a major part of the story when it comes to mortality (Dukas, 2008).

The author defines the term *senescence* as "an age-specific decrease in physiological performance accompanied by an increase in mortality rate." He points out that while there have been a number of studies that examined senescence in social insects, it was unclear whether honey bees lived long enough to show the effects of senescence. That is, if predation is very high, life spans would be correspondingly quite short, thereby reducing the chance that senescence would be a factor in mortality To address the question, the researcher set up two observation hives to which he added populations of individually marked age-cohorts of bees. For a period of six weeks in July and August, the flight activity of marked bees leaving and entering observation hives was observed daily from 11:00 a.m. until 5:00 p.m. in both colonies. Based on data from 611 marked bees recorded as foragers, Dukas reported that the "mortality rate of forager bees increased exponentially with age." The average life span of foragers was 6.76 days. In his discussion, the author noted that although there was an exponential increase in the mortality rate with age, there was also a high level of age-independent mortality That is, many foragers of all ages also died, a finding the author attributed to mortality from predation. Dukas also concluded it likely that the age-dependent mortality he measured was due to predation. By way of explanation for how this could work – note that individual bees age and undergo "physiological and mechanical deterioration." Previous research has shown that in honey bees increased wing deterioration is associated with aging and from other studies we know that wing damage in bumble bees leads to increased mortality rates. Most beekeepers have observed the tattered wings of some returning foragers. Apparently, these stalwart workers are slowing down and wearing out – making them increasingly likely to become a tasty morsel of food for a predator

Dukas makes the point that the life stage in the colony is more relevant than chronological age in "starting the clock" on senescence. Thus, mortality of nurse bees and other in-hive bees is low, while foraging activity itself becomes a most important factor related to mortality He cites previous work that showed that "oxidative stress-induced" damage in the honey bee brain occurs in foragers, but not in the bees that remain in the hive (regardless of age). Finally, Dukas notes that learning can help offset some of the effects of aging (take note, all you old codgers), as experienced bees can learn to avoid locations with high predation levels and have improved orientation skills. However, despite the value such wisdom can bring, Dukas writes "the overall lifetime pattern in bees and other animals is ultimately dominated by senescence."

One of the things to ponder from this study (besides the need to read up on 401k plans) is the relatively short average lifespan of foraging honey bees found in this study (6.76 days). As we think about the colony health issues faced by honey bees and beekeepers, CCD and otherwise, it might be useful to consider what effects even minor adjustments in the average lifespan of foragers could have at the colony level. What is the effect on colony health and growth rates if the average honey bee survives for a day less, thus living only 85% of the "normal" working life as a forager? Clearly, as beekeepers we might reconsider our inputs regarding nutrition, chemicals and management with the idea to provide a "quality of life" for the colony that maximizes the chance that foragers will be healthy and able to reach ripe old ages. May we all be so fortunate. BC

Dr. Steve Sheppard, Thurber Chair, Department of Entomology, WA State University, Pullman, WA 99164-6382, shepp@mail.wsu.edu, www.apis.wsu.edu.

Dukas, R. 2008. *Mortality rates of honey bees in the wild.* Insectes Sociaux, DOI 10.1007/s00040-008-0995-4

Malcolm T Sanford

CCD – The Role Of Emerging Pests, Pesticides And Pathogens

"But there's still not enough money to find out."

There continues to be great debate about the origin of colony collapse disorder or CCD. One result of this has been the splitting of scientists and beekeepers into various camps. Each has its own category of interest and speculation about what is responsible for CCD's overarching symptoms. Unfortunately, most of these are difficult conditions to assess for investigators and practitioners alike, because they represent shifting or moving targets of interest. In general, the three categories that can be discerned are emerging pests, pesticides, and pathogens. Beekeeping used to be a fairly traditional activity, and apiculturists could use similar tools or technologies year in and year out. Techniques, even in quite old beekeeping books, retained their validity over generations. This is no longer the case as conditions seem to be continuously in flux due in great part due to these emerging phenomena, often causing beekeepers to have to radically readjust their management.

It's worth taking a step back and looking at each group or category in order to attempt to find some commonality if possible among these challenges, and examine how they are related to each other and the CCD phenomenon. The emerging pests of most interest continue to be exotic mites that affect honey bees. In 1984, the tracheal mite (*Acarapis woodi*) was detected for the first time in Florida, and there appeared in conjunction with that event large die offs of honey bees, especially in panhandle, near the Capital of Tallahassee. At that time, I wrote in my *Apis Newsletter*

"There are reports of unexplained bee kills around Florida. In the panhandle area, a large-scale die off has been reported. Symptoms are diffuse; the bees die with their heads in cells, reminiscent of starvation. The catch is they are dying even with large amounts of food present. Also reported is disappearance of workers. These problems are some of the most difficult to grapple with for researcher and beekeeper alike."

"The search for solutions must come, as for human illness, partly from a detailed history of the patient and situation. Unlike humans, bees can't be asked to describe their symptoms. Where do you begin? How do you find the right questions to ask? How do you ask them? Unfortunately the answers to these basic questions are only guesses at best. The best advice is to explore a number of avenues in the hope of arriving at some common answer that will be explanatory

"The situation above is not unique, although the symptoms might be. Other parallel phenomena fill the apicultural literature; witness descriptions of 'disappearing disease,' 'Autumn collapse,' 'May disease,' and 'Spring dwindling.' What do these names mean to you? They are descriptions only, but do not adequately address the roots of the problem."[1]

We now must add CCD to the above litany it seems, although more specific symptoms appear to exist for this phenomenon than some of those described previously Since I wrote the above words, another major emerging pest made its appearance. The exotic, Asian bee mite, *Varroa jacobsoni* (latter to be re-named *Varroa destructor*), first found in Florida in 1987, quickly became the organism of choice to blame for colony demise, and for good reason. The history of this mite I have cataloged in two articles for this magazine.[2,3] Colonies were actively "collapsing" from *Varroa* for over a decade even as researchers and beekeepers struggled to find adequate treatments. Since then the mite has become an integral part of the honey bee colony [4]

Besides dying colonies, symptoms of *Varroa* predation took on the appearance of what looked to many like traditional diseases, including American foulbrood, sometimes crossed with sacbrood. This became yet another emerging condition named honey bee parasitic mite syndrome (HBPMS).[5] It is now generally acknowledged that the key to keeping honey bee colonies healthy is predicated on effective *Varroa* control. Without this key step, it is impossible to keep colonies productive across the globe in infested areas.

As the full extent of *Varroa* depredations became evident over the years, the tracheal mite was often sidelined by many beekeepers, especially in subtropical climes where bees could overwinter even with high populations, just surviving to begin anew the next season. However, recent information suggests that beekeepers ignoring this organism may do so at great peril to their bees.

The most recent emerging pest in honey bee colonies has not been found to be responsible for a disease per se nor blamed for CCD. But in spite of this the small hive beetle (*Aethina tumida*), introduced into the U.S. in 1998, certainlty affects bee health and productivity.[6] Again, beekeepers have had to scramble to learn about this insect's biology and adapt their management techniques accordingly

The first treatments on any scale for *Varroa* in the U.S. were based on two hard pesticides, the pyrethroid, fluvalinate (Apistan®), and when resistance to this material was detected, the organophosphate, coumaphos (CheckMite+®). The use of these materials and others over time created at least in part the next category of emergent conditions, chronic pesticide poisoning. It is now well known that both the above materials accumulate in the comb and can cause if not acute, at least persistent ongoing problems that interfere with the delicate biology of a honey bee colony Now that this has become well recognized, beekeepers have aggressively moved to ensure this buildup remains at a minimum by renovating combs on a regular basis, something not on the radar screen only a few short years ago. In addition, beekeepers are continually moving from a dependence on hard

"Beekeeping used to be a fairly traditional activity, and apiculturists could use similar tools or technologies year in and year out."

pesticides to "softer" materials, such as essential oils and organic acids for mite control. Although these are easier on colonies, their application requires much more care and control by beekeepers than the hard pesticides, called by some the "silver bullets" of mite control.

As the two large classes of pesticides listed above also lost effectiveness in agriculture as a whole primarily due to resistance by target organisms, a new type was developed, which has taken the pest control world by storm. The neonicotinoids, a group based on imidacloprid and its derivatives, kill a wide range of insects from beetles to fleas. These systemic pesticides are in widespread use and often provide protection in crop plants from the seed to the flowering plant. Although relatively benign to mammals, they are extremely toxic to insects, and have been blamed for honey bee losses, especially in Europe. Many see them as a major if not main cause of CCD.[7,8]

In conclusion, both pesticide use by beekeepers inside colonies to control *Varroa* and the ever-increasing implementation of systemic neonicotinoids in the greater environment are affecting honey bees in many different ways. Thus, pesticide application, itself a traditional problem for beekeepers, continues to cause novel problems in the management of one of nature's most complex insect societies.

A major symptom of *Varroa* in collapsing colonies that beekeepers could observe was individual bees with deformed wings. This could have two potential causes, the results of direct feeding on bee blood (haemolymph) by mites and/or transmission of viruses. The latter have always been associated with honey bees at least in a limited way. The viruses most neophyte beekeepers first learn about are those that cause sacbrood and/or are related to hairless black syndrome, a genetic condition.

According to a 1996 paper in *Bee World*, the International Bee Research Association's prestigious publication, there is an increasing laundry list of viruses associated with honey bees being identified, and they are increasingly of interest to investigators.[9] This is especially true now that *Varroa* has become a permanent part of the honey bee colony. The mite not only can transmit the viruses directly both horizontally and vertically, but can also "activate" latent ones simply by feeding on bees. The article provides a detailed description of honey bee viruses and notes where they have been indentified in the world. The list includes chronic paralysis virus, chronic paralysis virus associate, acute paralysis virus, cloudy wing virus, deformed wing virus and Egypt bee virus, Kashmir bee virus, slow paralysis virus, and bee virus X. The authors conclude that viruses are widely distributed, and most appear as "inapparent infections" that rarely cause outbreaks but can if conditions are right. They call for increased activity in identifying and studying these potentially "infectious agents."

One of the authors provided a guest editorial in a later edition of *Bee World*, stating that "There is increasing evidence that the global spread of *Varroa destructor* has resulted in a significant change in the type and prevalence of viruses causing mortality in honey bee colonies."[10] She says the current environment explains the almost ubiquitous occurrence of deformed wing virus and asks, "have we now reached a relatively stable situation again where both mite and predominant virus can be managed, or could the decline in certain types of virus leave a niche open for opportunistic invaders?"

Three viruses listed in the 1996 paper noted above, Black queen cell virus (BQCV), bee virus Y (BVY) and filamentous virus, are traditionally associated with *Nosema apis*. The relationship between these is not well known, but the virus may decrease the resistance of bees to viruses that invade via the gut. Both BQCV and BVY may also enhance the pathogenic effects of *N. apis*. If that isn't enough, close relatives of two viruses associated with the Asian honey bee *Apis cerana*, Apis iridescent virus (AIV) and Thai sacbrood virus (TSV), might also become emergent in the Western honey bee (*Apis mellifera*). Thus, a growing number of these relationships must now be studied more intensively Fortunately, an Integrated Virus Detection System has been developed to help in the growing field of virus identification. Scientists

at the University of California at Davis are attempting to resurrect one instrument to use strictly for those associated with honey bees.

One virus in particular has been given a lot of attention since the 2008 Apimondia Congress in Melbourne, Australia. This is Isreali acute paralysis virus (IAPV), not even mentioned in the 1996 *Bee World* article, but now recognized as a relative of the extremely lethal Kashmir Bee Virus (KBV). While the Congress was in session, several reports surfaced correlating the importation of Australian queens into the U.S. with CCD and IAPV These provoked a storm of protest from the host country as reported in my blog at the time:[11]

"An interesting and well written article by Shelley Gare, The Sting, *The Weekend Australian Magazine*, September 15-16, 2007 reveals the depth of press coverage Colony Collapse Disorder is receiving in Australia and around the world.[12] The Melbourne Congress is mentioned as is the research by Dr Denis Anderson, billed as 'The world's only general bee pathologist. Bearded, unassuming and smiley...' He decries a recent article in *Science* linking CCD in the U.S. to a specific strain of Israeli acute paralysis virus found to have originated in Australian queens, concluding that the virus has been found in hives not suffering from CCD and asking why if this was so, there are no hives in Australia suffering from the malady."

And then there is the emerging "new" nosema in *Apis mellifera* associated with the Asian honey bee (*Apis cerana*). This organism (*Nosema ceranae*) is of more and more concern.[13] How long it has been associated with Western honey bees (*Apis mellifera*) remains a mystery, and it appears to affect them differently than the traditional nosema (*Nosema apis*). So much so that a camp has developed believing that this organism alone could be responsible for CCD. Fortunately, there is evidence that it can also be controlled using the traditional material called fumagillin. But the directions on the label must now be reexamined, and probably will have to be changed based on this emergent pathogen.

In conclusion, the CCD situation continues to look more and more like an elaborate jigsaw puzzle. Unfortunately, just as part of it begins to take shape, more pieces emerge to complicate the picture. Again, the result of this is a growing number of scientists and beekeepers seeing things through their "own lenses" as they desperately search for answers. As Dr Anderson, the noted Australian researcher referred to elsewhere in the article, is quoted as saying, "Bacteriologists blame CCD on bacteria. Virologists blame it on a virus." We could add that others blame it on pesticides and still others on the new nosema. Finally, Dr Anderson concludes, "Everyone sees it through the prism of not enough funding." BC

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

References: All URLs accessed May 20, 2008; Most *Bee Culture* Articles can be seen at http://www.squidoo.com/Bee_Culture/

1. http://apis.ifas.ufl.edu/apis87/apfeb87.htm#1
2. Sanford, M.T 2007 *Two Decades of Varroa Part I* Bee Culture (October) Vol. 136 (10): 19-21.
3. Sanford, M.T 2007 *Two Decades of* Varroa *Part II* Bee Culture (November) Vol. 136 (11): 19-21
4. Sanford, M.T 2006. *The Fourth Individual in a Honey Bee Colony* Bee Culture (September) Vol. 134 (9): 17-19.
5. http://apis.ifas.ufl.edu/apis94/apdec94.htm#3
6. http://apis.ifas.ufl.edu/apis98/apjul98.htm#1
7. Sanford, M.T 2007 *Insecticides and CCD, Part I* Bee Culture (July) Vol. 136 (7): 17-18.
8. Sanford, M.T 2007 *Insecticides and CCD, Part II* Bee Culture (July) Vol. 136 (7): 17-18.
9. Allen, M. and Brenda Ball. 1996. *The Incidence and World Distribution of Honey Bee Viruses* Bee World, Vol. 73 (3): 141-162.
10. Ball, Brenda. V 2004. *The Trouble With Viruses* Bee World, Vol. 85 (2): 25.
11. http://abeekeepersblog.blogspot.com/2007_09_01_archive.html
12. http://www theaustralian.news.com.au/story/0,25197,22417482-5012694,00.html
13. Sanford, M.T 2007 "A New Nosema," *Bee Culture* (February 2007) Vol. 135 (2): 18-21.

Trapping Varroa

Ross Conrad

Varroa Mites. After first being identified within the United States in 1987, they quickly spread out across America to become the biggest challenge U.S. beekeepers face today The initial response from the beekeeping industry was to follow the same path other agricultural commodity groups had trod, and turn to chemicals to control these damaging pests. History has proven however, that whenever we use chemicals to control insect or mite pests, they always develop resistance to the chemicals forcing us to use larger doses of insecticide, or resort to chemical alternatives that attack the target organism differently and are often more toxic. History simply repeated itself when the use of Apistan (fluvalinate) quickly led to fluvalinate resistant mites, ushering in Checkmite+ (coumaphos, an active ingredient in VX nerve gas) which *Varroa* also began to tolerate, thus leading to the latest chemical panacea to be promoted: Hivastan (fenpyroximate). Rather than continue on this chemical treadmill, there are numerous non-toxic alternatives that are available that offer longer-term solutions for healthy hives. Over the next few months, we will cover some of these options.

The Drone Comb Trap

Humankind has a long history of using traps to capture animals, initially for food, and later for economic gain. Thus, it is not surprising that one of the earliest methods used by beekeepers in an effort to control *Varroa* populations within the hive was traps. It was observed by researchers early on that the pheromone *Methyl palmitate* was the scent found most attractive to the female mite and that drone brood gave off more of this pheromone than worker brood.[1] This discovery led to the development of a market for wax and plastic foundation manufactured with the larger drone sized cells. Once drawn out and filled with maturing drone brood these frames act as *Varroa* magnets attracting the female mites that are ready to reproduce. By removing these frames once the drone brood and female mites have been sealed within the cell during its final phase of development and placing the frames in a freezer for 24 hours, the reproducing mites within the cells and their offspring are destroyed. Once removed from the freezer the frame can be put back into the hive to trap more mites. Unless your bees are extremely hygienic, it is a good idea to help them clean up the thawing drone comb by first removing as much of the dead brood as possible before reintroducing the frame into the colony Beekeepers report good results by directing a forceful stream of water from a garden hose angled to shear off the cappings of the drone comb and flush out the contents of each cell. Flushing the cells out with water

may potentially be used instead of freezing the combs, freeing up your freezer space and saving energy to boot.

