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BUZZ EXTRA NEWSLETTER

MAY 2004

Bee Culture

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Sunflowers have become a significant source of honey in some parts of the U.S. where they are raised for oilseeds and food seeds and birdseed. Ann Harman explores major nectar sources in her article on page 49. The photo is by Elbert Jaycox, Extension Specialist in Apiculture for 18 years at the University of Illinois Urbana-Champaign.

Jake, as he was often called, published a newsletter entitled Beekeeping *for many years as part of his Extension work. It was well written and widely distributed.*

After he retired and moved back to his New Mexico home, he started writing a monthly column in this magazine in February, 1986, under the title 'The Bee Specialist. He continued until 1990, when he again retired.

Jake passed away in March. He was 80. We will have more on him next month.

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

MAY 2004 VOLUME 132 NUMBER 5

FEATURES

DEPARTMENTS & COLUMNS

KEEP IN TOUCH

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MAILBOX

Kids and Bees

We were able to reach almost 300 children and their families at the American Beekeeping Federation Convention in Jacksonville by providing two library programs and a school presentation. These programs were made possible through the help and support of volunteers, the ABF and the Foundation for the Preservation of Honey Bees Inc.

Before arriving at the school, I sent information to the teachers with introductory materials and follow-up activities to do with their students. I included lists of resource materials for the classroom. After the program I left all the beekeeping equipment, pollen, propolis, videos and other realia for the children to experience with smaller groups. The teachers were very responsive.

On the last day of the convention was the Kids and Bees Event at the Beaches Branch of the Jacksonville Public Library.

Of course no event can happen without the generous help of our volunteers. This year we set up and tore down in record time thanks to all the help from the past honey queens and princesses. Susan Bunch was once again available and willing to run errands and step in wherever the need was. Margaret Henson graciously provided transportation for many of the volunteers.

Barry Henson was so kind as to take photos of the event. Bo Sterk and Lee Bicknell from St. Augustine provided the observation hive and the beekeeping equipment. Elienn Zebroski from Ponte Vedra tracked down local contacts even though she has been down with pneumonia. Once again a big thank you goes out to Dadant for supplying the beeswax and wick for candlemaking. Pyramid Publishing supplied coloring books entitled "Welcome to Our Honey Farm" to all the children.

For more information on this recent publication call 262-752-0184.

Kim Lehman
Austin, TX

WV Auto-Clave

I saw the West Virginia Auto-clave at work at the Mid-Ohio Valley Beekeepers Association meeting February 7 at WV University in Parkersburg. Other states should have equipment like this available to beekeepers.

According to Paul Poling, Apiary Specialist and George Clutter, State Apiarist, beekeepers in West Virginia can use this Auto-clave free of charge to clean up American Foulbrood equipment. The beekeeper can either take equipment to them or have them take the equipment to them if they have a large amount of equipment to be treated for AFB.

It works as follows: affected equipment is placed in the Auto-clave (it will hold up to four complete hives). The temperature inside the auto-clave is raised to 250°F and placed under 30 psi for up to an hour and a half before it is done. The pressure is then released. The process recovers wax in the frames – a grey brown color according to George – which is given to the beekeeper. Many samples have been sent to the Beltsville USDA lab for confirmation that spores are killed. Tests show the spores are killed and no reinfection from AFB spores have turned up in treated equipment.

The day this equipment was run thru was cold and snowy. The temperature inside the auto-clave did not reach 250° but the wax in the frames was melted when the auto-clave was opened and a great amount of steam was released.

Dana Stahlman
Blacklick, OH

Organic Beekeeping

Organic Beekeeping by Gunther Hauk, *Bee Culture*, March, 2004 should be one of the most significant articles on beekeeping.

At first glance I said to myself "Oh no, not another testimony to the ethereal qualities of what is falsely, at least in my opinion, called organic honey." Yes, there no doubt such exists if we do not take the term "organic" too literally, but rather use it as a euphemism, a word in good taste that signifies a produce of ultimate purity.

Reading the article clarifies any doubt of what the author has in mind. Far more than using the term organic for its exploitive value he strikes at what may be

Continued on Next Page

MAILBOX

one of the dilemmas facing our rapidly expanding but possibly deteriorating environmental condition worldwide. Either we take heed of the warnings as outlined by the author, using beekeeping as an example, or we deal with the consequences by default, condemning future generations.

Yes, examples of so-called "organic" circumstances exist. Two years ago while photographing at high altitude (7 to 8 thousand feet) in Lassen National park, California, I observed a multitude of honey bees working rabbit brush bloom. These were bees isolated by many miles from commercial yards; tree habitants, survivors.

Conversely, we no longer get crops of yellow star thistle honey in our neighborhood of the upper Sacramento Valley of California, Why, I don't know for sure, but I suspect it to be something physiologically affecting the nectar process of otherwise normal appearing plants. Research is not ordinarily aimed at disclosing information that may not fit our concept of needing greater and a greater productivity. Raising productivity is a relentless survival necessity brought on by a worldwide population explosion. One cannot argue with its benefits that we all enjoy in America but is it a palliate that will eventually plunge us into a vortex of consequences that are uncontrollable?

Larry Goltz
Redding, CA

AKA Killer Bees

I'm the only beekeeper in the power station where I work. I have the privilege of working with a lot of intelligent people. They ask me a lot of questions about honey bees, as I am known as the beeman. One of the most frequent questions is when are killer bees going to arrive in South West Michigan. This is where I will put on my teacher's hat and tell them that Killer Bees are a Hollywood creation, and are more myth than fact, and honey bees known as killer bees are actually a hybrid of African bees that were accidentally released in Brazil in the late 50s.

And even though there are people that are killed by bee stings associated to Africanized bees, they don't hang from tree branches in evil swarms, waiting to pounce on some poor unsuspecting elderly person. Some will say yes but you are biased, and I will have to admit that I am. "After all to know the bug is to love the bug." Then I get the response, is that right, with a raised eyebrow. And I walk away with a feeling that I did not convince them.

On March 2 I received your article on African honey bee update from *Bee Culture's* catch the buzz email. So now I can tell my co-workers with some facts, that even though Africanized honey bees have been in the U.S. since 1990 they haven't advanced north any further than Texas, and only taken up residence in a few South West states, and for some unknown reason, even though there are some theories such as rainfall amounts, have not moved east to any south east states like Louisiana, or Georgia. I try and convince them that the Africanized (AKA Killer Bee) has it's limits and by moving into the U.S., where we have the ability and the resources to study and develop a plan to control them, better than other countries that they have invaded. They won't have to worry about their cookouts this Summer.

Your article also gave me some hope, and piece of mind that I will be able to continue with the hobby that I enjoy, without the threat from this Mighty Adversary.