When using drone comb to trap mites, it is important to remember that the trap is only going to impact the mites within the hive that come within the general vicinity of the trap. Therefore, the most efficient utilization of traps is to stagger their location within the hive in order to try and cover as large an area as possible. This is most effectively accomplished in hives that are made up of two hive bodies. By placing one trap in the lower hive body somewhere on the right-hand side of the colony (say in frame position three in a 10-frame box) and a second trap on the left-hand side of the upper hive body (in frame position eight for example), the traps will cover a larger and more consistent area than if a single trap is used or both traps were positioned on the same side of the hive.

A Trapping Alternative

After trying this method of trapping *Varroa*, I found myself uncomfortable killing off the drone brood in my efforts to keep the mite population in check. Doing so seemed inconsistent with what I view as my role as the steward of my hives. It also seemed disrespectful to me to be wasting all the hard work and resources (honey and pollen) that the bees invested in raising those frames of drone brood. These thoughts and feelings inspired me to come up with and alternative to the drone comb trapping approach. I was looking for a trap design that would capture mites without harming the male bees and be situated within the brood nest where the majority of mites in the hive are located. With these basic criteria in mind, and some insightful suggestions from a fellow beekeeper, I came up with a frame-shaped design with slotted sides that replaces a frame in the brood area. The slots in the sides of the frame are large enough for a mite to fit through but too small to allow the honey bee to pass. By positioning the entrance slots vertically the mites that enter the trap make their way down to the bottom of the apparatus unhindered. By cutting the end bar in half and attaching a small hinge, I am able to easily access the interior of the trap. A strip of paper strategically placed on the floor of the trap and coated with a sticky substance (I used Tangle Foot available at your local gardening center) causes the mites to collect on the paper for easy removal.

While this trap captures mites as they crawl around the colony, the sticky paper within the trap can be made extremely attractive to mites by adding Methyl palmitate to its surface. Methyl palmitate can be purchased from chemical supply companies. At temperatures above 85°F (29.4°C), however, Methyl palmitate crystals will melt. Since the brood nest of the hive is typically kept well above this temperature, I folded the paper so that it will hold the pheromone in its liquid form. I used a wax-like paper purchased from an art supply store that is normally used for tracing pictures since it will not absorb liquids. The paper when positioned in the bottom of the trap should also be folded in such a way as to ensure that the edges are flush with the sides of the trap, and there is no room for mites to crawl past the edge and underneath the paper rather than onto its sticky surface. As with the drone brood trap mentioned above, these traps are most effective when rotated around the hive, or used two at a time and on opposite sides of the colony in order to attract mites from throughout the interior of the hive.

Additional Considerations

A significant benefit that a sticky trap offers over a drone brood trap is that the number of mites caught within the trap are readily visible. This makes the sticky paper mite trap effective as a monitoring device. Because Methyl palmitate is naturally present within a colony, is approved by the USDA as an animal-feed additive, and is used by industry to reduce foaming during cardboard manufacturing, trapping with pheromone bait should be able to be implemented while honey supers are on the hive without the risk of honey contamination. Use of Methyl palmitate as bait within such a trap can be accomplished without infringing upon the intellectual property rights of the researchers who discovered Methyl palmitate's attractiveness to mites, or the FDA's pesticide

regulations, as long as the honey harvested is not sold but kept for personal use and you are not selling the pheromone to others as a mite control agent.

Since traps are mechanical in nature, I do not believe that *Varroa* will develop resistance to this form of control like they have to chemical treatments that impact the mite's biological processes. An argument that has been made against the idea of using drone brood traps, or traps that utilize the pheromones given off by drone brood as an attractant is that by consistently removing mites that have a disposition for reproducing on developing drones, are we not inadvertently selecting for mites that prefer to reproduce on worker brood? At first glance this sounds like a valid concern. However, the shorter brood cycle of the worker bee as compared to the drone, reduces the number of baby mites that can be raised to maturity during the worker brood cycle by roughly 33-50 percent when compared to drone brood.[2] This reduction in the mite's ability to successfully reproduce in worker cells has a significant effect on their overall population buildup within the hive. So far, all efforts to remedy the *Varroa* mite problem through a genetic solution has been focused on the honey bee. If drone brood trapping places selective pressure on the mite by increasing the number of mites that prefer to reproduce on faster-developing workers, such an event could serve to improve upon the ability of the mite and the European honey bee to coexist without the population of mites, and their attending diseases, overwhelming the host colony This is precisely the type of long-term solution that is needed if we are to ensure the future of the honey bee and the beekeeping industry.

Whether or not trapping selects for mites that prefer to reproduce on worker brood, it can be an effective way to remove significant numbers of mites from a hive, and because they work physically, traps can be utilized throughout the active season without fear of contaminating the harvest. I have not found that traps alone have proven to be enough to keep a colony from crashing due to an overabundance of *Varroa* within one-to-two years. However, when used effectively and in conjunction with other low-level control devices and management techniques such as bees with natural mite resistance, the making of nucleus colonies (see June 2008 *Bee Culture* Pg. 38) and a screened bottom board (the subject of next month's article), traps can keep the level of mites low enough throughout the Spring and Summer that only a single high-impact treatment in the Fall is required to ensure that the bees will survive the Winter without being destroyed by the mites.

Whatever we as beekeepers do to help control the mite population within our beehives, whether its a short-term chemical attack, or longer-term approaches to which *Varroa* are unable to develop resistance, they should all be considered temporary solutions that ultimately are designed to simply buy time for the honey bee until it can develop the ability to naturally resist the mites on their own and live without the need for our constant intervention. BC

Ross is the author of *Natural Beekeeping: Organic Approaches To Modern Apiculture* published by Chelsea Green; dancingbeegardens@hotmail.com. Dancing Bee Gardens, PO Box 443, Middlebury, VT 05753.

1. S. Hart, *Baby Bee Odor Lures Cradle-robbing Mites Science* News (August 12, 1989): 103
2. A. I. Root Co., *The ABC & XYZ of Bee Culture* (Medina, OH: A. I. Root Co., 2007): 553

a closer look

DRONE PRODUCTION

Clarence Collison

Queens and workers have control.

A colony of honey bees normally consists of one queen, several thousand workers, and drones – equivalent to about 20% of the number of workers when drone populations are at their peak. However, the ratio of drones to workers changes with the season and with the size of the colony (Sasaki et al. 1996). It has been established that the ratio increases before or during the swarming season, after which it decreases markedly (Allen 1963, 1965).

Drone production has a basic annual cycle, and is highly variable between colonies and in different geographical locations (Allen 1965). Drone comb building and the rearing of drone brood are influenced by a number of interrelated factors such as time of year (Allen 1958, 1965), worker population size (Taber and Owens 1970), queen behavior (Koeniger 1970), availability of existing drone comb (Allen 1963), and nutrition of the colony (Taber 1973, Taber and Poole 1974).

Numerous studies have examined and compared combs associated with managed colonies provided with frames and foundation, colonies allowed to build natural u-shaped combs, and combs from feral colonies, to better understand the mechanisms that regulate the production of drone comb and drone brood. In England, the production of drone-size cells in colonies building their own comb reached its peak in April and May. Combless colonies, in some ways equivalent to swarms, tend to build drone cells at the edges of the combs, especially on outside combs. The amount of drone comb they produced was determined by the amount already present (Free 1967). Drone comb production was also stimulated by the presence of occupied queen cells, but not by the absence of a queen.

Taber and Owens (1970) found that as the size of the worker population increased, the amount of drone comb tended to increase and the positioning of this drone comb moved toward the center of the cluster In this study, drone comb did not necessarily occur on the edges or outside of the combs as suggested by Free (1967). Drone comb construction was also shown to depend on the availability of nectar and pollen, but not on the queen.

Taber (1973) further demonstrated that the presence of adult and immature drones are an important indicator of the nutritional condition of the colony (quantity and quality of food) – specifically the amount of pollen which has been available to the bees during the previous month. A shortage of pollen will result in reduced drone production. Taber and Poole (1974) demonstrated that seasonal restrictions on brood rearing associated with nutritional deficiencies can be averted through careful nutritional management. They were able to rear both queens and drones and mate them during the winter in Tucson, AZ by feeding a pollen-sugar-water-dough mixture.

The proportion of comb area dedicated to drone comb is significantly different in managed versus feral colonies. For instance, Szabo (1983) found that managed colonies provided with starter strips, constructed drone comb on 8.7% of the total comb area. Owens and Taber (1973) observed that about 10% of the total comb area was drone comb in colonies which built their own comb. According to Seeley and Morse (1976), 17 ± 3% of the comb area of natural nests of honey bees is devoted to drone comb. A study on managed hives showed that colonies provided with a plentiful supply of drone comb produced significantly more drone brood than colonies in which the amount of drone comb was severely restricted in the Spring. Colonies given only one drone comb also produced significantly more drone brood than colonies with no added drone comb. Fewer drone cells were built on worker combs in the colonies receiving drone comb. The maximum amount of drone brood did not exceed about 2580 sq. cm in any colony (Allen 1965). This observation was reinforced by Levin and Collison (1991), who observed that the percentage of drone cells occupied by drone pupae for colonies with old combs, colonies provided with comb foundation or free building colonies was only 30.8%. These studies reveal that there is an upper limit for both drone comb building and drone brood production.

Even though colonies have upper limits for the amount of drones they will produce, Szabo (1995) was able to demonstrate that mass production of drones is possible in selected colonies by continuously removing the capped drone brood. By employing this method, the mean number of drone pupae reared per comb was 1,428 and the average number of pupae per colony was 17,137 He recommended that the removed drone brood be distributed to

"A colony will produce anything from eight to 20% of its comb area into drone cells, depending on the queen, colony health, time of year and worker behavior."

other colonies; they will be accepted during a nectar flow, but during drought conditions only queenless colonies or colonies with old failing queens will tolerate them. Prior feeding of the colonies also helps them to accept foreign drone brood. Manually removing and replacing drone combs, however, does not directly alter worker and queen regulations on the level of investment a colony is willing to make into the drone caste. Mass production of drones is useful to obtain drones of known genetic origin for the controlled mating of queens, to manage *Varroa* mites by periodically removing and freezing drone combs, and to reduce the spread of Africanized genes in areas where Africanized bees are established and European queens are mated.

It is often assumed that worker honey bees regulate their colony's investment in drones because they expend so much energy building drone cells and feeding drone larvae. Recent research suggests that honey bee queens also contribute to the regulation of their colony's drone production through the modulation of their egg-laying decisions (Wharton et al. 2007, Sasaki and Obara 2001, Sasaki et al. 1996). Koeniger (1970) demonstrated that the queen seems to recognize a drone cell mainly with her forelegs during cell inspection. In none of his observations did he find drone brood in worker cells, though the queen laid 8-10 times as many eggs into worker cells as in drone cells. This seems to indicate that the fertilization of the egg is prevented by a specific stimulus of the drone cell, and that the laying of fertilized eggs in worker and queen cells depends on the absence of this stimulus. More recently, Ratnieks and Keller (1998) using molecular techniques was able to demonstrate that the queen has precise control of egg fertilization, as she lays unfertilized eggs in drone-size cells and fertilized eggs in worker-size cells. They concluded that honey bee queens have great and quite possibly complete ability to control the fertilization of the eggs they lay

Queens have the ability to control the sex ratio of their eggs in response to seasonal cues.

The largest number of eggs laid in drone-size cells coincides with the swarming season (Sasaki et al. 1996). This coordinates with the behavior of workers who build more drone cells and invest more care in drone rearing before and during the swarming season.

It is likely that this coordinated regulation of the sex ratio by queens and workers tends to optimize the economics of the colony. A decrease in the number of unfertilized eggs laid by queens was observed during the swarming season when colony food stores were insufficient. Drone cell construction, however, was not affected by the food shortage (Sasaki and Obara 2001). The smaller proportion of unfertilized eggs in the hive could not be accounted for by worker cannibalism. During non-swarming seasons, queens either greatly reduced or stopped laying unfertilized eggs, even when colonies were well-supplied with food. These results suggest that the honey bee queen adjusts the egg sex ratio by referring to both the nutritional resources and their own intrinsic seasonal factors.

In an effort to further show that honey bee queens can influence the regulation of drone production, queens were either allowed or prevented from laying drone eggs for a period of time and their subsequent tendency to lay drone and worker eggs was examined (Wharton et al. 2007). Half of the queens were confined to drone comb and half were confined on worker comb for a period of time, then both types of combs were made available to them. Queens that were prevented from laying drone eggs for a brief period of time later produced more drone eggs than queens who had not been prevented from laying drone eggs. On the combs in which queens were given a choice of comb type, no evidence of worker cannibalism of eggs and larvae were observed. Nor did the workers influence the queen's decision by either filling the drone-size cells with nectar or refusing to rear the drone larvae that hatched. Further research is needed to determine what cues the queen uses to alter her egg-laying decisions in relation to her previous investments in drone production.

Overall, the size of the drone population in a honey bee colony depends on a sequence of actions and decisions taken by the queen and workers. With each action, there is an opportunity for the bees to alter the colony's investment in drones (Wharton et al. 2007). Because workers initially construct the brood cells and can later modify any queen investment patterns by decreasing the number of immature or adult drones, it is widely assumed that workers control colony drone production. In order to increase colony efficiency by minimizing the number of drones that will be destroyed by the workers, a queen might be expected to adjust her egg-laying patterns to achieve her colony's current optimum investment in drones. BC

References

Allen, M.D. 1958. Drone brood in honey bee colonies. J. Econ. Entomol. 51. 46-48.

Allen, M.D. 1963. *Drone production in honeybee colonies* (Apis mellifera). Nature, London 199: 789-790.

Allen, M.D. 1965. *The effect of a plentiful supply of drone comb on colonies of honeybees.* J. Apic. Res. 4: 109-119.

Free, J.B. 1967 *The production of drone comb by honeybee colonies.* J. Apic. Res. 6: 29-36.

Koeniger, N. 1970. *Factors determining the laying of drone and worker eggs by the queen honeybee.* Bee Wld. 51: 166-169.

Levin M.G. & C.H. Collison 1991. *The production and distribution of comb and brood in honey bee (*Apis mellifera *L.) colonies as affected by freedom in comb construction.* Bee Science 1(4): 203-211.

Owens, C.D. and S. Taber III. 1973. *Size and shape of comb constructed by honey bees in a 1.2-m³ box during one season.* J. Econ. Entomol. 66: 1234-1236.

Ratnieks, F.L.W and L. Keller 1998. *Queen control of egg fertilization in the honey bee.* Behav. Ecol. Sociobiol. 44: 57-61.

Sasaki, K. and Y. Obara 2001. Nutritional factors affecting the egg sex ratio adjustment by a honeybee queen. Insectes Soc. 48: 355-359.

Sasaki, K., T Satoh and Y Obara 1996. *The honeybee queen has the potential ability to regulate the primary sex ratio.* Appl. Entomol. Zool. 31: 247-254.

Seely, T.D. and R.A. Morse 1976. *The nest of the honey bee (*Apis mellifera *L.).* Insectes Soc. 23: 495-512.

Szabo, T.I. 1983. *Effect of various combs on the development and weight gain of honeybee colonies.* J. Apic. Res. 22: 45-48.

Szabo, T.I. 1995. *The production of drone comb and drone brood in honey bee colonies.* Am. Bee J. 135: 642-643.

Taber, S. III 1973. Drones- their value to you. Am. Bee J. 113: 302, 304.
Taber, S. III and C.D. Owens 1970. *Colony founding and initial nest design of honey bees, (*Apis mellifera *L.).* Anim. Behav. 18: 625-632.
Taber, S. III and H.K. Poole 1974. *Rearing and mating of queen and drone honey bees in winter.* Am. Bee J. 114: 18-19.
Wharton, K.E., F.C. Dyer Z.Y Huang and T Getty 2007 *The honeybee queen influences the regulation of colony drone production.* Behav. Ecol. 18: 1092-1099.

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

'Bout a 100 – Sideline Beekeeping

SUMMER NUCLEUS HIVES AND PRE-WINTER MANAGEMENT

Success Means Attending To Details Before, During And After

Larry Connor

Last month I went into detail about the preparation of nucleus increase colonies during the peak swarm season for your area. This month we will concentrate on one beekeeper's application of this theme that gives you details of this process. This will give me a chance to discuss the role of nighttime temperature and how you go about making decisions on when to make up increase colonies.

In mid-May I dropped by the Lake Shore Beekeepers Association meeting in North Judson, IN for a Spring Field & Nuc Clinic. The meeting was held in a park directly across the road from the home of Scott Pajor, a 50 ± colony sideline operator with hopes of growing the number of colonies to a full-sized sideline operation of 200-300 colonies. He showed the members how he makes nucs, and the simplicity of the system is just as I discussed in last month's article.

The day before the meeting Pajor checked the hive he planned to make increase from and discovered that they were actively producing queen cells for swarming. It was, of course, mid May and the statistical peak of the swarming period for Northern Indiana. It was at the end of the fruit bloom and there were many different plants in bloom. Pajor had been capturing one or two swarms a day. He removed the colony's queen and installed her into a hive of her own in order to save her While this is not what he had planned, it gave him a hive with lots of queen cells for the demonstration.

Pajor starts out with an empty hive body (he uses deep frames) with a screened bottom board attached. He had both frames of drawn comb as well as frames of foundation. Since he is in an expansion period in his beekeeping, and had been catching swarms, much of his extra equipment, including new hives, had already been put to use.

Here's a photo essay showing beekeeper Scott Pajor's method of how to set up late Spring and Summer increase.

Indiana beekeeper Scott Pajor discusses his method of making increase colonies with the members and visitors at the Spring Field & Nuc Clinic sponsored by the Lake Shore Beekeepers Association. If you live in the area from Chicago, IL to Grand Rapids, MI, including northern Indiana and southwestern Michigan, contact Dave Laney at 574-276-5278 or davelaney@kconline.com. This is a relatively new organization that has been meeting in different areas of the region every month or so.

Pajor had selected a strong colony with bees in two deep hive bodies as the donor of an increase nucleus. Since he found queen cells the day before, and had removed the queen from this hive, he did not need to search through the combs. There is, of course, an excellent chance that the hive has a queen that has emerged and is prepared to leave with a swarm. However, since Pajor found the old queen and the queen cells were just sealing, he was probably able to catch the hive a day or two before the old queen left with a prime (first) swarm. As these photos show, the colony had a large bee population, and brood was in both hive bodies.

Working from one side of the brood nest, Pajor minimizes the disturbance to the colony while it is working the spring flow. Here he is inspecting one of the frames he will add to the increase colony.

Pajor moves the first frame he has selected to the its new home. This frame contains sealed queen cells and brood of a variety of ages, but most of the brood was older larvae approaching the sealing stage. This balances the brood age of the next frame, which contains older sealed brood.

Pajor moves the second frame from the parent hive to the increase unit. He has selected a frame with good honey reserves at the top of the comb, and a solid brood pattern in the center of the comb. Much of the brood was near emergence, and there is good bee coverage on this frame.

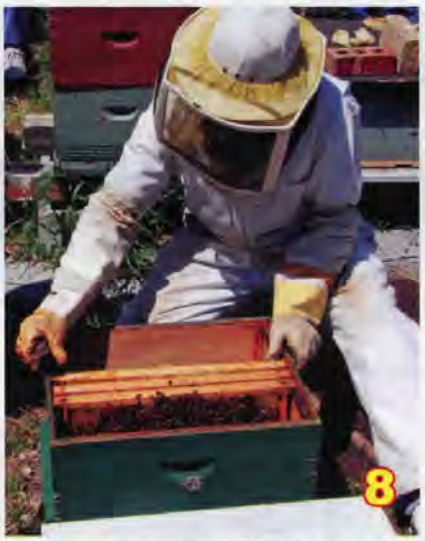
This is a food frame containing capped honey and open cells of pollen. This provides the increase colony with adequate food on days it is unable to forage, and will guarantee colony growth. As the pollen is removed by the nurse bees and consumed to make brood food to feed developing larvae, the cells will be polished so the queen will lay into them. New beekeepers must not think that frames are always used for the same function all season. The bees maintain a very dynamic method of optimizing comb for the needs at that moment in their development. As colonies expand they will consume stored honey, then use the cells for pollen storage (which needs to be very close to the brood area for full utilization), and then be used for brood rearing. As the season ends the reverse may happen, with last worker bee emerging in the late Summer, then used for pollen storage, and finally used for honey storage for the Winter.

Once all the combs used in the increase colony have been removed from the parent hive, Pajor inserts frames with drawn comb or foundation for the strong colony to draw out and utilize for brood production or food storage, as needed by the hive. He keeps the placement of the frames at the same location where the brood and food frames were removed. Pajor is on a program of replacing comb every five years, so each hive body needs to have two new frames added each season.

Pajor uses screened bottom boards as part of his mite management plan, and has fastened this screened bottom board to the increase colony. While it would be okay to leave the colony like this for a day or two, it is better to fill the spaces to the left and right of the three frames of bees with frames of drawn comb. This will allow the bees and queen to quickly expand into the comb. If you do not have drawn comb, you must add foundation in frames. The bees will have to work harder to build the comb, but new increase colonies often do a fine job of building worker combs.

Every beeyard visit has something you can learn from. Here old roofing material has been snatched from the landfill and is being used as a labor and chemical free method of controlling weeds in front of the colonies. Also note the hive stands; they get the hives off the ground and out of any standing water. It also saves the back from so much bending. The stands sit on cement blocks.

Pajor adds the third frame to the increase colony. He has found an outside frame of pollen and stored honey on this frame. As described above, the bees will be able to use the resources on this frame and then use the comb for brood rearing.



Pajor positions the combs so they are the proper distance from each other. He positions the brood in the center of the box so it is able to expand in both directions. Last month I described a method where the brood is put at one side of the hive body. I'll get back to this matter at the end of this photo essay.

The final arrangement of combs in the new increase colony shows the use of newer combs and solid frames. From the top the combs are: Food frame with honey and pollen. Frame of sealed and ready to emerge brood with honey stored at the top of the frame. The older larvae close to sealing with a newly sealed queen cell. If there were not queen cells, a beekeeper could add a queen cell that was locally produced, or add a queen from any number of sources. Pajor used a combination of drawn comb positioned next to the brood and bees, and then filled the empty space in the hive body with frames containing foundation. Adding combs of drawn comb will make it easy for the colony to expand during the nectar flow, but because he is short on such a resource, he adds a bit of both to average things for all his new colonies.

I spoke to Pajor a few days after he set up this colony He reported that he had not moved the increase colony, yet is still had a good population of bees. This is good. It means the bees that were moved with the combs were primarily young nurse and house bees and not old field bees. Older bees that have had flights are likely to return to their home where they have carefully orientated. If the colony had been extremely weak, he could have added additional bees by shaking them from the brood frames onto the front of the hive. Or he could have added a swarm that he caught to the colony. That would give the colony a laying queen from the start, and would not need to wait for the queen to develop, mate, and start laying.

How cold is it tonight?

Springtime buildup in beehives is more dependent on nighttime temperature than many of us want to know. If the nighttime temperature is in the 20s and 30s (degrees F) most evenings, it is very difficult for the bees to build the brood nest rapidly More experienced beekeepers have seen entire frames of drawn comb filled with eggs in a day or two. If the temperature in the brood nest in such a rapidly expanded colony is stable, then the colony will explode in size. But if the colony is weak, in a cold exposure location, or subjected to cold nighttime temperatures, it will be hard for the colony to develop. The instinct of the bees is to expand rapidly when seasonal factors are in agreement.

A colony of bees generates its own heat, and a large colony will keep a standard hive body or two warm when the temperature drops. And if the combs and stored honey are also warmed by colony metabolism and daytime temperatures, there will be a lag time where heat is released over the evening hours, perhaps enough to protect those fragile eggs and young larvae.

For this reason beekeepers like Scott Pajor make up early Spring increase colonies stronger than they do with late Spring and Summer colonies. In late April and early May Pajor will make up increase colonies with five frames of brood and food. This helps insure better stability overnight, so when new bees emerge the colony can support and equalize temperatures days and nights.

Bees enter clustering behavior at 57/58°F I add about 15° for small colonies and 20 degrees for large colonies and add that to the temperature at night. If the temperature reaches 42° at night, I would expect even the smaller colony to survive without any affect on the brood production.

But if the temperature reaches 20° during the rapid Spring buildup and stays there for hours, I'd expect to see considerable brood loss in expanding Spring colonies, especially smaller, rapidly growing colonies that have gambled with expansion. Even with the additional 15-20° due to colony metabolism, we will have temperatures inside the hive of 35-40°F, forcing the bees into cluster and off the brood combs at the outside of the colony

Well, we had 30° weather after the meeting in Indiana. Pajor had the same weather, and was pleased that the low temperatures did not hurt the colony shown in the photos. Perhaps it was the short time period of cold exposure – even eggs can take some cooling. But it is risky to exposure bees to extremes in temperature, especially those small increase colonies. It is another reason to make up colonies when the weather is warmer and more stable. Then our tropical bees can grow unimpeded.

Heat conservation is a factor in how you position frames of brood within the hive or nucleus box. When a deep or medium hive body is divided into two parts, the brood should be placed against the common wall. This conserves heat of both small colonies by creating one thermal cluster When the temperature is warmer at night, and the brood rearing is rapid, a placement in the center of 10 or eight-frame equipment allows the bees to expand in both directions while keeping a solid thermal core. BC

Dr Connor's books, including Increase Essentials, *are offered for sale through many bee supply dealers, and at his website, www.wicwas.com. A PayPal store is available on that site for those who want to have the convenience of purchase via this option.*

OUTBREEDING MITES & OVERWINTERING NUCS

You can raise bees without miticides Here's how.

Me Disselkoen

Background

Information and management techniques here are based on G.M. Doolittle's book, *A Year's Work In An Out-Apiary*, which was originally published in 1908 by the A. I. Root Company of Medina, OH. It was reprinted in 2005 by Dr Lawrence J. Connor and is currently available from Wicwas Press. This book is about section comb honey production but the important information in the book pertains to bee behavior and bee management. If you read between the lines, it is even a great guide for novice beekeepers.

Best practices for nuc nutrition over the winter

On page 49 of Doolittle's original book, he discusses how he made nucs with six frames of brood and four frames of honey on September 1 and later overwintered them in a cellar There was little or no brood rearing until he took them out of the cellar on April 14 at which point the bees could get maple pollen for buildup so he didn't need pollen reserves. That is why he didn't have eight frames of brood until May 20. I can have eight frames of brood in an outdoor, overwintered, healthy hive with adequate pollen reserves by May 1. Doolittle basically overwintered a package that didn't need pollen or honey reserves until it was removed from the cellar Everyone is expected to feed a package in the Spring. Doolittle targeted his feeding by waiting until April 14 when natural pollen was available to take them out of the cellar He then dropped down into the hive the honey reserve combs that he had stored in the apiary all Winter We can overwinter our nucs outside instead of in the cellar by positioning a candy board with pollen over the top of the hive so that we can have brood in March here in Michigan on the 43rd parallel. This will put us three weeks ahead of Doolittle's schedule and provide us with eight frames of brood by May 1 instead of May 20.

Last year (Spring 2007) we had a late April snowfall along with a deep freeze and some nucs starved as a result. From this experience I learned that by overwintering July nucs outdoors it is unreasonable to assume that they can build up and maintain a honey reserve, and this is what initially prompted me to use a candy board. Doolittle knew this about nucs because he was in the business of producing section comb honey so he didn't have enough honey reserves to overwinter his nucs outside. He overwintered his nucs in a cellar where the temperature remained at around 45°F all Winter long. At this temperature, and with little or no brood rearing, bees do not require a lot of honey so Doolittle's four frames of honey were sufficient to keep his nucs alive until Spring. Overwintering bees in cellars is a practice that was studied in depth by Dr C.C. Miller and is explained in his book, *Fifty Years Among the Bees,* that was published in 1915 by the A.I. Root Company of Medina, OH. On page 291 he points out that, "Theoretically, the right time to cellar bees is the next day after they have their last flight for the season." He also discusses other requirements in bee behaviors.

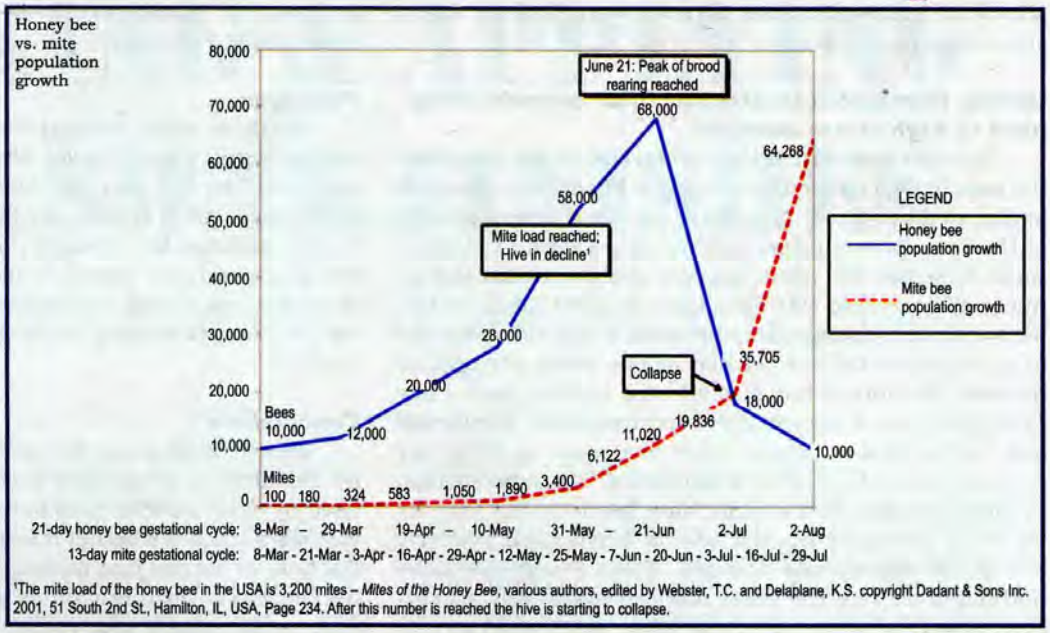
This Spring we didn't experience any problems with starvation as a result of using the candy boards but we did experience a shortage of pollen in some of the hives due to the extended winter weather which set back the brood rearing in those hives by a couple of weeks. This past long Winter taught me that it is also unreasonable to assume that these outdoor July nucs can build up and maintain a pollen reserve. Doolittle also knew this which is why he removed his nucs from the cellar on April 14 in time for the first pollen flow. Another reason that many nucs don't have enough pollen reserves to endure a long Winter stems from the fact that when the nuc is created in July, the bees don't have enough time to buildup a pollen reserve because all of the pollen is being rapidly used for intensive brood rearing (which we leverage to outbreed the mite). In fact, the bees are using up the pollen as fast as they are bringing it in during the three remaining brood cycles before Winter sets in.

During mild Michigan Winters nucs can overwinter very well without candy boards or extra reserves of pollen but one never knows whether the Winter will be mild or harsh or whether it will be short or long. I am currently exploring the best way by which to integrate a pollen patty with a candy board to provide the maximum nutritional safety valve for Winter buildup. I prefer real pollen because it is a more natural product than pollen substitutes. If we can have the appropriate nutrition available within these nucs to bolster them through unpredictable Winter weather patterns, we will no doubt see positive results that more than compensate for the small effort and investment. Some of our prize nucs that did phenomenally well this year went into Winter with more pollen reserves than other nucs. They are now (late May) flourishing comparatively and are right on target with the ideal number of frames of brood.

Further explanation about mite loads

You may question the mathematics If on July 20, and assuming that you have already made your first spring splits on May 1, you take a hive with a mite load of 3200 mites and split it into four nucs, each nuc will have a mite load of 800. Then with three brood cycles,

Graph 1: *Hypothetical projection of honey bee and mite reproduction starting with 100 mites and 10,000 bees on March 1 in the Grand Rapids, MI area (43rd parallel). Honey bees' mite rate increases 1.8 times per 21 day brood cycle versus* Varroa *mite's rate increases 1.8 times per 13 day cycle.*



¹The mite load of the honey bee in the USA is 3,200 mites – *Mites of the Honey Bee*, various authors, edited by Webster, T.C. and Delaplane, K.S. copyright Dadant & Sons Inc. 2001, 51 South 2nd St., Hamilton, IL, USA, Page 234. After this number is reached the hive is starting to collapse.

or 63 days, the mites will continue to increase into the Winter. You might ask, how can you have a hypothetical mite load of 100 in March as presented in Graph 1?

The reason is that there is an interruption in the honey bee larvae after creating the nucs in July when the old queen is removed and new queen cells are inserted so that the mites can't reproduce (see Graph 2). On day 22, or when there is breeding medium again for the mite, all the fertile mites will enter the medium. This is an unsustainable load and the bee larvae and mites will both die. The only mites that will survive are the ones that entered the periphery larvae with one or two mites in each cell. These few remaining mites will slowly increase through the Winter and will amount to around 100 by March (see Graph 2). Then in the following season, you will need to make splits again in May and July to continue to outbreed those 100 mites that you had in March or the hives will eventually collapse as detailed in Graph 1

Addressing queen mating issues in newly-created nucs

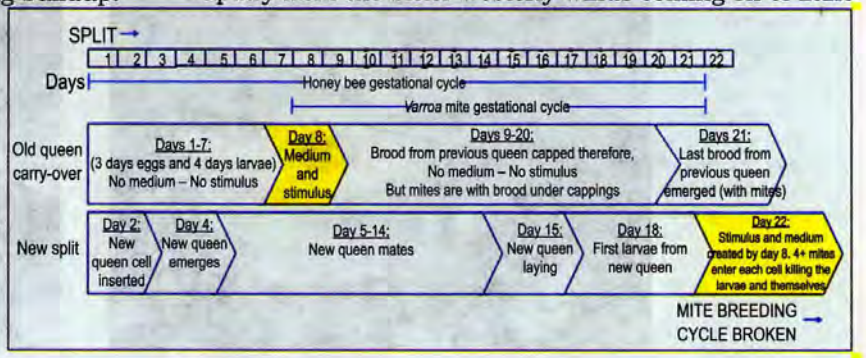
In August, if you see that one of the queens did not mate, you can unite this nuc with a mated queen in another nuc *before day 22.* After day 22, you must destroy the nuc that didn't mate because uniting it would only infest the good nuc with mites since the failed mating didn't break the mites breeding cycle. Good beekeepers always take their losses in the Fall. There is no reason to let a failed nuc eat honey and dysentery the hive when you can store this honey and use it later for Spring buildup.