Brent Bean
Sawyer, MI

Bioterrorism

I want to thank you for publishing the article by Jim Fischer in the February 2004 issue of *Bee Culture.* I am an American-Canadian who has lived in western Canada for 30 years. Many of us in Canada have been troubled by the apparent loss of liberties and freedoms in the great country of the U.S. and saddened that bureaucracy and big government has made it increasingly difficult for ordinary people to speak their mind and to exercise the freedom and independence that once made America so wonderful.

It was very encouraging to read Fischer's editorial about the bio-terrorism laws and their effect on small businesses. It is refreshing to realize that there are many people (even those within government) who share this concern.

Bravo for *Bee Culture* and the courage of its editors to publish something that questions the conventional wisdom of 'safety and security at any cost.' There is hope for America as long as people are willing to risk voicing these controversial viewpoints.

Ron Miksha
Calgary, Alberta

Boomers & Beeswax

A generation ago, pure beeswax was precious. One year, we sold our wax for $2.25 a pound. We sold about 12,000 pounds of wax that year Beeswax users saw this high price and took action. Soon, improvements in paraffin purity, and thus improvements in adulterated beeswax started showing up. Buyers found suppliers in China, and Chinese producers found customers not too concerned with purity issues. We have the 2004 wax market to prove all these points.

Beeswax is a fine moisturizing emollient. People with lots of money and vanity are willing to pay ridiculous sums to moisturize their emollients. How about a few examples:

From the New York Times, January 4, 2004, *Winterproofing* by Ellen Tien. Pulse, p. 3.

Ellen has a great job. She samples and notes the qualities of various products designed to minimize the drying effects of winter Not all of these products contain beeswax.

Kiehl's Ultimate Hand Salve: $18 for five oz. $11 for 2.5 oz.

Super Flight Cream $35 for 1.7 oz. at www.prescriptives.com.

Fresh Brand, Repair and Restore Face Balm $95 per oz.

MAILBOX

Fresh Brand, Crème Ancienne $250 for 3.5 oz.

Origins, Never Say Dry salve $29.50 for 1.7 oz. at www.origins.com

Jurlique Lip Care Balm $20.00 for .3 oz. tube www.jurlique.com

Tripod Labs Advanced Moisturizing Formula $11.95 for 5.75 oz.

Getting the idea? These are premium products people are gladly paying extraordinary prices for Why? People will pay for a product delivering superior performance, or creates the belief of superior performance.

Generations of bee guys have known how to soften hands and skin. I am part of a generation that gave up on the beeswax market. A few beekeepers have not. Steve Conlon sells lip balm made of almond oil, beeswax, and honey, and maybe a kiss of other essential oil, and he sells it for a whole lot more than $2.25 a pound. He sells a lot of it too. What is the industry doing with beeswax? Not much.

The Baby Boomers have wrinkles. We don't like wrinkles. Baby Boomers are vain. Baby Boomers have lots of money, and BB's are madly self-indulgent. Savvy marketers go to work every day trying to resonate with the largest, richest, most self-indulgent demographic this nation has ever seen.

I gave a few talks last Fall on beekeeping. I have thought for some time about the Baby Boomers and the impact they will have on the consumption of honey Baby Boomers detest the loss of youth. We can't jump as high, we can't ski as fast, we can't party like we used to. We still have much life left to live. We are determined to not go quietly into the night. We are confronting the surgeries incident to our ages. We seek to be restored and repaired, quickly. We seek remedies to keep us looking youthful. Honey, a Natural Daily Choice to Enhance Health and Well Being.

Domestic honey producers should prepare today to meet the demands of the Baby Boomers. This group of consumers will need to be re-acquainted with honey for the very first time. Eating healthy has not been a concern for the newly minted middle-aged. All of a sudden it is. We need to get their attention, and focus their attention on how honey, and by implication, beeswax can enhance healthy living choices.

Remember the old 'spoonful a day' recommendation for honey use? The recommendation could not be more spot on for the 40 million budding geezers among us.

As my daughter says, 'Dad, Honey is the bomb-diggity!'

John Miller
Newcastle, CA

INNER COVER

You, or somebody you know has had this happen.

Pulling into a beeyard or just walking out the back door, you notice the stillness even before you're close enough to hear. And there's no motion. No sparkle of light off frantic wings heading up and out. Nothing. Maybe birds, passing cars. That's it. And that's not right.

If this is the first time you'll mutter something like, "what the .?" If it's not, the reaction can range from a curse to a prayer. Neither help.

When you get close enough to see, what you see is slaughter. Genocide. Mass murder There, in front of the hive, in a disorderly heap, are all your bees. If it's early some may still be twitching, spinning, buzzing. Most are still. Soon, all of them are quiet.

These bees have been to the killing fields. They encountered an insecticide while foraging on a blooming crop, flowering weeds growing in or on the edge of the crop field, or on flowers in an area the killing agent drifted to.

Because of their extraordinary misfortune, they were sprayed directly, or more likely brought death home to share. Nearly everybody they touch or share food with dies, later.

Sometimes better dying through chemistry is more subtle, stealthy, like a thief in the night. That's when death comes hidden among the pollen grains, sneaky like, it pretends it *is* pollen, and is stored for future food, a time bomb, ticking.

This kills the children and the babies. The colony goes childless, then queenless and perishes without a whimper, leaving not a mark or a clue.

American farmers suffer the same price pressure from imports as American beekeepers. To cope, they all explore reducing costs, increasing efficiency, the search for better markets, ways to slow urban expansion, and how to pay for restrictive regulations on every facet of management.

To keep from killing everything, there are rules, regulations and guidelines for applying insecticides – whether on corn or cotton, soybeans or poplars. The presumed inalienable right of your bees to be on flowers in a farmer's field, when confronted with the same presumed inalienable right of that farmer to manage his crop and protect it from economic damage by insect pests is the result, and the cause of that disorderly pile in front of your colony.

And it is necessarily inconvenient to adhere to those guidelines, rules and regulations if you are an applicator spreading poison – they tell you how much poison to use, how often to use it, and most annoying, where to *not* put it.

The struggle to apply, yet comply is clouded by the weather, the mud, the schedule of the applicator, and the destruction being committed by the target pest.

The guidelines, rules and regulations that accompany every insecticide container on the label have the force of the law. But there are some that want the laws changed. They want the laws to go away. They have muscle, manpower and money. Simply, they are pesticide sellers.

The government, in its wisdom, has seen the value of protecting not just honey bees, but all living things from the excesses of insecticide abuse. But it is also keenly aware of the wants, needs and rights of applicators to do what they do. It is, at best, an uneven tug-of-war. Those with the most muscle, money and manpower win.