Never introduce a mated queen to a nuc when making splits in July. You must always give a queen cell in July to break the mites breeding cycle and then have the emerging new queen outbreed the mites. You can only introduce mated queens in the Spring.

Experimental windshield results

The comparison between experimental, wide-open, windshielded nucs and packed, windshielded nucs for Winter 2007-2008, on Michigan's 43rd parallel, was significant. The experimental, unpacked but windshielded nucs overwintered well under 50% and the packed, windshielded nucs overwintered well over 50% (10 nucs out of 14 for 71%). This past extended Winter with consistently low temperatures and high winds also had the second worst snowfall on record in Michigan. These weather conditions gave us the chance to truly test nuc overwintering practices and exposed various areas for improvement. For example, some of the difference in outcomes had to do with location as the packed, windshielded nucs were wintered within a large woods with good air drainage and the wide-open, windshielded nucs were overwintered in a wide-open, very windy beeyard that had virtually no protection at all. Wide open apiaries are great locations for honey production in the Summer but when you make the July splits for overwintering you want a well protected yard with good air drainage. An example of a well protected yard would be halfway down an eastern slope. This type of location would protect the apiary from the bitter westerly winds coming off of Lake

Graph 2: *A fertile mite must have a medium to lay her eggs and a stimulus to start reproducing. The medium and stimulus are always on the 5th day of the larvae, day eight, one day before capping the cell. When you split a hive you break the normal breeding cycle of the mite by interrupting both the medium and the stimulus . . .*



Michigan and would also harness warmth from direct sunshine on clear days.

Gentle, time-tested treatments after overwintering nucs in high-stress weather

During a brief Winter thaw when conditions permitted the bees to fly, I noticed symptoms of Nosema, a condition aggravated by stress. Now there are two different strains of Nosema, *Nosema Apis* and *Nosema Ceranae*. Both of these Nosemas will affect the hive and its health and all nucs will be treated with Fumagilin-B in the future. It has been a proven management procedure and you can treat at a cost of two dollars per hive or one dollar per nuc. In the past, Foulbrood has also affected healthy bees. I use Terramycin as a preventative treatment for Foulbrood and I also replace combs every five years to keep any accumulation of spores at a minimum. These two drugs, Fumagilin-B and Terramycin, have been around for over 40 years and have no side effects when used properly and in the appropriate dosages. These treatments have nothing to do with the mites and are completely acceptable. Now this brings up a huge issue that I won't go into at this point and that is the issue of side effects. Most drugs have side effects. Is CCD a side effect? Have any studies been done?

Looking forward: tailored beekeeping via targeted nuc production

The fact that we were successful in overwintering our nucs despite such harsh Winter weather conditions is yet another confirmation to me that Doolittle's approaches to bee management are highly effective and can provide us with ways to reverse the current tide of hive losses. For example, you might consider that if 10 out of 14 packed nucs survived this harsh, extended Winter, and these nucs were created from four hives last July, that yields a 250% increase within one year And there are beekeepers in many other states using this method that are experiencing similar success. One particular beekeeper in Indiana had virtually the same results in his protected apiary as we did in ours and he also experienced the pollen shortage due to the extended Winter This consistency provides further evidence that Doolittle had it right. Imagine the possibilities for our beekeeping industry With this method, we would be able to make a two-brood-frame split and target any pollination crop 12-15 weeks later much the same way as greenhouses target lilies for Easter These July nucs can be brought to a warmer climate and built up for a target crop (i.e. almonds) in February

Packages

For those beekeepers who want early packages in the Spring (April), please take a close look at the gestational cycles in Graph 2. On day 22, you have no sealed brood in the hive which is virtually the same thing as a strong five lb package hived eight days earlier This package will produce three brood cycles before Winter, and will come out real strong in the Spring. So if you really want early Spring packages, make July nucs or buy them in the Fall.

Conclusions

We are finding out that methods used 100 years ago by Doolittle in producing section comb honey can be used by today's beekeepers to raise chemical-free bees for various purposes whether it be for pollination, honey production, or simply just raising the bees themselves. And beekeepers in northern states will have neither need nor expense to venture south with their bees for the Winter if they overwinter their nucs properly by providing the right nutrition and protection. In fact, northern beekeepers even have the option to overwinter their nucs in cellars as did the old masters which would bypass the need to provide annual Winter outdoor safety valves and protection for those nucs while still keeping the bees chemical-free. Finally, creating nucs with mated queens or queen cells in May and queen cells in July not only enables us to keep bees chemical-free, but produces tremendous increases in bee population. We have here the opportunity to replace a lot of honey bees being lost currently and in past years which will help us protect our industry from the import of bees from other nations.

In the past I have learned that even if I agreed with and understood someone else's methods, I still would not try them. And it seems to me that most people will try things that they perceive as good *if they give themselves permission to do so.*

In 1908, Mr G.M. Doolittle gave you and I permission to use his methods. Several years ago, I gave myself permission to use his methods. Now you must give yourself permission to use his methods **BC**

Mel welcomes your questions, feedback, or suggestions: mdasplitter@sbcglobal.net

Experimental, windshielded nucs in wide-open apiary.

Interlocking galvanized panels wrap around bottom hive body to shield the brood nest from wind. Candy board with insulation fits snugly over the top of the brood nest. An empty super sits atop the candy board to hold extra honey stores to drop into the nest in the Spring.

Windshielded, packed nucs in protected apiary.

MAKING & APPLYING BEESWAX FINISHES

Make Your Own, And Make Your Own Better

Peter Sieling

With all the high-tech finishing products available today, cabinetmakers still use beeswax, either as the primary finish or as a coating to protect the underlying finish.

Furniture finishes fall into two main categories. Varnish finishes form a film on the wood's surface. These include varnish, polyurethane, lacquer, shellac, and paint. Oil and wax finishes, which include waxes, tung oil, and linseed oil, soak into the wood, forming a film of negligible thickness.

Both types of finishes have advantages and disadvantages. Varnish finishes provide the best and most durable protection, but are difficult to apply. Air bubbles, dust particles, and brush streaks embed the surface. They can run, leaving drip lines. You have to be very careful applying a varnish finish.

Wax and oil finishes don't offer as much protection to the wood surface. They need to be replenished occasionally because they are thin. Unlike varnish or lacquer, they are easy to apply. They don't need to be removed with a chemical stripper before refinishing. Because the oil soaks into the wood, light reacts differently with an oiled finish, adding a depth to the furniture's appearance.

Preparing wood prior to applying finish

The quality of the final finish depends on the care you take in preparing the wood prior to finishing. Wood surfaces should be ready to finish before you assemble a piece of furniture. Power planers leave knife marks, and it's nearly impossible to reach into corners with sandpaper to remove knife marks without accidentally rounding crisp edges. Any parts that move independently of adjacent parts (for example, the floating panel in a frame-and-panel door) should be finished before assembly.

Depending on your skill level, there are three ways to prepare wood for finishing. Some traditional woodworkers clean up the stock with nothing but a hand plane. Others remove the planer marks with a hand plane and then finish with a cabinet scraper. Both methods are more pleasant than sanding, but require frequent tool sharpening (some woodworkers sharpen their cabinet scraper two or three times per hour).

Most people find sanding the easiest way to prepare the wood. Start with coarse sandpaper, 80 grit, for example, to remove planer knife marks. Always sand parallel to the grain. Use 100 grit to remove scratches left by the coarser sandpaper. Wipe the wood thoroughly with a clean rag before each change of sandpaper. Any coarser particles left on the wood will embed in the finer sandpaper and leave coarse scratches than won't clean out. Work through progressively finer grits, going to 120 and finishing with 150 or 180 grit. Most woodworkers spend more time sanding than necessary, hoping not to miss that single scratch and have to start over. Look at the surface with light shining across it and when the scratch size is consistent, switch to a finer grit.

150 or 180 grits are fine enough for a varnish finish because the degree of gloss comes from the finish itself. Oil or wax finishes require finer grits because the gloss of the finish is dependent on the polish of the wood. You may use grits up to 220, 320 or even 400. Use a rag moistened with mineral spirits to clean the sanding dust off the surface before adding the finish.

Applying the Finish

The following finishes have been recommended by

Beeswax Finishes

I found these traditional recipes in both old bee books and modern woodworking magazines.

Basic Beeswax Paste Wax

Mix 1 part turpentine to 1 part beeswax

This formula's proportion varies widely. One author recommended one part beeswax to five parts turpentine. He described the consistency as "like Summer butter" When I tried it, my finish ran like salad oil. Either way, the turpentine evaporates, leaving nothing but beeswax. The 1.1 mix yields a consistency similar to commercial paste waxes.

The beeswax is reduced to shavings, mixed with the turpentine and allowed to dissolve overnight. Alternately, melt the wax in a double boiler and slowly add the turpentine while stirring.

Beeswax Oil Finish

The oldest reference I've found for this recipe comes from *Wax Craft, all about Beeswax: its History, Production, Adulteration, and Commercial Value* by T. W Cowan, printed in 1908. The latest comes from *Woodsmith* magazine.

Mix equal parts by volume: beeswax, turpentine and linseed oil. Melt the wax in a double boiler and add the turpentine and linseed oil, or shave the beeswax into flakes and let it dissolve in the turpentine overnight, then add the linseed oil.

traditional cabinetmakers – people who make period furniture. These are oil/wax finishes, which means that you need to finish sanding with extra fine sandpaper.

Shellac and Beeswax: After preparing the surface, apply shellac. You can buy it pre-mixed or mix your own. Shellac in liquid form should be used quickly because it has a short shelf life. Brush on the shellac in a thick coat, then immediately wipe off with a clean dry rag, or make a pad from a rag soaked in shellac and spread in a circular motion, finishing up by rubbing with the grain. You want to end up with a thin layer of shellac – just enough to seal the wood. When the shellac is dry, usually 30 minutes, sand with 400 grit sandpaper to remove the "nibs" – raised wood fibers that give the wood a rough feeling. Sand freely – you won't sand through the shellac because you've rubbed it into the wood. Clean the dust from the surface with a vacuum it or take it outside and blow it off with an air compressor.

Where Do They Come From?

Most finishes come from natural sources.

Shellac is a resin secreted by the lac beetle, native to India and Southeast Asia.

Lacquer is made from wood pulp cellulose nitrate (nitrocellulose) with resins added to make it less brittle, and nitrocellulose is made from wood pulp.

Linseed Oil: pressed out of flax seed. Its name derives from the Latin name – *Linum usitatissimum.*

Tung Oil: pressed out of the nut of the tung tree

Carnauba wax: made from the leaves of the Carnauba Palm native to northeastern Brazil. It is harder than beeswax and is sometimes combined with beeswax for a harder, more durable finish.

Turpentine: distilled from several species of pine trees.

Apply the basic beeswax formula (see sidebar) with a pad of clean cloth dipped in the paste wax. Use circular motions, finishing up by rubbing with the grain. Rub hard. You should not see streaks of wax when you're done. After at least four hours, add a second coat. When that's dry buff with a dry rag.

Linseed Oil and Beeswax: The oil soaks into the wood, bringing out the grain and enhancing color variations. This is similar to shellac and beeswax except that linseed oil takes much longer to dry. Using a pad of cloth or #0000 steel wool, flood the surface of the wood with linseed oil, rubbing in a circular motion. Let the oil soak in for 10-20 minutes, then wipe it off thoroughly. Let the finish dry until it's no longer tacky, usually a day unless the conditions are cool or humid. Rub the dry surface with dry #0000 steel wool (or extra fine sandpaper), then apply a second coat of linseed oil. Again, after drying, add a third coat of linseed oil.

Once the oil is dry, rub on the beeswax paste wax. Aim for an even thin coat. Give it time to dry. I usually wait half an hour. Buff with a dry cloth.

Beeswax Oil Finish: The advantage of this finish is that it's a one step process. Apply just like linseed oil above. Use multiple coats, lightly sanding in between. You can do three or more coats, depending on how built-up a finish you prefer. Finish by buffing with a clean cloth. BC

Peter Sieling finishes wood, keeps bees and sells lumber from his home in Bath, NY. He is scheduled to be a speaker at EAS 2009.

Just Starting Out?

GET TO A MEETING!

The Best Way There Is To Learn About Bees And Beekeeping!

With the recent flood of media attention focusing on honey bees and the problems they face, people from all ages, backgrounds and locations are becoming interested in beekeeping. This is fantastic and I hope the momentum continues. Just think, every person becoming a new beekeeper is one less person who knows nothing about bees and one more person hopefully informing others about the importance of bees and other pollinators.

This past year I have had more requests for the Georgia Bee Letter than ever before. Daily phone calls and e-mails requesting information about how to become a beekeeper keep coming in at a steady pace. Bee supply companies have been bombarded with new customers and have literally run out of items and are scrambling to fill orders. Steve Forrest (Brushy Mountain), Fred Rossman (Rossman Apiaries) and Jerry Latner (Dadant) have all informed me that business is the best they have ever seen. They are extremely excited so many new people are becoming fascinated with beekeeping and they too hope the trend continues. However, I can hear it in their voices; they're exhausted. They have been working from sunup to sundown, seven days a week and see no end in sight. No one could have anticipated the swarm of new people wanting to start up colonies. And hence, no one could have anticipated the amount of equipment needed to do just that.

Since there are so many new beekeepers in our ranks I would like to offer some advice; join a beekeeping association, attend regular meetings, acquire a mentor, subscribe to a beekeeping journal, get hands on experience by working with an experienced beekeeper, do your homework, find out as much information as you can and keep informed. Not too much to ask.

Attending local, state or national meetings may be one of the best things you can do as a beekeeper, especially if you are a beginner Only reading a book (even though there are some exceptional books out there) isn't going to cut it. Trust me. I hate the cliché but here it is; "Bees don't read books." Even experienced beekeepers are perplexed from time to time because their bees aren't doing what they should be. "Doggone it! They never did that before." Well that's Mother Nature and she has a way of changing "our" rules from time to time.

Plopping a colony in your backyard and walking away is a thing of the past. Much has changed even in the past few years. Beekeeping in the 21st century is challenging. You need all the tools at hand in order to keep your bees healthy and alive. Remember these are your pets and they need your attention, especially now. Books and articles will help with the fundamentals, the big picture or the outline so to say They will also help to familiarize yourself with beekeeping terminology· supers, uncapping tanks, EFB, hive bodies, queenline jars, excluders, hair rollers, shallows, *Varroa* mites, Duragilt, mediums, AFB, queen cells, inner cover, tracheal mites, crimp wire, Sacbrood, uncapping scratcher, queen cups, deeps, hive tool, small hive beetles, brood, telescoping cover, entrance feeder, nucs, foundation, grafting tool, grafting cups, extractors (radial verses tangential), settling tanks, and honey gates. However, it is the experience working a colony that will help you fill in the details. It will bring the picture to life. Unfortunately, it may take years to fully understand the world inside a colony but it sure will be fun getting there.

So why attend meetings? Bottom line, to learn from other beekeepers more experienced than you, to find a mentor, to keep up on the newest information and to hang with people interested in something you like, bees. Experienced beekeepers can be better than any book. They have the hands on knowledge, so listen, watch and learn. Plus they can tell you about the mistakes they've made in the past in order for you to avoid them in the future.

A book explains how to do a particular task but it can't prepare you for the actual event of doing it. However, working with a mentor in the field will help you build the confidence you need to work a colony. Opening a hive full of bees can be intimidating the first time so it is important to work with someone who knows what they are doing. They can also show you the finessé required when working a colony How to pull frames, look for the queen, examine brood, mash hive beetles with your hive tool, pull supers, and so on. Whenever, wherever, ask questions because believe me you will have thousands of them. Meetings are also a great source of information

about the latest problems plaguing our industry, and the best ways to solve them. They may not pertain to you personally but it is information you should be aware of.

Another reason to attend meetings is networking. Meeting and then knowing beekeepers in your area can be a life saver at times. You may need something that the queen, package or equipment suppliers can't get to you in time. You also share the same environmental conditions along with the same pollen and nectar flows. It gives you someone to bounce ideas off of, someone to borrow a super from or a frame of brood. It also helps to know that other beekeepers may be experiencing the same problems you are. Hence, you are not alone. "Your colony is queenless too? So is mine!"

But probably the best thing? You're hanging out with a bunch of people who understand what the heck you are talking about. Ever try to explain a simple beekeeping chore to someone who is not a beekeeper· "Yesterday, I went through a potentially queenless colony and took a frame out of the brood chamber to see if there where any eggs. It had been several weeks since I saw an open queen cell so I assumed a virgin had emerged. And sure enough there was milk-brood from wall to wall. She's of Italian decent but she sure has some Russian blood in her " Deer in the headlights: Blink. Blink.

When I first began my job at the bee lab, Dr Delaplane insisted that I speak at local and state meetings. I agreed, thinking there were maybe two in the state. Come to find out (and to my amazement) there were 15 county groups in the state of Georgia plus one state organization. If you go to the Georgia Beekeepers Association website (www.gabeekeeping.com) there is information about each club, meeting time and place – along with contact information.

Not only are local, state and national meetings important but beekeeping institutes, classes and workshops as well. In May we concluded our 17th annual Young Harris beekeeping institute. It was one of the largest institutes to date with over 150 people in attendance. National speakers like Jerry Hayes (Chief of Apiary Inspections with the Florida Department of Agriculture), Ross Conrad (Author of *Natural Beekeeping: Organic Approaches for Modern Beekeeping*) and Kim Flottum (editor of *Bee Culture* magazine and author of *The Backyard Beekeeper· An Absolute Beginner's Guide to Keeping Bees in Your Yard and Garden*) helped bring in the crowds. Regional speakers included Cindy Bee, Bill Owens, Jim Quick, Shane Gebaeur, Bob Binnie, Will Montgomery, Lonnie Funderburg, Dr Paul Arnold, Robert Brewer, Dr Keith Delaplane, and myself.

Jerry's topics ranged from CCD to Africanized bees to advances in disease and pest control. Ross enlightened us about the natural approaches for disease and pest control. Kim presented information on how to get started, who's who in beekeeping, and using nucs. The other speakers rounded out the program to make it one of our best yet. Now if you are new to beekeeping, you may not know all these names yet, but give it time and you will recognize most of them – especially if you live in the south.

Another thing that makes beekeeping meetings special is you can ask the speakers questions. I have met very few people in this business that can not be approached. Most are eager to answer your questions.

The UGA Beekeeping Institute like others across the states is a two day event. Participants are engaged in morning lectures and hands on workshops in the afternoons. The goal of our institute is to provide basic information for the beginner and more current topics or concerns for the experienced beekeeper The institute also has a master beekeeping program and Welsh honey judging certificate program. If you have either of these in your state, I would recommend you participate if for nothing more than for your own personal satisfaction.

Our institute also offers a master beekeeper program which starts off with the certified level, and then moves to journeyman, master and finally master craftsman. By the time you get to master craftsman you are required to not only pass an oral exam, but to participate in a university research project, complete 15 units of public service, present a program at a state meeting and the bee institute, demonstrate practical

Here is a list of beekeeping associations in the southeast and some upcoming meetings.

State	Web address	Upcoming meetings
Georgia	gabeekeepers.com	Sept. 26th & 27th
Alabama	alabamabeekeepers.com	Oct 10th & 11th
SC	cstatebeekeepers.org	July 17th -19th
NC	ncbeekeepers.org	July 10th - 12th
Tennessee	tnbeekeepers.org	Oct 17th &18th
Florida	floridabeekeepers.org	
Heartland Apicultural Society (HAS)	heartlandbees.com	July 10th – 12th West Virginia
Eastern Apicultural Society (EAS)	easternapiculture.org	August 4th – 8th Kentucky

experience in seven specialties and either publish an article or be interviewed on radio or TV concerning honey bees. It is quite the accomplishment. Actually they all are.

So far our institute has graduated over 100 certified, 16 journeymen, 12 masters and one master craftsman. Bill Owens still solely holds the title of Master Craftsman for the state of Georgia. Several states also have bee schools that offer a master beekeeping program along with classes and workshops for beginners and experienced alike. Check out your state association website for information about upcoming classes and meetings.

Over the years I have attended meetings all over the U.S. and I have to say there hasn't been a bad group yet. Not even the association that forgot to pick me up at the airport. The people you meet are from all walks of life, down to earth, friendly and eager to help new beekeepers. Get involved sooner than later You'll be glad you did.

It's July in Georgia which means only one thing, its hot! The sourwood flow should be reaching its peak so I hope your colonies are already in place. Since I am writing this article in May, I can't comment about how good or bad the sourwood flow is at this point. However, future projections are for an outstanding sourwood flow.

So far in Georgia our Spring flow has been exceptional in most places from North to South, East to West. But I have heard from a few beekeepers that they barely made a super of honey Location, location, location! Here at the lab we made a good bit of honey If only we could have kept our honey producers from hitting the trees we would have made a bumper crop. It was an unusual year for excessive swarms. Not only did 90% of my colonies swarm but they did so by the end of March first week of April. I am hearing other reports of swarming being higher than usual.

Now if you have missed the sourwood flow, there is still nectar to be had down south. Cotton should be blooming soon and the good thing about cotton is that it's usually irrigated. So drought or no drought it will be supplying the nectar and pollen for your colonies.

Hope your bees didn't hit the trees like mine.

See Ya! BC

Jennifer Berry is the Research Coordinator at the University of Georgia Bee Lab.

NATURAL REMEDIES - Part III

Abbas Edun

Products From The Hive For Health, Beauty & Energy

Pollen

Pollen is a fine powder consisting of microgametophytes[1] which are produced in the anthers of seed plants. It is used to transport the male gamete (i.e. the DNA) to the female part of a flower during pollination, the reproduction process of flowering plants. A lot of pollination is done by honey bees. Pollen is the essential source of protein for them. As early as 1814, François Huber[2] recognized that pollen was essential for brood rearing and since that time it has been shown that brood increases with pollen supply and that the peak population usually occurs six to eight weeks after fresh pollen has started to come in.

Throughout history, bee pollen has been used as a food. The Anglo-Saxons, Chinese, Egyptians and Romans regarded it as very beneficial to health. The Food and Drug Administration (FDA)[3] has not found any harmful effects when it is consumed. However, it does not permit persons who sell pollen in the United States to make health claims about their product, as no scientific basis for it has ever been proved. Furthermore, there are possible dangers not only from allergic reactions but also from contaminants such as pesticides and from fungi and bacteria growth related to poor storage procedures.

However, a variety of producers have been selling pollen for human consumption. It is often marketed as a health food, and is considered to be a natural health product and not a food, so it does not require a nutritional label. Pollen is used as a daily supplement for energy and good health.

Composition of pollen

Over the past 50 years researchers have tried to determine the composition of pollen and why it is so attractive to bees. It is a nutraceutical[4] which contains the following amino acids:[5] arginine, glutamic acid, histidine, isoleucine, leucine, methionine, phenylaline, threonine, tryptophan and valine. It is rich in vitamins, especially B12 and E, minerals, amino acids and enzymes. The vitamins found in pollen are carotenoids (Vitamin A), folic acid, lactoflavin, niacinamide, pantothenic acid, pyridoxine, riboflavin (Vitamin B-3), rutin (vitamin P), thiamine (Vitamin B-1) and Vitamin E in trace amounts.

Nutraceuticals are usually contained in a medicinal format such as capsule, tablet or powder in a prescribed dose. The implication is that the product is demonstrated to have a physiological benefit or provide protection against a chronic disease.[6]

Pollen also contains gonadotropic and estrogenic hormones, human growth hormone and the following minerals: calcium, magnesium, potassium, chlorine, copper, iron manganese, phosphorus, silica and sulfur

Uses of pollen

Pollen may be used as a remedy (in alphabetical order) for· allergies,[7] anemia, asthma, capillary weakness, chronic fatigue, impotence, infertility, kidney disorders, longevity, menopausal symptoms, prostate diseases and ulcers. It can also be used as an antibiotic and blood builder and to stimulate or suppress the appetite.

Bee larvae

Man has raided honey bee colonies for aeons not only to obtain honey and beeswax, but also their larvae. The earliest hunters enjoyed the larvae directly from the honeycomb. Their approach to some of the nests was fraught with danger but had deep religious and ceremonial meaning. Evidence that early humans actively sought those products as part of their diet is provided by the petroglyphic "Man of Bicorp."[8] It was discovered in the La Araña cave in 1924 by the Spanish archaeologist Eduardo Hernández Pacheco.[9] Dr Eva Crane has collected in a book[10] some of the most striking examples of the cave art which chronicle prehistoric hunts for the nests of bees.

Larvae now provide an important part of the annual protein intake of the Katangese, Kayapo and Tongwe natives who search for the nests of honey bees.[11] And the Boni people[12] are known for their unique tradition of whistling to birds that guide them to honey In some Asian markets, combs of bee brood are displayed alongside honeycombs and honey in jars.

Bee larva is a delicacy recommended on dinner menus in many parts of the world.

It is perfectly safe to eat and makes a delicious meal. Honey bee larvae are fed on beebread[13], a mixture of pollen, honey and a secretion of the bee's salivary gland.

The result is that they are much more wholesome than the hormone-laced beef, fish, pork and poultry which is available to us in most stores. They are also higher in protein and lower in fat than beef and do not yet have an indigestible chitinous cuticle.

Drones are the male bees; they develop when the queen lays unfertilized eggs. In contrast to his busy sisters, the workers, a drone's only function is to mate with a virgin queen. The author's view is therefore that the larvae of drones should be used in preference to those of workers. In fact, in China, Romania and Taiwan such larvae are used as a food, a nutritional supplement and an ingredient in cosmetics.

Drone larvae are fed for about six and a half days; after this feeding their cells are capped their average weight is then 340 mg.[14] The development of a drone larva has a similar growth pattern to that of a worker larva.[15] The precise amount of food consumed by a drone larva is not known, but it might be deduced from that of a worker larva. The sugar content of the food of a drone larva is 9.6% during the first three days of its development and 38.5% during the following two days.[16]

Therefore, during the first five days of its development, a drone larva will consume a total of 49.1

mg of sugar, 2.9 mg within the first three days and 46.2 mg over the next two days. During the last 1.5 days, the amount of food consumed by a drone larva is probably the same as the amount consumed earlier, since a drone larva increases its weight by a factor of two during this short period of time. Therefore, a drone larva will consume a total of about 98.2 mg of sugar in 6.5 days.

Drone larva extract (DLE) contains all the essential amino acids, proteins, glucids, mineral salts with oligo elements vitamin B-Carotene, Riboflavin, Thiamine, Phitomenadone precursor of the sexual hormones. Combined with pollen and propolis it is a bio-stimulator indicated in asthenia, malnutrition conditions, convalescence, physical and mental exhaustion, late puberty, menopause and andropause (male) disturbances, gastric and duodenal ulcer.

Studies in Romania show that DLE is an excellent product with which to fight many diseases, especially the sexually related ones, e.g., impotence and infertility. The entire contents of the cells containing drone larvae aged six to seven days are extracted. These cells contain specific nutrients for the drones: larval food, honey, bee bread and traces of propolis. The larvae are chosen at such an early age because they have not yet developed their hard chitinous exoskeleton. Under the trade name Apilarnil,[17] drone larva extract is a patented product of Romanian origin. The larvae and nutrients are harvested before the cells are capped. The mixture is triturated,[18] and after homogenization, filtration and lyophilization,[19] it is then ready for the consumer From its composition Apilarnil may be considered to be the male equivalent of royal jelly. When supplemented with powdered propolis the product is called Apilarnilprop. BC

Abbas Edun has been keeping bees in Ontario, Canada since 1979.

References:

[1]In flowering plants there are two kinds of gametophytes. The microgametophyte which produces male gametes (sperm) and the megagametophyte which produces female gametes (eggs).

[2]A Swiss beekeeper and scientist, born in Geneva on July 2, 1750. He was only 15 years old when he began to suffer from a disease which gradually resulted in blindness. However, he was able, with the aid of his wife, Marie Aimée Lullin and their servant, François Burnens, to make careful and original observations about honey bees. He died on December 22, 1831.

[3]The FDA is an agency of the United States Department of Health and Human Services. It is responsible for the safety regulation of most types of biological medical products, blood products, cosmetics, dietary supplements, drugs, foods, medical devices, radiation-emitting devices, vaccines and veterinary products.

[4]The term "nutraceutical" is a conjunction of "nutrition" and "pharmaceutical." It was conceived in 1989 by Dr. Stephen L. DeFelice, the founder and chairman of the Foundation for Innovation in Medicine (FIM), Cranford, New Jersey, so as to clearly identity this field of biomedical research. The FIM was established in 1976. It is a nonprofit foundation whose purpose is to accelerate medical discovery by creating a more productive clinical research community. According to Dr. DeFelice, a nutraceutical may be defined as a food or part of a food that has a health benefit including the prevention and treatment of disease. It includes dietary supplements, foods, and functional foods which are really dietary supplements in food dosage forms. However, the term as commonly used in marketing has no regulatory definition.

[5]An amino acid is any one of a class of 20 different kinds of small molecules that are linked together in long chains to form proteins in living things. The sequence of amino acids in a protein and hence protein function are determined by the genetic code. Amino acids are often referred to as the "building blocks" of proteins.

[6]Health Canada, Policy Paper on Nutraceuticals/Functional Foods and Health Claims on Foods, 2002. Nutraceuticals and functional foods are regulated under the Natural Health Product Directorate (NHPD) and the producer must have a site licence to sell the product. The NHPD is part of the Health Products and Food Branch of Health Canada. It is the regulating authority for natural health products for sale in that country. Its role is to ensure that Canadians have ready access to natural health products that are safe, effective and of high quality while respecting freedom of choice and philosophical and cultural diversity.

[7]The pollen of certain trees, weeds and grasses is the cause of upper respiratory symptoms that are the body's response to an allergen, i.e., a substance that causes an allergic reaction. Allergic rhinitis familiarly known as hay fever, is one of the most common chronic diseases.

[8]Petroglyphs are images created by removing part of a rock surface by incising, pecking, carving, and abrading. They are found world-wide, and are often (but not always) associated with prehistoric peoples. The word comes from the Greek words petra meaning "stone" and glyphe (a carving) (it was originally coined in French as pétroglyphe).

[9]See Las pinturas prehistóricas de las cuevas de La Araña (Valencia): Evolución del arte rupestre en España. Comisión de Investigaciones Paleontológicas y Prehistóricas. Pacheco was born in Madrid in1872 and died in Alcuéscar when he was 93 years old.

[10]The Rock Art of Honey Hunters, International Bee Research Association 2001. Dr. Crane Eva Crane (June 12, 1912 – September 6, 2007) was Director of the Association from 1949 until her retirement in 1983. She was an authority on the history both of beekeeping and of honey hunting, and her writings on those subjects are known all over the world.

[11]Katanga (formerly Shaba) borders Angola on the southwest, Zambia on the southeast, and Lake Tanganyika on the east. The capital is Lubumbashi. The Kayapo are Brazilian natives. They live in the plain lands of the Mato Grosso and Para, south of the Amazon Basin and along the upper tributaries of the Rio Xingu. The Tongwe people live in Kigoma District, on the eastern shore of Lake Tanganyika in western Tanzania to the chimp-inhabited peaks towering above. In 2000 their population was estimated at about 31,550. They are farmers, fishermen, hunters, herbalists and musicians.

[12]A semi-nomadic Hamitic tribe living between the Indian Ocean and the Somali border in northeastern Kenya's Lamu district. With little or no access to health care and other resources, their ranks have steadily dwindled and the tribe is now on the verge of extinction.

[13]Also known as cerago, which is derived from the Latin "cera" meaning wax. See "pollen," supra.

[14]Jay, S.C. 1963. The development of honeybees in their cells. J. Apic. Res. 2: 117-134.

[15]Thrasyvoulou AT, Benton AW (1982) Rates of growth of honeybee larvae. J. Apic. Res. 21, 189-192.

[16]Planta, 1888 cited by Haydak, Mykola H. 1968. NUTRITION DES LARVES D' ABEILLES. In Chauvin,R. Traite de biologie de l'abeille, Vol. I, Biologie et physiologie generales, p. 302-333. Masson Et Cie, Paris.

[17]Its etymology is as follows: APIS, the Latin name for bee; LAR, an abbreviation for larva; N, the first letter of the given name of the inventor (Nicolae); and IL, the first two letters of his family name (ILIESIU). This product began to be widely used in Romania around 1980.

[18]I.e., it is ground into powder. The word "triturate" is derived from the Latin "trituratus," the past participle of "triturare," meaning to grind.

[19]Biological materials must often be dried to stabilize them for storage or distribution. Drying always causes some loss of activity or other damage. Lyophilization (also called freeze drying) is a method that significantly reduces the damage. Because it is the most complex and expensive form of drying, lyophilization is usually restricted to delicate, heat-sensitive materials of high value.

A Backward Glance – Beekeeping During The Spring of 2008

James E Tew

The real world versus the ideal world.