But there's a stranger side to this. If the rules change, if they allow, sometimes, the murder of honey bees in corn or poplars, where will be the bees for almonds and apples next year? Careless, illegal, even now-legal insecticide applications by one facet of agriculture will threaten the livelihoods of not only beekeepers, but those farmers they pollinate for Both groups are being sucker punched by other farmers for short term gain.

The muscle, the manpower, and the minds of the sprayers, the beekeepers, the apple and almond growers and the advocates of all the living things have to figure this out.

The EPA *must not* allow the restrictive use of insecticides to relax, even a little. You must tell someone who can help. Your state or national beekeeping association. Your Congressman *and* your Senators. They can tell the EPA your concerns.

Curses, prayers and even lawyers, it seems, aren't help enough.

•

I was chasing the answer to a completely different question recently when another question completely took over.

What took over was, when very young house bees start working, one of their first tasks is cleaning out cells – house cleaning.

O.K., that makes sense – that's closest to the warmest and safest part of the nest.

The question is then, "So what do they do with this stuff?"

I looked in every learned text I could find (maybe five or six), and didn't find an answer Of course, I admit I didn't read every book or paper ever published on the subject. I may have missed it.

But still, what could they do with it? Is there, like, garbage pickup on Thursdays? Do they give it to somebody who takes it somewhere? Who do they give it to? And where would they take it?

Sometimes animals eat what they can't carry away so they can, well, carry it away the other way. Maybe that's what they do. Yuck.

Maybe they just pitch it, letting it fall where it may down between combs, bouncing off the heads and tails of 20, maybe a 100 fellow workers before it hits the bottom. Imagine getting bopped by a load of dirty linen right on your antennae. Ouch and yuck.

Well, maybe somebody knows and can tell me. Or, maybe nobody knows, which I suspect. I can't imagine for a moment I'm the first to ask this question.

Kim Flottum

Pesticides, Again. Housecleaning.

NEW

New *Varroa* product to be launched in the UK

Exosect Ltd, an R&D company based in the UK specialises in the design of environmentally friendly insect pest control techniques. Exosect design products for a wide variety of insect pests, all of which are based on a natural wax powder called Entostat™, which has electrostatic qualities.

Exosect Ltd. has developed an innovative new thymol based application for use on *Varroa* in beehives, which is inserted to the hive entrance. The bees distribute the preparation throughout the hive themselves. As the system is highly targeted, it uses 60% less thymol than other leading hive products. Not yet registered in the U.S.

Where did it all begin?

Insects carry an electrostatic charge on their bodies. As Entostat powder charges readily, it adheres to insects very strongly The significance of this is that Entostat powder can be combined with any number of ingredients be it insect pheromones or small doses of essential oils and applied to insect pests using a number of novel, non-intrusive methods.

How does it work?

The Exomite Apis system uses an innovatively designed bespoke applicator, which unlike other systems does not require the beekeeper to open the hive at all. The applicator slots into the hive entrance and bees therefore have to pass through the applicator to enter the hive. The base of the applicator consists of a tray, which extends into the hive underneath the frames. A preparation of Entostat powder, combined with thymol, is placed in the tray. As bees enter the hive they pick up the powder on their bodies through electrostatic powder attraction and carry it into the hive. The bees then distribute the powder throughout the hive as they come into contact with other bees. The powder even gets in to the brood cells where *Varroa* can also be found.

Field trials show that with even medium to high infestation of *Varroa*, the exomite Apis knocked down a high number of *Varroa*, with over 80% efficacy.

Exomite Apis employs 60% less thymol than other leading hive products and is recommended in the United Kingdom as a hive cleanser for use in hives with low to high *Varroa* infestation. The Exomite Apis is designed to be used as part of an Integrated Pest Management (IPM) approach in order to maintain a healthy hive.

Exosect Ltd will be happy to discuss license opportunities with possible collaborators in the U.S. Contact sales@exosect.com or John Chandler on +44 0 2380 763838.

Landscaping Herbs, by Barbara Collins and Floyd A. Giles. Soft cover, 204 full size pages, color photos, black and white line art. Available from *Bee Culture's* Library, 623 W Liberty St., Medina, OH 44256, $29.95 includes domestic freight.

If you grow herbs, for fun, for food or for bees, you will love this book. There are over 90 specific herbs discussed, but each herb also has listed several cultivars and related plants for additional uses and ideas.

Each plant has a color photo (in the front of the book), showing the blooming plant – flowers, foliage and sometimes the whole plant, plus many have additional color photos of the cultivars discussed. There are 133 color photos.

There is also a short section listing herbs for special situations – drought tolerant, moist, alkaline, acid, and clay soils, shade, heat or salt tolerant and special use herbs for climbing, bold appearance, trailing, backgrounds, butterfly and bees and more.

Each herb discussed comes with a detailed line drawing, and loads of information. Scientific name, common name(s), plant family, growing zones, description, how to grow it, what the blossoms look like (and for many, whether they attract honey bees or butterflies), the foliage, how to propagate, landscape uses and a list of cultivars, plus a list of related herbs and additional information about those.

It has a short glossary and good index, but just paging through this book is entertaining and educational.

If you grow herbs, like bees in your garden, or just enjoy a diverse and useful group of plants, you will use, and enjoy this book.

The workplace Health and Safety benefits of Loader use can now be enjoyed by four-way pallet / forklift users

There are two schools of thought regarding loading and managing of hives.

The first is that the hives are placed on a four way pallet and handled in. This offers time savings in loading/unloading tasks but offers no alternative to then having to manually handle the boxes. A complaint is the strain damage to the lower back.

The second school of thought is based around the use of a vehicle mounted Loader This offers far greater flexibility because the Loader removes manual handling tasks.

We now have the prototype in the field being evaluated. The reports are excellent since the beekeeper can unload/load bulk hives and perform all the hive management tasks utilizing the loader attachment. This development fills a health and safety need lacking for many years in the beekeeping industry.

The beekeeping Industry in Europe, Canada, New Zealand and Australia have long recognized the benefits of the EZYloader and this new innovative addition to the range will only add to the success of the product in these markets.

It is expected that the new EZYloader attachment for Orchard forklifts will be available within the next few months. For information contact Chris Wansbury, Managing Director, Varsitor Corporation Pty Ltd, email: varsitorsales@opusint.com.au, Tel: (07) 3832 3220, Fax: (07) 3831 1511, Mobile: 0403 159 417, Level 1 - 365 Turbot St., P.O. Box 1278, SPRING HILL, Qld 4004 Australia

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MAY- REGIONAL HONEY PRICE REPORT

Percent of Shelf Space	2003	2004
6 oz.	2%	2.6%
1/2# gl/pl	8.3	8.3
12 oz. pl.	20.4	23.3
1#	19.9	18.7
2#	12.2	11.5
Pint	6.3	4.2
Quart	5.6	3.3
5#	4.0	5.7
Cremed	9.1	7.5
Comb	2.2	4.6
Other	7.6	7.6
	97.6	**97.3**

(Not 100% due to rounding.)

5th Annual Store Survey

Across the board it looks as if 2003 was a downer year. For every category, 2004 showed an increase.

In spite of shelf price increases, the number of rows (or fronts or facings) is higher than its ever been. Total number of brands, number of local and even store brands are up. The number of brands with foreign honey more than doubled this year but are still way down from 2001 and 2000.

How much room each type of container is given is usually a sign of what sells. 12 oz. plastic is up yet again, with over 23% of total shelf space. That should tell you something. At least this year it looks like 1# and 2# gave up room for the 12 oz. Pints and quarts, while popular at informal locations, are decreasing in stores. Though cremed honey was down this year, comb honey was up over double (but still less than 4% of shelf space).

This month reporters visited local grocery stores to survey hone space. On average, there were:

	#Rows	#Brands	#Local Brands	#Store Brands	# With Foreign Honey
2004	18.4	4.2	1.92	1.35	1.76
2003	13	3.0	1.4	1.0	0.8
2002	15.6	4.6	2.3	1.0	3.5
2001	12.7	4.6	1.7	1.5	6.9
2000	13.5	5.2	3.8	3.1	5.5

SUGAR SYRUP/HONEY BLENDS

This relatively new product was noted by many of our reporters. It's taking space on the honey shelf, and is usually much, much cheaper. Some report as much as 95% sugar:5% honey. Is this legal? Can you put HONEY on the label? How much honey? Who wants it – customers, store owners, or are honey packers pushing it because they can't get good honey, so they add HFCS and drop the price to compete. This is, said one reporter, "outrageous and disgusting, and probably illegal as h___!" We couldn't agree more.

	Reporting Regions												Summary		History	
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	Last Month	Last Yr.
Extracted honey sold bulk to Packers or Processors																
Wholesale Bulk																
55 gal. Light	1.40	1.50	1.30	1.26	1.23	1.35	1.48	1.41	1.35	1.40	1.43	1.32	1.23-1.67	1.29	1.47	1.34
55 gal. Amber	1.22	1.35	1.22	1.15	1.18	1.17	1.38	1.22	1.22	1.30	1.47	1.33	1.15-1.47	1.27	1.28	1.17
60# Light (retail)	107.50	121.40	110.84	90.00	110.84	97.00	108.57	107.73	125.00	107.00	97.00	113.50	79.00-125.00	108.03	106.97	92.50
60# Amber (retail)	91.33	113.40	106.84	90.82	72.00	93.00	103.17	96.67	119.00	93.00	97.00	87.50	71.50-119.00	96.98	102.53	84.62
Wholesale Case Lots																
1/2# 24's	37.92	46.50	37.30	35.18	37.30	32.50	38.24	37.30	37.30	35.76	21.00	27.00	21.00-46.50	35.28	46.68	34.77
1# 24's	55.76	59.03	60.00	54.50	55.60	56.00	57.22	58.96	63.36	71.84	74.80	64.93	54.50-74.80	61.00	61.90	53.92
2# 12's	51.18	59.58	58.80	48.30	55.52	48.00	50.64	59.50	55.52	55.92	47.00	57.93	37.00-59.58	53.99	54.86	47.62
12 oz. Plas. 24's	50.13	55.03	54.00	49.36	57.93	48.00	48.70	46.86	48.00	47.64	60.85	49.47	46.86-60.85	51.33	50.72	44.48
5# 6's	47.76	62.98	59.98	50.85	59.98	60.00	55.57	50.00	59.98	61.86	45.19	62.25	45.00-62.98	56.37	60.36	54.31
Quarts 12's	73.00	90.45	84.00	71.04	81.25	81.33	75.96	76.50	74.00	99.90	89.40	85.50	71.04-99.90	81.86	81.14	69.18
Pints 12's	48.00	49.95	54.60	50.13	55.66	49.33	44.14	42.78	42.00	50.16	45.00	45.75	40.50-55.66	48.12	47.24	47.04
Retail Honey Prices																
1/2#	2.21	2.72	2.36	2.53	2.29	2.95	2.23	1.90	2.29	2.76	2.99	2.48	1.90-2.99	2.48	2.50	2.40
12 oz. Plastic	3.00	3.00	3.85	3.01	3.19	3.37	2.98	3.33	3.05	3.21	3.45	3.40	2.98-3.85	3.23	3.23	3.07
1 lb. Glass	3.45	3.65	3.95	3.73	3.25	3.87	3.56	3.98	4.69	4.06	4.06	4.06	3.25-4.69	3.86	3.99	3.68
2 lb. Glass	5.29	6.12	6.49	5.66	6.69	6.99	5.62	6.64	6.29	6.65	6.87	6.51	5.29-6.99	6.32	6.22	5.76
Pint	4.85	7.65	5.95	5.24	5.99	4.94	5.63	4.79	5.10	7.16	6.49	5.95	4.79-7.65	5.81	5.31	5.39
Quart	7.75	8.95	9.50	7.60	7.69	8.63	7.94	8.72	8.50	10.53	8.30	10.90	7.60-10.90	8.75	9.36	8.29
5 lb. Glass	12.20	13.31	12.76	12.59	12.76	11.45	12.44	13.69	12.76	13.79	13.94	12.99	11.45-13.94	12.89	13.01	12.05
1# Cream	4.31	5.29	4.53	4.30	4.53	3.99	4.14	4.48	4.53	4.38	4.50	4.23	3.99-5.29	4.43	4.57	4.91
1# Comb	4.83	4.95	4.15	4.98	5.59	4.25	5.22	4.99	5.59	5.59	15.00	4.90	4.15-6.11	5.65	5.13	4.59
Ross Round	5.25	3.72	3.60	4.85	4.54	3.10	4.75	4.00	4.54	5.15	5.83	4.60	3.10-5.83	4.49	4.89	4.31
Wax (Light)	2.15	2.13	2.00	2.03	1.20	2.10	1.58	1.25	2.00	2.00	1.90	1.80	1.20-3.00	1.85	1.84	1.75
Wax (Dark)	1.56	1.60	1.75	1.77	1.10	1.98	1.39	1.15	1.00	1.35	1.50	1.50	1.00-2.00	1.47	1.47	1.25
Poll. Fee/Col.	45.00	41.00	40.00	39.25	30.00	42.50	44.22	40.00	30.00	41.22	27.00	41.50	27.00-45.00	38.47	40.62	42.23

RESEARCH REVIEWED

Explaining • Defining • Using

Steve **Sheppard**

"The appearance of mites resistant to coumaphos . . . in only three years of use is disturbing in light of the limited control alternatives."