I thought it would be different

I thought this year would be different, but every year, I always feel that things will be different – indeed, will be better As each new bee season begins, I plan to do the right bee things. My plans always are always tasks like reversing brood bodies or, this season, I'm going to do a better job of controlling mites. I'm going to super in time and I'm going to manage swarms better The truth is that every year the bees are the same and every year, I am a year older None of my planning really changes anything. The bees are always on time and I am always chasing along behind them – late. So, right now – right on schedule – the bees are forging full-speed ahead and I am trying to catch up. Right or wrong, that's normal for me and my bees, but I thought it would be different this year

I know, I know

I know, I know I've been told that my contributions to this magazine read as though I lead a chaotic bee life; that most of my bee events are disastrous or nearly so. Here's the thing: I do lead a chaotic bee life and many of my bee events are disastrous or nearly so. Here's yet another thing: I am not a bad beekeeper, but simply a normal beekeeper I have grown to believe that bee books, magazines and web pages offer ideal standards for beekeeping. My world is rarely ideal. Good things simply go wrong. That's the real world.

Bees fighting.

For Example

In my lab, I have a nine-frame observation hive that survived the Winter weak and defeated, but it did survive. During late Winter, I fed it both syrup and pollen substitute. It took the syrup – erratically – but ignored the pollen substitute altogether As Spring progressed, the colony began to recover from the Winter doldrums and began to build up. I knew from previous experiences that any time this particular unit survives the Winter; it invariably swarms just a few weeks later True to form, it became crowded. I made a four-frame split, but I still expected the colony to have swarming on its mind. In fact, it did swarm. Normally, swarms always land on the only short tree in the yard; therefore: (1) I was expecting the swarm and (2) I was expecting it to land on the tree. (This swarming event is always good for photos and future articles so I really didn't worry about it too much.)

While I was on the road returning home from a meeting, I got a call that the observation hive was on the move. Bees were in the air and all over the front entrance of the observation hive. I went straight to my lab and found part of the swarm on the back of a nearby colony and part of the swarm on the observation hive entrance. I thought, *"Maybe the queen didn't go." "Maybe the split I made had some odd effect on the ensuing swarm."* There was lots of bee confusion. There were bees in the air, bees on the ground, bees at the entrance – this was really a messy swarm. It was only then that I noticed that many of the bees on the ground were dead – not just simply disoriented. *"That's strange."* Closer examination showed dead bees everywhere – not just the few I initially saw. *"Pesticides? Too early."* Finally, I examined the front of the hive on which the swarm had "pitched." There were dead bees everywhere and live bees still engaged in mortal combat.

That goofy swarm had left the observation hive and – for whatever bee reason – had tried to enter the entrance of another established hive. Bad mistake. The area in front of the hive looked like a war zone. I put the small swarm that was on the back of the hive in a hive body and let the bees at the observation hive entrance re-enter the observation hive – which they did. At this point, I have no idea if the queen survived the fracas. *"What was wrong with alighting in the tree this year?"* I will never know This is an example of the real world versus the ideal world. If I had written this swarm saga from the ideal perspective, it would have been: Swarm issues, swarm clusters on tree at convenient height, beekeeper

hives swarm, both bees and beekeeper live happily ever after I argue that my perceived beekeeping chaos is more typical than the perfect scenario. Beekeepers should not be made to feel guilty for not being able to keep perfect bees in a perfect world.

Labor

I have complained in previous articles about my labor shortages. I am at a point in both my life and my career where I have found labor (or simply help) to be completely non-existent. If anything gets done, I do it. Yet, I have a full-time day job. Some of my present chaos is caused by this chronic problem. When I was a young beekeeper and long before I assumed university responsibilities, I used my brothers, my Dad, my cousins, my friends, and very rarely – my wife, to occasionally help with my bee chores. Initially, it was a long list of people who could be called upon to help remove supers or move colonies. You see, all those years ago, I was working mightily to keep my bees in the perfect bee world. Yet, in my imperfect world, I got all of these people stung. They quickly got better at excusing themselves from my bee ventures. They had scheduled kidney transplants or they were going to be on a different planet that day, or maybe climbing the Alps. The excuses ranged from real to preposterous, but the fact is that, one by one, they were dropped from my list.

Now, at 60 years old, I am frustrated when trying to find competent people (that should read *younger* people) who could help with various common beehive management procedures. Trying to get good help is nearly not worth it. I have grown to accept the fact that I, alone, am the crew. For those readers who have been reading my comments for many years, I wrote a series of articles under the masthead of, "*The Solitary Beekeeper* "Therefore, I now become defensive of my "crew" when I continually get additions to my list of bee management recommendations. Now I should requeen *every* year I should reverse bottom deeps. I should treat for mites. I should replace my wax combs every three years. I should monitor for American foulbrood. I should control swarming. I should put supers on and I should take supers off. I should process honey I should move bees for pollination and I should move them back home in just a few weeks. I should make certain that Autumn colonies have enough food stores and I should reverse inner covers and reduce entrances. I should cut grass in yards and trim around colonies. Wait! I should be making splits to replace Winter losses. Yet, every one of those tasks requires ancillary work and energy. Buying gas for mowers, loading equipment (and then unloading it), keeping engines maintained, buying powdered sugar for Terramycin treatments, matches, smoker fuel, getting trucks stuck in bee yards (which requires borrowing a tractor), being sore at night from lifting supers all day, studying the latest mite treatment scheme, and now – CCD. Folks, that's a lot for one person, so, I do what you do – I keep fewer colonies in fewer yards and those colonies get less management than they should. It looks chaotic. The ultimate effect of this is that bee colony numbers – across the U.S. – decline. Labor shortage is a fundamental cause. Don't acquire more colonies than you can manage – even if it means you keep fewer colonies.

Well, that's depressing

Yes and no. Labor and time shortages are real, but the value of beekeeping is still very real also, but trying to keep bees as though it is 1957 is impractical – even impossible. We have mites. Some of us have to deal with Africanized bees and small hive beetles and even more of us have been hit with the thing called CCD, but that's just where beekeeping is today It's not good. It's not bad. It's just beekeeping. The world needs bees and the world needs beekeepers. We will learn to cope with our challenges.

Swarm on colony moving into a nuc box.

How?

Sorry, but I don't have all the answers. No one does. But I do have some suggestions; some that are more practical than others. Importantly you should know that no one or two quick changes will radically alter your bee life. This problem is more convoluted than that.

Accept the 25-50-25 rule

Mr Wade Taylor, a long-time commercial beekeeper from Montana, has found that no matter what you do, 25% of your colonies will be poor, about 50% will be okay, while the remaining 25% will be great. I completely agree with these numbers. None of you should expect 100% of your colonies to be in the great category Interestingly, if one takes the top 25% and moves them to another location, in short order, within that superior 25%, the 25-50-25 rule will re-express itself. Don't work yourself silly on the elusive goal of all your colonies being great.

Leave the bees alone

Too much hive manipulation is as bad as too little manipulation. Estimates vary, but it takes about 24 hours for a disturbed colony to return to the normal state. Add to this that we only open colonies on good days when bees should be foraging. Work your bees efficiently and then let them be bees. For most of us, opening our colonies should be the occasional event – not the daily event. For new beekeepers, I have a caveat, open your bees as often as you like while you are learning, but after about two to three years, begin to back off on your hive rummaging. Get an observation hive to meet your bee observation needs.

A one-person operation.

Cut the busy work

Depending on your personality and your situation, cut the busy work. Hives don't have to be neatly painted. Grass doesn't have to be constantly mowed. When supering, add too many boxes rather too few. Don't work yourself to death scraping burr comb and propolis. Scrape enough to make the equipment fit properly. Then use it. If equipment needs extensive repair, toss it. And the equipment components you are using should be alike. Unless you are playing, don't have some Kelley plastic stuff mixed with screened bottom boards mixed with transportation covers mixed with telescoping covers. Your labor-life is somewhat simplified if your colonies are all similar

Put wheels on everything

Honey and hive equipment is heavy Use hand trucks. Use carts. Don't stoop and lift any more than absolutely necessary. If you keep more than 10-20 colonies, explore a lift gate for your truck. I know, I know, this sounds extreme, but if you are getting on in years, and if labor is short, a lift-gate can REALLY make your bee life easier

Neither I nor my bee program is particularly wealthy, but I have three old, high-mileage trucks, two of which have lift gates. I could not keep my 40-80 hives without these lifting devices. I can move small numbers of bee colonies alone. I met my Springtime university pollination need by simply loading the hives onto the truck, driving the truck to the orchard and walking away from it. About two weeks later, I started the old, loaded truck up and drove it back to the yard where I unloaded the colonies. This is extreme, but it is one way I cope with labor shortages.

Small things

I love ratchet straps for moving colonies. They are in the truck. They are in my lab. They are everywhere. I will never staple another hive – or worse – try to move a hive that is held together by propolis. They are easy to use and they have multiple uses outside beekeeping.

Buy a bag of cedar bedding chips to use as smoker fuel or have a store of dry fuel. Start the smoker with pine needles or grass clippings and add the chips. Keeps adding chips and clippings and packing until the smoker is full. With occasional fuel additions, it will burn all day A lit smoker that burns for hours stops you from having to shut down and re-light your smoker This is a little thing, but too many little things are what wear me out when working bees all day

What I am trying to say

Don't expect so much of yourself and your bees. Respect your bees, but respect yourself, too. Some colonies will not be supered in time. Some will swarm and too many will die during Winter Queens won't be replaced on time. Stop beating yourself up. Do the best you can with your bees and then let them do what they can, accept the outcome. Strive for great colonies but know that most will be average. Most importantly, work smart. Take care of yourself and your bees. We need you both. 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/

EAS 2008

Kent Williams

The 2008 EAS Program and Registration is at www.easternapiculture.org

On August 4, 2008 there will be a resounding exclamation of "Welcome to Kentucky" for all 2008 EAS attendees. For the readers that have never visited Kentucky this article might serve as an orientation guide in preparation for the trip to Murray, KY – the site of EAS 2008.

For those choosing to drive from eastern states to Murray, you will experience the diversity of geography within KY If entering KY from West Virginia, you will pass through the Eastern Coal Fields, Bluegrass, Western Coal Fields, and Pennyrile regions before arriving in Murray, which is in the Jackson Purchase region. Kentucky, which is actually a Commonwealth, not a State, was originally designated "Kentucky County" as a part of Virginia in 1776. Later the County was divided into three separate Counties before being admitted to the United States as the 15th State in 1792. In 1818 the region that is referred to as the "Jackson Purchase" was purchased from the Chickasaw Indian Nation by Andrew Jackson . hence the name for the region. The "Purchase" region, as it is referred to by locals, is the lowest in elevation, and the farthest west and south of the five major regions in Kentucky Members of the Chickasaw Nation originally inhabited the region, before settlers began arriving around 1800. Due to the natural barrier of two rivers on the eastern border of the region, most settlers entered from the south, coming primarily from southern Virginia and North Carolina through what is now Tennessee. This caused the population of the region to identify much more closely with southern philosophy, which led to the region being very "pro-south" during the War Between the States. Many of the early settlers of Kentucky were veterans of the Revolutionary War, who were paid with Frontier (KY) land grants due to the Federal Government's lack of liquid capital in the early years of the USA.

The climate of the Purchase region is nearer to that of Memphis, TN than Louisville, KY The usual temperature for the first week of August in Murray is in the neighborhood of 75° nighttime lows – 95° daytime highs, with humidity in the 70% 100% range. EVERYTHING is air conditioned, so the daytime temperatures need not overly concern visitors. Southern culture has other influences on the people of the region, in that the cuisine is very much Southern in its flavor Local specialties include deep fried catfish, pork barbecue (smoked), and the usual vegetables for a southern meal, peas, fried okra, squash etc. Each region of Kentucky claims to have the "real" barbecue, and in keeping with that tradition, if you want true barbecue, it has to be prepared the "West Kentucky way." West Kentucky, to a resident of the Purchase region, is defined by the Mississippi River to the west, the Ohio River to the North, the Tennessee and Cumberland Rivers to the East, and the Tennessee border to the South.

For visitors to Kentucky there are several outstanding, if not unique, points of interest that may be visited during your trip through the Commonwealth. Some of the sights are the Horse Park near Lexington; the famous distilleries near Louisville and Bardstown; Mammoth Cave; The Walter T Kelley Company, in Clarkson; the Land Between the Lakes National Recreation Area near Murray; the National Quilters' Museum, in Paducah; and several historic sites from the Civil War

Kentucky has a rich beekeeping tradition, though primarily on the hobbyist to small sideliner scale. Three generations past, the average farm in Kentucky had a few cattle, chickens, hogs, and beehives. The typical farm grew corn, hay, and vegetables and subsisted with few, if any, outside inputs. At any farmers' market where a beekeeper chooses to sell honey there will be a large percentage of customers who will state that their father/grandfather, etc had a hive, or two hives of bees when the customer was but a child. I suppose, though, this is a common response almost anywhere. There has been a recent resurgence of interest in small-scale beekeeping in Kentucky, with all regional beekeepers schools leaning heavily toward beginners in attendance. EAS 2008 will incorporate presentations that should appeal to beginner, and first year beekeepers – as well as "cutting edge" presentations for more advanced beekeepers.

Attendees to EAS 2008 will find in Murray the usual franchise food offerings, as well as the usual chain lodging selections. There are also several local (not chain or

franchised) restaurants serving a variety of foods. Some regionally well known attractions include the Riverfront section (including the Quilters' museum) of Paducah; the antique district in Hazel; the battlefield parks of Fort Donnelson (Dover TN) and Columbus-Belmont (Columbus, KY); and the National Recreation Area comprised of Kentucky and Barkley Lakes, and the land area between the Lakes. Being "born and raised" in this area, I am naturally biased to some degree concerning the character of the people of this region. That being said, I am sure if you visit Murray, KY for EAS 2008, you will be appreciative of the genuine hospitality of the people. Here in the Purchase region we treasure family, friends, good food and good fellowship. If you attend EAS in Murray, you will witness the truth of that statement first-hand. BC

Kent Williams is a small commercial beekeeper in Kentucky and is the President of EAS 2008.


Gorse

Late Blooming Shrubs For Bees

Connie Krochmal

Though many of the bee shrubs bloom during the Spring, there are a number of excellent summer flowering species. These help to provide nectar and pollen during Summer dearths.

Bladder senna (*Colutea arborescens*)

Recommended for zones five through seven, this fast growing shrub can reach 12 feet tall with almost an equal width. It can tolerate considerable pruning if limited space is available. Dwarf cultivars can be found at nurseries.

As with most legumes, this has compound leaves. Rather small, the yellow, pea-like flowers are three-fourths of an inch in length. They have some red mottling. These open in clusters on the new wood from mid-June until August or so. This plant is named for the bladder-like seed pods.

Very easy to grow, bladder senna requires no particular attention. Being a legume, it thrives in poor soils. This prefers a well drained, sunny spot.

This plant provides nectar and pollen for bees.

Bush cinquefoil (*Potentilla fruticosa*)

Very hardy, this performs well in zones two through seven. It has a slow growth rate. A member of the rose family, this bushy plant is mostly rounded. Bush cinquefoil grows from one to four feet tall with a matching or slightly greater spread.

The small, alternate leaves are compound with three to seven leaflets. In some varieties, the foliage is silver The bark peels with age.

Bush cinquefoil has flat, buttercup-like blossoms with five, rounded petals. Varying in size and color from one variety to another, they're typically white or rich yellow. Ones with pink, red, or orange blooms are also available. Some have contrasting centers. These are usually one to two inches in diameter

Cinquefoil blooms occur singly or in small clusters. This plant is very floriferous. It blooms throughout the Summer from July until early Fall.

Very easy to grow, bush cinquefoil blooms best in full sun. It thrives in a rich, moist, well drained soil. But, this also adapts well to infertile rocky, dry spots. For best results, prune it back every year Other than that, this plant requires very little care. It is pretty much insect and disease-free.

Offering nectar and pollen, bush cinquefoil is a favorite among bees.

Butterfly bush (*Buddleia davidii*)

This shrub is hardy to zone five. In colder climates, it can be killed to the ground. However, the new shoots that emerge can easily grow five feet in a single season. If left unpruned, butterfly bush can reach 15 feet tall and half as wide.

This has opposite, gray-green foliage that remains semi-evergreen in mild climates. The stems are arching.

When grown from seed, butterfly bush blooms the very first year The small blossoms form huge, upright, terminal spikes, which can be 1½ feet long. This species has pinkish-purple blooms with an orange eye. Varieties with other colors, including pink, red, and white, are available. These open from late June or early July until frost.

Butterfly bush blossoms have a wonderful honey-like fragrance.

Globe butterfly bush (*Buddleia globosa*) is a related species. Also known as orange ball tree, this is slightly less hardy, only to zone seven. It can reach 15 feet in height. Depending on the climate, the crinkled foliage can be evergreen to semi-evergreen. Globe butterfly bush has vivid yellow blooms that appear on terminal spikes, up to eight inches in length. These are heavily scented.

Requiring no special care, all of the butterfly bushes do especially well in dry, sunny spots. These need a well drained soil. Most will easily self sow.

These shrubs are much more floriferous if they're pruned on a regular basis. Cut the oldest stems to the ground in the Spring before growth begins.

All of the butterfly bushes provide nectar and pollen.

Chenault coralberry (*Symphoricarpos x chenaultii*)

Recommended for zones four through eight, this

Butterfly bush.

member of the honeysuckle family reaches three to six feet in height. With arching stems, Chenault coralberry has a low, spreading growth habit. If not pruned on a regular basis, it can grow to be 10 feet or so across.