The ability of honey bees to detect diseased or mite-infested brood and remove it has been termed "hygienic behavior." A number of queen producers in the U.S. and abroad now include selection for this trait in their breeding programs to increase the overall tolerance of bees to foulbrood and *Varroa destructor* One standard assay for hygienic behavior involves testing individual colonies for the ability to detect and remove freeze-killed brood. While it is generally agreed that olfactory cues (i.e. smells) coming from infested cells triggers the behavioral response in honey bees, the identity of the chemical or chemicals involved has proved elusive. However, in a recent paper by Nazzi and colleagues (Nazzi et al., 2004), one such compound was identified and, when applied inside capped brood cells, was shown to increase the number of cells emptied by bees.

The researchers, working in northeastern Italy, conducted three related experiments to initially identify and then test the chemical cue used by bees to detect infested cells. First, they compared the hygienic behavior of bees within their own apiary when faced with mite-infested and mite-free capped cells. The researchers inserted *V. destructor* mites into capped cells through tiny slits that were then reclosed. For the control colonies, they made the slits and reclosed them, but did not insert a mite. There was a significant difference between the uncapping behavior of the bees toward mite-infested vs. mite-free cells. Overall, 17% of the infested cells were uncapped and 4% of the mite free cells were uncapped by the bees after 10 days. While the proportion of uncapped infested cells may seem low (17%), note that these bees were not previously selected for hygienic behavior, yet the mite-infested cells were uncapped at a rate more than 4 times that of the mite-free cells.

The second experiment was a protocol to identify volatile chemicals that might be involved in this difference between mite infested and mite-free cells. The researchers used artificial cells (gelatin capsules), each containing a bee alone or a bee and a mite and collected the emitted volatile chemicals on a special absorbent filter The material collected on the filter was then analyzed using a gas chromatograph-mass spectrophotometer While the methodological details of the GC-MS are beyond the scope of this column and interest of its author, the outcome of the analysis was that the researchers were able to identify several compounds that differed between the two groups.

The third experiment was a bioassay to determine if any of these identified compounds or plausible variants would elicit hygienic behavior in honey bees. The authors injected the compounds (dissolved in the solvent hexane) into capped cells in amounts similar to that estimated for a single bee and mite. For the control cells they injected hexane alone. They found that one compound, (Z)-6-pentadecene, caused a significant increase in the number of uncapping events compared to the controls (28% compared to 16%). While the results of this research may have no immediate application to mite control, the researchers suggest that identification of chemicals triggering hygienic behavior can be used to develop improved assays to screen honey bees for hygienic behavior

The need for improved methods to screen selectable traits in honey bees is perhaps greater now than ever before. A recent scientific note by Jeff Pettis of the USDA-ARS bee research lab in Beltsville MD (Pettis, 2004) makes this point and also exposes the fragility of continued reliance on chemical treatments to control pests inside honey bee colonies. Pettis showed that *Varroa destructor* infesting some apiaries in Maine and Florida were resistant to coumaphos (the active compound in Checkmite+®). He ran a standard assay for mite mortality with a single lot of Checkmite+® using 24 colonies each from Maine and Florida and 44 colonies from Maryland. The colonies from Maine were from a migratory operation where the beekeeper had complained of continued high mite populations following treatment with Checkmite+® The colonies from Florida were from two apiaries in an area where the Maine bees were overwintered. The Maryland *V. destructor* population had a history of limited exposure to Checkmite+®

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RESEARCH ... Cont. From Pg. 13

and was considered likely to be susceptible to the miticide. The assay demonstrated that mortality of mites from the Maine apiary was 13%, while mortality of mites from the Maryland population was between 80-100%. The mite mortality in the two separate Florida apiaries was 7% and 80%. The mortality of mites in the Maine apiary and in one of the Florida apiaries was statistically significantly lower than in the other tested populations. Pettis concludes that "The appearance of mites resistant to coumaphos . in only three years of use is disturbing in light of the limited control alternatives"

The paper of Nazzi and colleagues indicates one of the means by which bees can detect the presence of *Varroa destructor* and opens the door to possible improvement of an assay to help select bees that can better defend themselves. The paper of Pettis reminds us that we have only limited time to get these improvements underway and in place. BC

Nazzi,F G. Della Vedova and M. D'Agaro. 2004. *A semiochemical from brood cells infested by* Varroa destructor *triggers hygienic behaviour in* Apis mellifera. Apidologie 35:65-70.

Pettis, J 2004. *A scientific note on* Varroa destructor *resistance to coumaphos in the United States.* Apidologie. 35:91-92.

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Mark **Winston**

Expecting The Unexpected

"Naïve is an interesting word, with ambiguous connotations in its dictionary definitions."

I do quite a bit of teaching to non-science majors these days, and just for fun I asked one of my classes to free-associate words that expressed their opinions of scientists. I furiously wrote their responses on the ubiquitous whiteboard that has replaced blackboards in today's higher-technology classrooms

I was barely able to keep up with their invective, as they rapidly fired out terms like "arrogant, lofty, cerebral, cold, atheist, egghead," and so on. My self-esteem was sinking lower with each stroke of the pen, but finally someone yelled out a term that was out of order We paused, and asked her what she meant.

"Naïve," she proclaimed. "Good scientists assume they know almost nothing, and curiously expect the unexpected."

Her comment came back to me over the Winter break this year, in a voice mail message left by a former student who now lives in Iowa. He is an entomologist, working as a consultant for pest control operators, and had been taking his two young sons for a walk in the Iowa woods around Christmas. They came across an external honey bee nest hanging from some branches.

Not knowing much about honey bees, he assumed this was interesting, and called to speculate about what it meant and why it was there. Perhaps this was an errant colony of Africanized bees, he wondered, or maybe represented a new phenomenon brought on by global warming?

Coincidentally, Jim Tew had written an article about external nests for *Bee Culture* that month, (December 2003), and the combination of phone call, Tew's article, and my free association exercise brought back a flood of my own external nest memories.

We were the "killer bee team," a group of graduate students led by Chip Taylor from the University of Kansas sent down to South America to determine why the introduced African bee subspecies was doing so well, predict their arrival date in North America, and develop ideas to stop or control these highly aggressive bees.

We also were naïve, as none of us had any experience with honey bees when we started. This deficiency turned out to be a real advantage in that we had no preconceptions that a more traditional background in apiculture would have brought to our study.

We noticed immediately that a high proportion of feral nests were external, located under branches, overhanging rocks, open sewer manholes, old tires, rusting cars, and eaves of buildings. Lacking experience, we assumed that this was normal, and that the bees had built these nests with the intent of using them.

Only upon returning to North America did we discover that the conventional wisdom assumed that external nests were mistakes, made rarely and only by swarms that failed to find a cavity to construct a nest in.

We considered external nests to have three advantages for tropical bees. First, they are more easily cooled in a tropical climate than a cavity, and a shaded external nest may require less energy for temperature regulation. Second, they remove the necessity for a swarm to search for and find cavities at all, which would be advantageous in a habitat where cavities may be elusive or in short supply.

And third, external nests provide an unrestricted view for guard bees to see potential marauders for quite a distance, so that the entire face of the nest can explode in defense when danger is perceived. This defensive advantage was revealed every time we approached such a nest and were attacked from many yards away.

We soon learned to be well-protected when approaching external nests, but others have not been as fortunate. One of the worst honey bee attacks on record occurred when a student in Costa Rica was hiking up a steep hillside and encountered a large, exposed nest of Africanized bees as he climbed around a rock. The bees exploded, and within a few minutes he had been fatally stung over eight thousand times.

Our naivete led us further to develop a comprehensive theory about why Africanized bees were so successful in tropical environments. We speculated that these nests reflect a deliberate strategy by tropical bees to build small nests and swarm often, investing energy in reproduction rather than nest construction. Taken together, these observations that grew from our ignorance about honey bee nesting

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"We speculated that these nests reflect a deliberate strategy by tropical bees to build small nests and swarm often, investing energy in reproduction rather than nest construction."

biology went a long way towards explaining why these bees have been so successful in the wild.

I also have benefited from the naivete of others, and occasionally have been one of those experts who fail to envision the unexpected. Our pheromone research with European-derived honey bees in Canada reminded me that I, too, can know too much.

My chemist colleague Keith Slessor and his students had identified a complex blend of the honey bee queen pheromone, at that time a mix of five components and now with nine known compounds. Identifying these chemicals involved a bioassay in which putative compounds and blends were tested in a small dish for their attractiveness to worker bees.

The synthetic blend was highly attractive in our assay. Keith began to speculate that queen pheromone might attract worker bees if sprayed on blooming crops, thereby improving pollination and crop production.

Ridiculous, I thought. After all, we and others had proven that the queen pheromone had some highly specific functions within the colony, especially involving the regulation of queen rearing and the inhibition of worker ovary development. There was no known function for queen pheromone in foraging.

Since its activity was highly context-dependent, there was no reason to expect it would attract worker bees to flowers. Except, Keith's lack of preconceptions led him to believe that a low dose of pheromone sprayed on flowers would trick bees into being attracted, even though the context was unlike the social situations in which they regularly encountered queen odors.

Slessor's naivete won out over my experience, and we devised an experiment in which we sprayed synthetic pheromone on blooming cranberry fields. To my surprise and Keith's eternal I-told-you-so delight, the spray increased bee foraging dramatically, resulting in a 30% increase in cranberry production and an $8000 per acre jump in profit to the growers in that particular experiment.

Subsequent research has established similar effects on pears, blueberries, kiwifruit, some apple varieties, and other crops. Queen substance is now being sold as Fruit Boost by the Canadian company Phero Tech to enhance commercial crop pollination, and a backyard garden formulation will be released shortly.

Keith expected the unexpected, but he, too has been lured by experience until the naivete of others exposed unanticipated results.

We had identified five components in the honey bee queen mandibular glands that composed the queen's attractiveness to worker bees by the late 1980's. We tested these five synthetic components against an extract from queen's glands, and found them identical in attractiveness to worker bees.

After exhaustive experiments, we proclaimed that we had fully identified the mandibular gland components of the honey bee queen pheromone, although we recognized that substances produced at other locations in the queen's body were still to be discovered.

One of Keith's students, Chris Keeling, went on to find four additional compounds that doubled or tripled the worker bee response in our assay. One of these compounds proved particularly difficult to elucidate, so Chris and Keith decided to back away from our own conventional wisdom that assumed we had identified everything in the queen's mandibular glands.

Chris went on to discover one additional mandibular compound by conducting experiments under red light. There is a sixth mandibular substance that is light-sensitive, and it rapidly loses its effects when exposed to daylight. This is not an issue within colonies where it normally is dark, but all of our work until then had been conducted on a laboratory bench under well-lit conditions. Again, naivete and jettisoning assumptions had revealed insights that conventional wisdom had hidden.

Chris's discovery led us to reconsider another bit of our own conventional wisdom. We had compared queen pheromone blends of Africanized and European bees, and found little if any difference in queen production or worker responses.

Yet, Africanized bees build external nests in which colonies are exposed to daylight, albeit shaded. Do Africanized queens produce this sixth mandibular substance, and do workers respond to it? Are there biologically significant differences in pheromone-based functions due to this compound, and if so do they provide any management tools to better-handle Africanized bees?

"Naïve" is an interesting word, with ambiguous connotations in its dictionary definitions. "*Lacking worldliness and sophistication*" and "*lacking critical ability*" are two, but "*simple and credulous as a child, ingenious, not previously subjected to experiments*" are others.

I'll go with the latter, and proudly add naïve high on my list of scientist descriptors. Science can reveal insights best when proceeding from the vantage point of such naivete.

Expecting the unexpected, now that's a state of mind for all scientists to aspire towards. BC

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

NO NAME BRAND OR WHO'S ON FIRST?

James **Fischer**

NEWS RELEASE:
The Canadian Food Inspection Agency detected nitrofurans in honey packaged for consumer sale, and ordered a recall of Honey sold by the Loblaws company under the trade name "No Name Brand" Honey.
The affected lot numbers are 220EQ and 248EQ...

Ring, Ring, Ring...

A: Good morning, CANADUH, how may I help you?