There are several cultivars available, including Hancock, which is less than two feet tall.

This shrub has fine textured, green foliage that turns yellow during the fall. Chenault coralberry brings an abundance of pink, bell-shaped flowers. Opening in June and July, they appear in terminal clusters on the new wood.

This plant gets its name from the clusters of berry-like fruits. These come in two colors – pink, and red with pinkish tinges. The side away from the sun remains white. These fruits persist throughout the Winter

Chenault coralberry tolerates a range of pH from acid to neutral. It is adapted to most soils. Though they will grow in partial shade, these bloom better in full sun.

Bees love these flowers from which they obtain nectar and pollen.

Common gorse (*Ulex nanus*)

Also known as furze, this small, densely branched shrub is hardy to zone five. It can be up to six feet tall. With a twiggy appearance, common gorse has spiny stems that can be prostrate. The rather sparse foliage is mostly reduced to spiny leafstalks.

Common gorse is best known for its rich yellow, pea-like blossoms. They usually emerge from the axils of the thorns and terminally at the ends of the twigs. The blooms open during August and September The seed pods are about one-half of an inch in length.

Like other members of the bean family, this species resents transplanting. So, buy container plants. Common gorse does best in a sandy, somewhat acid soil.

This provides bees with nectar and pollen.

Dyer's greenwood (*Genista tinctoria*)

Also known as woadwaxen, this shrub is hardy in zones three through eight. It grows about three feet in height, and is about as wide.

A member of the bean family, dyer's greenwood has attractive green stems. Its twigs and branches remain green throughout the year The foliage is deep green. Rather small and narrow, this is about an inch in length.

The vivid yellow blossoms, which are around three-fourths of an inch long, resemble those of peas. These open in erect bunches that are three inches or more in length. They start appearing during early Summer, continuing on and off for three months or more.

A carefree plant, dyer's greenwood will grow in most any soil, including poor, dry ones. It adapts to a range of pH levels from acid to neutral. This does best in a loamy or sandy soil. It requires very little attention other than pruning in the Spring to remove the tips that were damaged by Winter cold.

Because dyer's greenwood can be hard to transplant, use container plants.

This shrub provides nectar and pollen.

Holly osmanthus (*Osmanthus heterophylla*)

Also known as false holly, this is named for the holly-like leaves. Despite their similar appearance, there is an easy way to tell the two plants apart. While the foliage of true hollies is alternate, that of holly osmanthus is opposite.

This evergreen is recommended for zones seven through nine. A member of the olive family, holly osmanthus typically reaches about 10 feet in height. However, it can get taller under good conditions.

Rather spiny, the leaves are 2½ inches long. Some cultivars have variegated foliage. The fruits, over one-half of an inch in diameter, ripen to blue-black during the Fall.

The small white or yellowish-green blossoms are very fragrant. These open over an extended period from mid-Summer throughout the fall. With four petals, these emerge in small bunches from the leaf axils.

Native to Japan, this will grow in shade. But, it blooms best in full sun. This tolerates a range of pH conditions from acid to neutral. It prefers a fertile, well drained soil.

Holly osmanthus requires very little attention. When grown as a hedge, it withstands considerable pruning.

Bees collect nectar and pollen from holly osmanthus.

Hydrangea (*Hydrangea spp.*)

Several species of these deciduous shrubs are in cultivation. The most popular ones tend to be cultivars of the big leaf hydrangea (*Hydrangea macrophylla*) and the panicle hydrangea (*Hydrangea paniculata*).

The size and hardiness can vary slightly from one species to another The hardiest hydrangeas are suited to zones four through eight.

Typically, hydrangea foliage is opposite, though it sometimes occurs as whorls. This can be six inches or more in length.

Hydrangea blossoms come in a range of colors, including white, blue, and pink. In some cases, the color is determined by the soil pH.

The blooms open from Summer into the Fall in large, terminal panicles. These clusters contain both sterile and

fertile blossoms.

Hydrangeas grow well in sun and partial shade. They need a rich, moist, well drained soil.

The fertile flowers, which are less conspicuous than the sterile ones, provide nectar and pollen for bees.

St. John's wort (*Hypericum spp.)*

There are a number of shrubby St. John's worts. While some of these shrubs are deciduous, others are semi-evergreen or evergreen. Some species are native to certain areas of the country

Though hardiness can differ slightly from one kind to another, the hardiest is suitable for zone four

Usually, these are one to four feet in height with a comparable spread.

St. John's wort has dark green or blue-green foliage. The opposite leaves are two to four inches in length. They often have semi-transparent dots. The older bark tends to peel.

St. John's wort blossoms have five, bright yellow petals. In some species, they're fragrant. The ornate flowers reach three inches or more in diameter. Opening terminally and from the axils, these occur singly or in clusters. They emerge throughout the Summer, often on the new wood. The prominent stamens can give the blooms a fluffy look.

These plants thrive in full sun and partial shade. They tolerate a range of pH conditions, and are suited to dry, rocky spots.

Bees eagerly work these flowers for pollen.

Smoke tree (*Cotinus coggygria)*

Recommended for zones five through eight, smoke tree receives its name from the conspicuous hazy or smoky looking panicles. Despite the common name, this is actually a shrub that reaches ten to 15 feet in height.

Also known as smoke bush, smoke tree is an open, upright, spreading shrub. It has attractive, blue-green, textured foliage.

This plant blooms from mid-June onwards. Yellow with five petals, the individual blooms are quite small – less than one-fourth of an inch in diameter These appear on panicles that are up to eight inches in length. Purple flowering varieties are available. The real color comes from the prominent hairs on the flower stalks.

Easy to grow, smoke tree needs no special attention once it is established. This shrub does well in a wide range of soils and pH levels. It adapts to dry, rocky sites. However it grows best in a well drained, sunny spot.

This plant can cause dermatitis in susceptible individuals. It is related to poison ivy and cashew

Bees find this to be a good source of nectar

Thorny elaeagnus (*Elaeagnus pungens*)

Recommended for zones six through 10, thorny elaeagnus is related to the Russian olive. This popular evergreen reaches about 12 to 15 feet in height with a matching spread. Native to Japan, it is a very fast growing plant.

The dark green foliage has wavy edges. The leaves reach four inches in length. The undersides have a silvery appearance. In some varieties, the foliage can be variegated. During the Spring, there is sometimes a crop of red berries.

Thorny elaeagnus has small, dangling, tubular blossoms. Only one-half of an inch long, these are silvery white. They open in trios from the leaf axils. These start appearing in late Summer, and continue for several months. They have a very sweet fragrance reminiscent of gardenia.

Very easy to grow, this evergreen adapts to most soils and growing conditions. Though it grows well enough in the shade, it won't be quite as floriferous. Thorny elaeagnus tolerates air pollution and salt spray This responds well to shearing when grown as a hedge.

Bees collect nectar and pollen from the flowers. BC

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

INVASION

When Bee Races Hybridize, They Take The Best Of Both Races

Alan Harman

As with any species that aspires to rule the world, the honey bee, *Apis mellifera*, invades new territories in repeated assaults and research at the University of Illinois finds that when these honey bees arrive in a place that has already been invaded, the newcomers benefit from the genetic endowment of their predecessors.

In research published in Proceedings of the National Academy of Sciences, entomology professor Charles Whitfield and postdoctoral researcher Amro Zayed, analyzed specific markers of change in the genes of honey bees in Africa, Europe, Asia, and the Americas.

They also focused on geographic regions – such as Brazil in South America – where multiple honey bee invasions had occurred.

The researchers were looking for tiny variations in the sequences of nucleotides that make up all genes. Certain versions of these single nucleotide polymorphisms (SNPs), or "snips" are more common to African honey bees, while others occur more frequently in honey bees in Western Europe, Eastern Europe, or Asia.

By comparing these SNPs in bees from different geographic territories, and by looking at the frequency at which particular alleles, or variants, occur in functional and nonfunctional parts of the honey bee genome, the researchers were able to determine that the invading bees were not just randomly acquiring genetic material from their predecessors by interbreeding with them, but that certain genes from the previously introduced bees were giving the newcomers an advantage.

An earlier study led by Whitfield and published in Science in 2006 showed that *A. mellifera* originated in Africa and not Asia, as some had previously hypothesized.

That study showed the honey bee had expanded its territory into Eurasia at least twice, resulting in populations in eastern and Western Europe that were quite different from one another

The earlier analysis also confirmed and extended results of previous studies showing that African honey bees had mixed with but largely displaced their predecessors in the New World, which were primarily of western European stock.

When the European old-timers mixed with the African newcomers, their offspring looked, and in most respects behaved, like the African honey bees.

These more aggressive, "Africanized" bees received a lot of media attention in the U.S. as they moved north from South America. The U.S. Department of Agriculture says the first Africanized honey bees appeared in Texas in 1990. In less than a decade they had also spread to southern California, Arizona, Nevada and New Mexico.

Whitfield and Zayed wanted to understand the evolutionary mechanism that allowed the African honey bees to move into these new territories and dominate the bees that had arrived in the New World centuries earlier from eastern and Western Europe.

Their analysis of about 440 SNPs selected randomly from throughout the Africanized honey bee genome showed that most of the alleles were common to African honey bees. But of the alleles common to European bees, those found in functional parts of the genome (in genes) were showing up more frequently than those in nonfunctional regions (between genes).

"We asked the question: Is hybridization an essentially random process?" Zayed says. "When the African honey bees mated with the western European honey bees that had been in South America for centuries, one might expect that the hybrid offspring would randomly pick up both the functional and nonfunctional parts of the genome.

"But actually what we found was there was a preference for picking up functional parts of the western European genome over the nonfunctional parts."

Whitfield says it appears that the Africanized bees that kept some of the functional western European genes were gaining an advantage.

"Those African bees are doing better because there were western European honey bees there for them to mix with," he says. "Now we can say we have a signature for evolution in the genome."

While the researchers do not yet know how these European honey bee genes are enhancing the survival and fitness of the Africanized bees in the Americas, Whitfield says, it may be that specific traits from Western Europe are beneficial, or it may be that being a hybrid is, in and of itself, a good thing for these bees.

In a separate finding, the researchers also discovered a genome-wide signature of evolution associated with the ancient expansion of honey bees from Africa into temperate regions of western and northern Europe. In this expansion, functional parts of the genome have changed more than nonfunctional parts.

Whitfield thinks that these changes may involve social adaptations to survive the hard Winters.

"The way the honey bees survive in temperate regions is sort of the way humans do," Whitfield says. "They have a shelter They store resources."

Not needing to survive in such cold weather, African bees store less food and reproduce more.

"So how does an animal that's basically tropical make it? How does it expand its territory and thrive in very harsh Winter conditions in this temperate region?" Whitfield asks. "Humans did it, and *Apis mellifera* did it in some interestingly parallel ways." BC

Alan Harman is a freelance writer who lives in Michigan and contributes frequently to this publication.

SAND & BEESWAX

Mix To Make Carvable Blocks

Peter Kevan
Andrew Serafin

Dust-free fine sand can be combined with beeswax to make safe, environmentally friendly, carvable, machineable, and recyclable blocks.

Silicon-dust free sand itself can be used safely for educational and recreational projects. It can be bought as 'play sand' in various retail stores. However, sand is sand, and although it can be molded when it is wet, it has limited scope for use. By amalgamating sand with a binder, it can be made into blocks that can be worked (carvings, sculpture, or machined). Further, making the material re-usable is important, especially for making non-permanent models. For educational and recreational purposes, the bonding material must also be safe, and better still "environmentally friendly "

We have found that bees' wax is useful for making sand-based blocks that can be used for carving, sculpture, and even gentle machining. Beeswax itself is used extensively in educational and recreational activities, is a major component of high quality cosmetic products such as creams and lipsticks, and is used by the pharmaceutical industry for making medicinal salves. Thus, it is safe and "environmentally friendly "

Particularly important to making workable blocks with sand and beeswax, is the low melting point of beeswax at 150°F After some initial trials, we tested two formulations (Table 1), and found that the first mentioned worked well. It took to machining with a spade-bit and twist bit on a drill press. The holes are crisp and smooth walled. It is also carvable with a sharp knife and by chisel. A block of material was given to skilled carvers for assessment, and shown to two individuals with degrees in fine arts. One carver noted that the material carved well, but blunted his tools rapidly. The second carver produced the ape's head shown here. The texture seems to prevent the carving of very fine details. The fine artists and carvers noted that the material was interesting and had great potential for sculpture and making molds. It has a slightly sticky feel, and pleasant, characteristic honey-like scent.

We describe how to make re-usable sand-and-beeswax blocks for use by creative people of all ages. After various trials at mixing, it was found that the sand and wax can be mixed easily in a kitchen crock-pot, the internal temperature of which reached 230°F when set on high, and about 175°F when set on low. At 175°F the process of mixing is very slow.

Table 1: Sand and beeswax mixtures and their hardness

Sandtastic®-sand	Beeswax	New or Used	Hardness
550g (19.4 oz)	88g (3.1 oz)	New	92 - 94 points
		Used	94 - 98 points
550g	66g (2.33 oz)	New	70 points
			Hardness measured by Pacific Transducer Corp. Model 306 Durometer Type A (ASTM D 2240 - 64T)

Blocks of the first formulation (Table 1) were broken down, and reconstituted. Small changes in the scent, color, and hardness were noted. Thus, the material can be reused after being melted in the same way as the original blocks were made.

We made our blocks in waxed cartons such as are used in the food industry (e.g. milk cartons). We also made a press to fit the cartons and compress the formulation into blocks, but that operation can be done with a wooden spoon or spatula.

It is anticipated that dust-free sand and beeswax could be used for making molds, even by the lost-wax method, for castings. Also, carvings made from the mixed materials could be protected with epoxy paint or varnish for permanent display

We note that beeswax itself is a mixture of chemicals and varies somewhat. We advocate that the beeswax used should be clean and residue free. We stress that only clean sand should be used to avoid problems of dust, e.g. health hazards and binding with the wax.

We used only Sandtastic® brand uncolored fine play sand. The idea we present could be used with other sands or different grain sizes (coarseness) and colors (natural or dyed). Thus, readers interested in trying out sand-and-beeswax blocks may wish to experiment to obtain the right consistency and hardness for their needs. Even so, we expect that the proportions of sand to wax would be similar to what we have found useful. BC

Ape's head carved by Dylan Mannik-Zulinski (about four inches high)

GET READY ... GET SET ... EXTRACT

Ann Harman

Welcome to all of my fellow members of the Procrastinator's Society Our honey supers are full or filling up and it is time to extract. Are you ready? It's July. Do you know where your uncapping knife is?

Yes, it is time to get our honey houses ready for extracting. It makes no difference whether that is a separate building reserved for honey and bee activities or your kitchen or garage or garden shed. You are working with a food product and your work area must be clean and suitable for doing that. Depending on your situation and the state you live in you may be subject to inspections and regulations.

If you are a hobbyist or small sideliner your extracting equipment gets used about once a year As it sits idle all sorts of things happen. Dust blows around, spiders discover a nice homesite and spin a web. Even a busy mouse can move in during the Winter months. Although you have covered up some of your equipment, critters can find a way in. That dead moth in the bottom of your extractor does not belong in a honey jar Even if you have a honey house, annual maintenance before extracting is a must.

You'll need scrub buckets, scrub brushes, big brushes, little brushes, rags, towels, mop, vacuum cleaner, some sort of detergent, elbow grease, staple gun, hammer, bandaids, work clothes, garden hose, hot water, and anything else you can think of. Oh yes, a radio to play your favorite music while you work. Shut the cell phone off! You'll get done quicker if you don't stop and talk.

Let's start with the space itself, top to bottom. Vacuum up all the cobwebs and any other debris. You don't want that stuff falling into the extractor and the containers you will be using. Light fixtures are usually in the ceiling. Bare bulbs need to be protected. They are considered a hazard because of broken glass. You can buy bulb protectors at your local building supply They are a good idea to have in sheds and garages anyway I have them in my barn and in the tractor/equipment shed. By the way, you can replace those old fashioned bulbs with the new energy-efficient ones.

Perhaps you have fluorescent fixtures with the plastic light diffusers covering them. Well, that is a nice place for an insect graveyard. While you have the vacuum handy, remove the diffuser and vacuum up those bits and pieces in the fixture itself. Wash the diffuser Imagine that – the place looks brighter already If you have other types of ceiling fixtures you will need to clean them. You will be surprised at the assortment of insects that could not find their way out.

Light is something to think about if you are extracting in a garage. Kitchens usually are well-lit, as are big honey houses. If you are contemplating building a honey house, no matter what the size, think about efficient lighting for your workspaces, especially the bottling and labeling area. Working in your own shadow accomplishes nothing.

Now for the walls. Use the vacuum on the walls and corners for spider webs. Do you have windows, and do those windows have screens, and do those screens have holes? If you plan to open a window for ventilation during extraction that hole in the screen is an open door for bees in the daytime and creatures of the night, after dark. Fix the holes.

You can go ahead and sweep or vacuum the floor now to get rid of some debris, but we will return to that later It will be the last area to really clean because for the time being you will be walking around on it while cleaning up. If you have a honey house with a floor drain you need to see if it still drains or if some enterprising chipmunk moved in at the outlet and made a nest. If the floor drain is hooked up to the main drain system you can ignore the comment about a chipmunk. However, this is a good time to check it before moving on to other areas.