Q: Did I dial correctly? Did you say "CanaDUH"? Shouldn't you say "Canada"?
A: "CANADUH" is the "Canadian Agency Notifying All on Demonstrated Unsafe Health." How may I help you?
Q: I'm calling about the contaminated honey that I read about in the newspaper.
A: Yes, I can assist you with that.
Q: Which honey is contaminated with Nitrofurans?
A: No Name Brand.
Q: No honey is contaminated?
A: No, honey IS contaminated!!!
Q: Did I hear you just say that no honey is contaminated?
A: Honey IS contaminated. That's why we ordered a recall.
Q: OK, you ordered a recall of what brand?
A: No Name Brand.
Q: So you didn't recall any brand of honey?
A: No, we DID recall a brand of honey!
Q: So which brand of honey is contaminated?
A: No Name Brand.
Q: So, no name brand of honey is contaminated?
A: Yes, exactly.
Q: So only honey sold by local beekeepers, without a name brand is contaminated?
A: Absolutely none of the honey sold by local beekeepers is contaminated.
Q: But then IS any honey actually contaminated?
A: Yes.
Q: And a specific name brand of honey is contaminated?
A: Yes.
Q: But the brand has no name?
A: No, the brand IS "No Name"
Q: How can a big company sell honey with no name brand?
A: It is a major name brand.
Q: Then are you refusing to divulge the name brand?
A: No, the name brand is "No Name Brand"
Q: So, is the label, like blank or something?
A: No, the label says "No Name Brand" on the label.
Q: Now wait just a second! I go to the store, OK?
A: Sure.
Q: And I want to buy some honey, OK?
A: That's a fine idea. Honey is good.
Q: But I don't want any of those Nitrofurans, OK?
A: Understandable.
Q: So I walk up to the shelf, and I see a jar of honey with no name brand. That's the one to avoid, right?
A: That's the one.
Q: So as long as I buy honey with a name brand, I'm not going to get any Nitrofurans in my honey.
A: No, if you buy honey with the name brand "No Name Brand," there might be Nitrofurans in that honey.
Q: Never mind. Just forget about the names, OK?
A: But you called and asked...
Q: Just drop it, please?
A: Very well, sir.
Q: What is the health risk posed by Nitrofurans in honey if I have already eaten some?
A: Almost none. The amount of nitrofurans in the honey are uniformly low and pose a low risk.
Q: Can I get a disease?
A: It is a potential carcinogen.
Q: You mean it might make me commit sins in my car?
A: No, carcinogens are things that can cause cancer.
Q: But why would these Nitrofurans get in honey?
A: Perhaps because it is an antimicrobial drug.
Q: But I read that honey is one of the oldest antimicrobial substances known to man! Why would anyone need to use an antimicrobial drug when they had honey around?
A: We are still researching that.
Q: So, it is a potential carcinogen, but it poses a low risk.
A: Exactly.
Q: But if it is such a low risk, then why the recall?
A: To protect the public.
Q: AGAINST WHAT?
A: Against the risk.
Q: Against the "low" risk?
A: But it is a risk. The public is advised whenever there is a health concern.
Q: Uh, do you know how MUCH honey is contaminated?
A: Only a few lots.
Q: Well, is it a few jars, or a lot?
A: It's not much, really.
Q: Then why did you say "lots"?
A: Because lots are contaminated.
Q: You mean "a lot IS contaminated"
A: No, TWO lots are contaminated!
Q: My head hurts. Let's move on, shall we?
A: Of course, sir.
Q: Now, the contaminated honey is imported, right?
A: Correct.
Q: So if I buy honey that says "Canada" on the label, then I won't get Nitrofurans in my honey, right?
A: No, I'm afraid that's not correct.
Q: Huh?
A: If you buy honey labeled "Canada No. 1" it most likely is blended with honey from other countries.
Q: How can anyone get away with calling honey from other countries "Canada No. 1"?
A: Well, it is like the "USDA Grade A" label in that country just to the South of us. It is an assurance that the honey meets certain quality standards.
Q: But shouldn't "quality" at least imply uncontaminated honey?
A: We're trying, sir.
Q: Yes, you're very trying.
A: Thank you, sir... I think.
Q: But wait a moment – I read that Canada produces TONS of honey, more than most other countries, right?
A: Yes, Canada is one of the largest producers of honey in the entire world.
Q: So why would anyone IMPORT honey into Canada?
A: Because Canada exports most of its honey, to places like the U.S.
Q: Where is it all labeled "USDA Grade A"?
A: Exactly.
Q: So if I want to be sure I am buying Canadian honey...
A: Yes sir, you should mail-order it from the U.S.

Kids 'N Bees

Putting Pizzazz In Your Presentations

Kim **Lehman**

This is the last of our series on presenting programs for children about honey bees. The other parts included organizing events, hands-on activities, and presenting to groups. Children love seeing beekeeping paraphernalia, and products of the hive. But why stop there? Here are a few other ideas to add a bit of pizzazz to any program.

Often I incorporate multimedia, live music and theatrical elements to my programs. But most of us don't become involved in auditorium style and size presentations so here are many simple-to-implement ideas for you to use.

Take Home Give Aways

When possible, supply children with something to take home. In this way they have a reminder about the day. Often an item will stimulate conversation with the child's parent or caregiver Some possible give aways include a bee stamp for the back of their hands, honey sticks, stickers, a bee bookmark, bracelet, a coloring sheet or coloring book. You can find rubber stamps in hobby or specialty stores. The easiest way to stamp a roomful of children quickly is to have everyone put a hand on top of their head and stamp the back of their hand as they leave the room. Honey sticks are quick and easy to distribute. Let the children know that you have a honey stick for each of them. Teachers often prefer to keep the honey sticks until it's time for the children to go home. If you have the time and inclination, a little card attached to the honey stick with fun facts about honey and your contact information provides an extra touch. You may even generate some business from it. Bee stickers are always a hit and can be found many places including teacher supply houses. I've made my own bookmarks and bee bracelets by using a computer graphics program or original artwork printed on cardstock paper. Coloring sheets are easy to produce and hand out. Coloring books can be purchased from Dadant and Sons at 217-847-3324at or Pyramid Publishing at 262-752-0184.

Costumes, Clothes and Accessories

Your physical appearance is your first impression. When I walk into a school there is no question about who I am or what I am there for No introduction is needed. The secretary takes one look at my black and yellow stripes and points me in the direction I need to go.

So, what to wear? Anything with bees on it or that brings honey bees to mind will do. Let's start from the top. A hat is always on my head. I trade my usual beret in for a hat with eyes or a flower cap. The easiest and least expensive accessory is to make antenna. Simply take a piece of fun foam (hobby stores carry it) and make a loop to fit your head. Next fasten chenille sticks so they stick straight up in the air This is also a great craft for the children to make. You can also find antennae at a party supply store.

For the more ambitious, begin with an old hat. It could be a baseball gimme hat or a hat with a brim. Heat up the hot glue gun and fasten plastic flowers all over it. It can become a part of your presentation illustrating the work of nature in that flowers need bees and bees need flowers. You can even use a bee puppet to make the point come to life.

Of course the easiest addition is to purchase a bee hat which is ready to go. Little Daydreamers makes one of my favorite bee hats. You can find this hat at the Giant Steps website at http://www.giantstepsbooks.com/hats/anichats.html.

A bee suit is always an attention getter You can either wear the suit when you enter the school or put the suit on as part of a transformation during your presentation. I always wear a yellow and black striped sweater or shirt. It is not a common fashion so thrift stores are my biggest supplier. If I am working with someone else or have a volunteer I will share my shirts

KIDS 'N BEES ... Cont. From Pg. 19

to add a bit of fun and drama.