Stop for a moment. At this point take a good look around. Are there any areas of peeling or flaking paint? Not good. Now you need to add scrapers and sandpaper to your list of cleanup tools. Peeling and flaking paint is very bad in a space where food (honey) is handled. It would have been good if your painting had been done some months ago, before extraction time. But you are a member in good standing of the Procrastinator's Society You will have to decide whether you can paint now or just clean up the flaking areas and paint later, after extraction is completed. At least if you take care of the peeled paint areas now they will be ready for painting after extraction. While you are handling honey you really do not want paint that has any kind of smell lingering after it is dry.

While you are at the building supply you might want to buy some of the heavy contractor's plastic sheeting. Oh yes, while you are there, make certain that you have some staples for your staple gun. Problem areas can be covered temporarily with plastic sheeting. To keep the sheeting from sagging between staples, cut strips of cardboard and staple through both strips and plastic, running the cardboard similar to a frame for the sheeting.

Go take another look at the windows. How does the paint look on them? If the windows themselves are not in good condition you can staple a piece of that plastic sheeting over them for now and plan on repairs and painting later in the Autumn.

Beekeepers with one or two hives frequently use the kitchen for extract-

ing. But you need to have a good cleanup there anyway. Get those dirty dishes out of the sink! Now scrub the sink. Look at the kitchen light fixtures and clean those. Get rid of the clutter on the countertop and clean it well. Vacuum the floor, even though you are going to protect it. You do not want dust and mystery bits hiding in the corners. You can put a single sheet of plastic to cover the floor, then a layer of newspaper on top. Try it out by walking on it. Sometimes a single sheet of plastic on a kitchen floor is slippery We can't have you slipping, falling down and getting entangled in sticky frames and knocking over a bucket of honey Keep a stack of newspaper handy As the first layer gets a bit sticky, add another layer of newspaper over the first one. As each layer gets sticky, add another

Using a garage for extracting can be a problem. Walk in and smell it. Does it smell of gasoline from the lawn mower and a couple of little tanks of gasoline sitting there? What is on those shelves? Garden supplies such as weed killers, fertilizer, plant sprays. Sort of smells like a chemical factory? Clumps of dried grass from the mower are scattered about mixing with the clots of mud from the garden boots. Don't step in the oil spot left by your parked car Then there is the usual abandoned assortment of things – the flower pot with last Christmas's poinsettia (quite dead), the dog's chewed-up Frisbee, the shovel with the broken handle. Maybe it is now time for the major cleanup of the garage if you intend to use it as a temporary honey house.

You can clean up those shelves, then staple some of that plastic sheeting as a curtain to cover them up. The mower, accompanied by its little gasoline tanks, has to find another home, at least temporarily Is the garage smelling better? You have, of course, checked and cleaned the light fixtures and vacuumed up the spider webs. It's time to go back to the building supply Look for garage floor cleaner It will help with that oil spot from the car Now clean the floor starting with another good vacuuming. Then a wash and let it dry You will use, again, one layer of plastic sheet on the floor, then layering the newspaper over that.

Now for a look at a different situation. The garage or shed does not have a ceiling. The rafters are exposed and you look up at the underside of the roof. Oh look – there is a bird nest left from last year Over there is an abandoned paper wasp comb. And lots and lots of spider webs, the old ones nice and dusty This is a situation that must be attended to. Although you may sweep and vacuum you will never get rid of all the dust, insect parts and bits of bird nests. You are going to have to create a ceiling.

Now it is time to invite two or three friends to help. They will each have to bring a ladder and a staple gun – you can call it an entrance fee if you wish. You are going to create a ceiling with the plastic sheeting. Yes, it will take a bit of time to sort out the best way to handle the plastic but it can be done. Just turn on the radio and have plenty of cool drinks and snacks. Promise your helpers some honey – unless they are beekeepers; then you will have to think of something else. Perhaps an offer to help them clean up their honey house. After all you are now experienced!

The hard part is done. All you have left to tackle are the extractor, buckets, settling tanks, strainers and other equipment. Now that you have found your uncapping knife, check it, if electric, to make certain it still works. Clean off the capping scratcher Wash out the extractor, buckets, settling tanks, lids. Everything that you will be using! If your extractor has a motor now is the time to turn it on. You do not want a problem when it is full of uncapped frames. If it is hand-cranked, make sure it is turning smoothly. How is the gate in the extractor? Can you open and close it? Check the gates in buckets and settling tanks. You do not want those leaking when the containers are full of honey. What a mess.

Everything is now clean and dry Arrange your equipment to make a comfortable working area. Even in a small space, like a kitchen, you need a spot to set the full honey supers, a place to uncap, and a place for the empty supers. Please make sure you can work safely in the space you have.

Now you are ready to extract! Invite some friends over to help. They do not have to be beekeepers. In fact it is better if they aren't. Their enthusiasm for a sticky job makes extracting fun. But be sure they stay to help you clean up afterwards. Oh yes! You do have to clean up afterwards – that's part of keeping a good honey house. One more word of advice: don't forget to close the gate on the extractor before the bucket overflows. BC

Ann Harman keeps bees and extracts honey at her home in Flint Hill, Virginia.

GLEANINGS

JULY, 2008 • ALL THE NEWS THAT FITS

MANUKA HONEY MISLABELED?

A New Zealand producer of Manuka honey is refusing demands it pull its honey products from the shelves.

The Active Manuka Honey Association says Manuka Health New Zealand Ltd. can't prove the products contain UMF (unique manuka factor).

But the company is refusing, saying it's a dispute over whose research to believe.

It funded German research that it claims showed a natural compound, methylglyoxal, is responsible for manuka honey's unique antibacterial properties. The company says the compound can be easily checked with an objective scientific test.

UMF is the registered name and trademark of the association and companies using the label on their products, base their claims on the UMF "phytochemical agent" identified by Waikato University biochemist Peter Molan.

Association brand manager John Rawcliffe tells reporters the association had asked Manuka Health NZ to take product using the brand off shop shelves. This included spreadable honey and honey-based products such as toothpaste and sweets.

He says product testing has shown that Manuka Health had packed and sold UMF honey that is not true to label.

Rawcliffe says the association is also concerned about Manuka Health activities that he says were viewed as being contrary to the best interests of the association and the UMF trademark.

"We have been alarmed about Manuka Health claims made in promotional materials which could mislead the public to believe that UMF honey had unsupported medical claims," he says. "We have a number of concerns over the truth to labeling claims on their product. Methylglyoxal is only one active component in the honey."

The association has terminated Manuka Health's membership claiming its their medical claims contravened its protocol and did not comply with New Zealand law.

"As a result of the termination of membership, Manuka Health is no longer entitled to use the UMF trade mark on any of its promotional materials and products, including those currently on shelf," Rawcliffe says.

Manuka Health chairman Ray Thomson says company has told its lawyers to challenge the termination and seek an interim injunction to stop it.

He says researchers at the Technical University of Dresden found last July that the unique manuka factor is actually methylglyoxal. Manuka Health set up tests to certify levels of the compound in honey-based health products. It launched the first honey products certified to contain specified levels of methylglyoxal in January.

Thomson says the association is taking action against it because several of its member companies regarded the discovery of methylglyoxal as a threat to the UMF brand.

Molan says he has complained to the Commerce Commission about the methylglyoxal rating used by Manuka Health.

They only give you a chemical analysis of how much MGO (methylglyoxal) is in the honey," he says. "It does not tell you the antibacterial activity." – *Alan Harman*

For Updates On Colony Collapse Disorder See Kim Flottum's Weekly Blog At www TheDailyGreen.com See The Beekeeper, under News

OBITUARY

Cliff Hendricks passed away quietly at home on April 6th, 2008, at the age of 100. One of Wisconsin's largest beekeepers and honey packers in the 1940s and 1950s, he sold out in the 1960s to go into commercial real estate, mining, timber and other interests. Cliff never stopped keeping honey bees, keeping hives at his home in Milwaukee for the rest of his life. Some honey was donated to the church, with the rest being sold to keep him in bees and equipment. Cliff took on a number of students over the years, mentoring a large number of new beekeepers, teaching them to be "honey producers." Cliff started beekeeping at the age of 11, selling several skunk pelts for $5 to pay for his first beehive hive. "The frames didn't have any foundation, and the bees built the comb sideways through the frames," lamented Cliff. He always said that the bees were good to him. He loved fishing and hunting, in between working bees and organizing ventures, and brought family and friends with him to share in his fun.

In 2005 Cliff was awarded the "WHPA Pioneer Award." Cliff has been a regular fixture at the Milwaukee Waukesha Beekeepers Association, giving a presentation on two queen hives at the February meeting. Everyone has spoken to Cliff at one time or another, benefiting from his unique knowledge of beekeeping through the years. He will be missed by his family and many friends.

In Cliff's name, the Milwaukee Waukesha Beepers Association raised enough money to sponsor eight beehives overseas through Heifer International, in conjunction with the reading program at the Brookfield, Wisconsin Library. Thank you Cliff, for your smile, and everything you have done for beekeeping, and all of us honey producers. We all hope that St. Peter lets you through the gates with your honey bees, smoker and hive tool.

STEVE TABER

1924-2008

Mr. Stephen Taber III, a world-recognized honey bee researcher, of Elgin, SC died Thursday May 22, 2008 at Kershaw County Medical Center in Camden, SC. He was 84 years old.

He was born on April 17, 1924 to Dr. Stephen Taber II and Bessie Ray Taber of Columbia, SC. His father was the South Carolina State Geologist from 1912 to 1947, and the head of the Department of Geology at the University of South Carolina where he was involved in the engineering of the Santee-Cooper Dam among many other projects.

Steve's first commercial beekeeping experience was in 1941 in upstate New York where he worked for Mr Elton Lane for one Summer making $30 a month. He worked two more Summers in New York and Wisconsin for another beekeeper where he claimed to have learned much of the basics of beekeeping.

Steve became interested in bees at an early age, using the banks of the Broad River in Columbia as his research yard. In 1942, he graduated from University High School and enlisted in the U.S. Navy as an Aviation Cadet. Steve was honorably discharged from the U.S. Navy in September of 1945 after the end of World War II.

In 1950 he graduated from the University of Wisconsin in Madison, WI, with a B.S., specializing in Bee Research under the tutelage of Professor C.L. Farrar. His first position was with the Entomology Research Division of USDA as an assistant to Dr Otto Mackenson in Baton Rouge, LA. This is where he met his long time friend Dr Murray Blum. After 15 years in Baton Rouge he was transferred to the United States Department of Agriculture (USDA) Bee Research Center in Tucson, Arizona where, in his words, "he was his own instructor " After his retirement from the USDA he moved to California in 1978 and founded "Honey Bee Genetics" – a high quality breeder and production queen business. Steve traveled extensively to teach, lecture, and research. He lived in France, continuing his genetic research with bees, for a few years before returning to the Columbia area.

Some of his students are leaders in the world of beekeeping research today. His book, *Breeding Super Bees*, published by the A.I. Root Company, attests to some of his research and his studies around the world. His articles and research publications are still being referenced by honey bee researchers world-wide. Articles written by Steve, some in collaboration with others, appeared in numerous publications for over 50 years. They include the *American Bee Journal*, *Gleanings in Bee Culture*, *Journal of Economic Entomology*, *Journal of Apicultural Research*, and *Beekeepers Quarterly*.

The life and legacy of Steve Taber is one that will remain in the hearts of those who knew him. His knowledge and mannerisms have moulded the lives of all those he touched. He will never be forgotten.

One of his students writes: "Taber was the most brilliant and wonderfully eccentric bee researcher, ever He also was the best teacher; he made us question everything we knew or took for granted, and then transformed those questions into creative and constructive research problems – all while teasing and yelling and laughing wildly and free".

He was preceded in death by his two older sisters, Dr Elsie Taber & Molly Denton. Survivors include his eight children: Caroline Kauffman of Colorado; Stephen L. Taber, Louis Taber, and Ray Taber of Arizona; Eugenie Taber of Texas; and Guyle Taber, Brian Taber, and Sarah Taber of California. Also surviving him are his six grand children Megan Eichenlaub, Stephen Ray Taber, Lucas Taber, Grant Taber, Wyatt Taber, and Owen P Taber; and two great-grandchildren Stephen Colter Taber and Nicole Marie Taber.

Donations in Stephen Taber's name will be accepted for the "Stephen Taber SCBA Young Beekeepers Fund" at South Carolina Beekeepers Association and for honey bee research at The Foundation for the Preservation of Honey Bees, Inc.

His cremated remains are interred at the Ft. Jackson National Cemetery in Columbia, S.C.

Display Advertisers

Before I got my Rhode Island Reds, I talked to Howard and Margo, because they've always had chickens.

I wanted a rooster and the rest pullets. I definitely didn't want a bunch of roosters.

Howard said, "A chicken sexer can tell if the chick is male or female. They pick up the chick and blow up its backside, and that's how they know. Chicken sexers are in very high demand. Not everybody can do it."

"Or would want to," I said.

Margo said, "I use the nail test, to be sure. You hold the chick in your hand and wait until it's very still. Then you dangle a nail on a string over its head. If the nail goes back and forth, it's a rooster If it goes in a circle, it's a hen."

I said, "That's the nuttiest story I've ever heard!"

Margo said, "Look, Ed, you're Catholic, right?"

"Right," I said.

"Then you believe some pretty unlikely things "

"Maybe," I said, "but I'm still don't believe you can sex chickens with a nail on a string."

When I told this story to Father Bob, he didn't seem that skeptical. He said, "You know, my dad could witch a well. He'd hold a forked stick in front of him, and start walking. All of a sudden, that stick would swing down toward the ground, and that's where the water was. How do you explain that?"

I can't explain why I converted to Catholicism and my sister Patty wound up an Evangelical. One of us is Republican, the other not. One lives in the country The other prefers the suburbs, close to a Wal-Mart. One keeps bees. The other loathes them. Other than these few minor differences, we have a lot in common. We're flesh and blood.

On a perfect May morning, I pick Patty up at the Salt Lake City airport, and we drive to Whitehall, Montana for Aunt Gert's 90th.

We take back roads – through tidy little orchards north of Salt Lake, past ice-blue Bear Lake on the Idaho border, then in and out of Wyoming, skirting west of the Tetons, now up into the timber along the Henrys Fork. I'd like to get out and fish. Pretty soon we're in Montana, close to West Yellowstone, but we take the cutoff to the Madison Valley I point out to Patty where Dad saw the UFO.

We see our first beehives, 40 splits set out neatly in the sagebrush south of Ennis. "Oh, just look at the little darlings!" I say

"*Little darlings*? That's not what *I* call 'em!" Patty shoots back.

She had an unfortunate run-in with yellow jackets as a child. I'm sorry

I was doing a series of experimental bee stings on my bum knee before I left, and I actually considered bringing along some clipped worker bees to continue my treatments, but that would have really taken the fun out of the trip for Little Sis.

We drive over the hill to Virginia City, then down the Ruby Valley to Sheridan. We stop in front of Mom and Dad's old house next to the Episcopal Church on Main Street. They retired here. We drive down to Dad's spot on the Ruby, where he fished almost every afternoon.

Pretty soon we're in the Jefferson Valley We pass the Barkell Hot Springs bathhouse and pool which is now somebody's home, then the curve where at 19 lovely Aunt Mamie hit her brakes on the ice. She got pinned under the car Grandma tried but couldn't save her

Patty spots a cow moose crashing through a hayfield. Hey! A moose? You never used to see moose around here.

We spy Whitehall's red-roofed water tower On the left is the site of the old Packard Ranch, where Grandma and Grandpa raised seven kids through the Great Depression on cows, apples, and yes, honey bees.

At the motel, Patty heads straight for bed. Over the phone I hear the wine glasses still clinking at Gertie's, even though the birthday girl has retired for the evening. I can't resist.

Uncle Happy and Gert raised seven kids in a shoebox. Gertie still lives in it. Hap's in a better place. He ran Happy's Bar at the Borden Hotel – when he wasn't hunting or fishing. When I mention seeing the moose, Cousin Susie says, "There's lots of wildlife now that Happy's gone!"

On Sunday at Top and Gail's, the place is thick with relatives from all over Montana and as far away as Toronto and even Holland. Gail serves Gertie's signature Italian spaghetti. Gert's all in, but when I ask her if the spaghetti's up to her expectations, she brightens and says, "You'd better believe it!"

My redheaded second cousin Lori wants to know all about honey bees. She's expecting her first bees – two packages – in the morning. A beekeeping relative! A kindred spirit! She's relieved when I tell her she won't have to release queens into the packages.

"Just empty the bees into the hives, feed them, and don't mess with them for a week!"

She keeps apologizing for asking so many questions, but I like her spark. Every novice needs a mentor She can call anytime.

Patty likes to be early for everything, so we take I-15 back to Salt Lake. As we pull into the airport, she says, "This was a good get-together Everybody got along. Nobody really got going on politics – or religion."

Amen I say

Ed Co by

Red Headed Cousin