Now what about the feet? Children have a fascination with shoes. Go figure. I make a point to delight the children with some kind of zany shoes. While preparing a pollination activity I went crazy covering pieces of clothing with flowers. A hat, a tie, a belt and last but not least a pair of shoes. I took an old pair of tennis shoes and went at it. One teacher recently saw these shoes and decided she needed a pair of her own. I never thought of myself as beginning a fashion trend but I suppose there is a first time for everything!

Puppets

I always have my eyes peeled for puppets. I find puppets at thrift stores, yard sales, toy stores and a variety of retail shops. The company, "Folkmanis," has a great bee hand puppet and a small bee finger puppet. They do not sell puppets directly but if you go to their website at www.folkmanis.com you can find contact information for different retailers. Of course you can always try your hand at making your own puppet. Take a yellow and black striped sock. Get out the glue gun again. Add white organza wings, chenille antennas, button eyes and you're set!

Fingerplays and Poems

A fingerplay is a poem with hand and finger actions. These little gems can add a level of participation with the younger audiences. Poems can add a little touch of whimsy for any age.

Here is a Beehive (traditional)

Here is a beehive. *(Hand in fist)*
Where are the bees?

Hidden away where nobody sees.
Soon they'll come creeping out of their hive.
1, 2, 3, 4, 5 *(Open fingers as you count)*
Buzz, Buzz, Buzz.

(Make a bee hand puppet to go with this fingerplay by taking a work glove and attaching chenille bees to each finger with a hot glue gun.)

A Traditional Rhyme

A swarm of bees in May
Is worth a load of hay.
A swarm of bees in June
Is worth a silver spoon
A swarm of bees in July
Is not worth a fly.

Busy Bee

I'm busy, busy, busy, said the bee,
The children are coming home for tea.
It will take me hours and hours
to visit all these flowers,
I'm busy, busy, busy, said the bee.

Bee on My Nose

What do you suppose,
A bee sat on my nose!

And then what do you think.
She said with just one wink!

I do beg your pardon,
I thought you were the garden.

Songs

I use songs and music in all the different programs I present. Music is magical. Unfortunately, I haven't found very many songs about bees that really grab me. I've made up a few songs by changing the words to well known traditional tunes. It's fun! Try it for yourself. Maybe one of these days I'll write some longer, more complex tunes to teach children about bees. It's just another project on my list of things to do.

Here is an easy song you can use. Have the children point to their pretend bee body parts.

Head, Thorax, Abdomen

(Sing to the tune: Head, Shoulders, Knees and Toes!)

To hear an instrumental version of this song go to www.niehs.nih.gov/kids/lyrics/headsh.htm

Head, thorax, abdomen, abdomen.
Head, thorax, abdomen, abdomen.
6 legs, 2 wings, and an exoskeleton.
Head, thorax, abdomen, abdomen.

Head, thorax, abdomen, abdomen.
Head, thorax, abdomen, abdomen.
Compound eyes, proboscis, antennae.
Head, thorax, abdomen, abdomen!

The kids always enjoy having something to take home with them.

Tongue Twister

Make up your own tongue twisters or have the children make one up. You may want to use a tongue twister to open your presentation or as a way to interact with students before your presentation. Here are two examples:

Busy buzzing bees buzzing busily.

Fun flying friends frolic from the flowers.

Bee Riddles

Riddles can be used as a great ice breaker in a group situation. Children in fourth and fifth grade are particularly interested in riddles. I've had children write and illustrate their own riddles about bees. It is amazing what some kids can come up with. Here are a few riddles to tickle your funnybone.

What is the quietest bee?
The mumble bee.

How does the queen bee fix her hair?
With a honeycomb.

How do bees get to school?
They take the buzz.

What do you get if you cross two bees with a water pistol?
A bee-bee gun.

Why do bees hum?
They don't know the words.

What do bees use Cheerios for?
Hula hoops.

How does a bee clean up spilled pollen?
With a bloom and dust pan.

What goes "buzz-a-choo, buzz-a-choo, buzz-a-choo?
A bee with a cold.

Where did Noah keep his bees?
In the ark hives

More bee riddles:
ag.arizona.edu/pubs/insects/ahb/act30.html

Videos

There are two videos for children about honey bees that I would recommend both for content and production quality. The first one is a Reading Rainbow Video called "Life Cycle of the Honeybee" geared for preschool to early elementary ages. It is 30 minutes long so if you decide to use it as part of a presentation, I would suggest showing the captivating Busy Bee Rap Song, which tells the story of honey bees making honey. Other topics covered in this video include opening a hive in a bee yard, extracting honey, how bees pollinate flowers, how a new beehive is started, and how important the queen bee is to a well-organized hive.

For more information on how to order this tape contact:

GPN Educational Media
Phone: 1-800-228-4630
Fax: 1-800-306-2330.
Web site: http://gnp.unl.edu/
Address: P.O. 80669, Lincoln, Nebraska, 68501.

The National Honey Board recently produced a video and teacher's guide for elementary grades four through six entitled "The Honey Files: A Bee's Life." This 20-minute video takes the viewer inside a beehive to learn more about bees and honey. Fun facts are woven into the four parts of this video covering pollination, bee behavior and beekeeping. A downloadable version of the teacher's guide, video clips, and games can be found on the Honey Files website below.

For more information on how to order this tape contact:

National Honey Board
Phone: 303-776-2337 or 800-553-7162
E-mail: info@nhb.org
Website: www.honey.com

Posters

There are a number of beautiful posters that could be used as part of your presentation or as a resource for educators. Many different beekeeping supply houses carry them. My favorites include:

"The Beekeeper's Year"
"Life Cycle of the Honeybee"
"Products of the Hive"
"The Life of the Honeybee"

In Conclusion

I am fortunate to have had people in my life share the love of nature with me. Now I seek to instill that same awe and appreciation of nature in others – especially children, the keepers of this earth.

It is rare that you actually hear about the influences you have made on young minds. I have had the good fortune of talking to teachers, parents or children who have been inspired by a bee program. A mother who was trying desperately to help her troubled teenager contacted me. Her son still talked about his interest in bees after coming to a program I presented years earlier When he needed something fulfilling in his life, he turned to his fascination with bees. Another time a very involved teacher sent a picture a child had drawn months after visiting her school. The girl thought of the bees and wanted to draw a bee picture as a gift!

Learning is exciting. By adding a few extra touches to your presentations you give children memories no one can ever take away. You may never know the impact you are making by taking the time to share the wonders and joys of honey bees with children. Rest assured your influence is greater than you can ever imagine. Keep up the good work. BC

Kim Lehman has been a bee steward for 15 years. As a university-trained teacher with over 25 years experience working with children, Kim now works as a children's performer and educator. Contact information: kim.lehman@sbcglobal.net, 512-627-0113 or P.O. Box 2743, Austin, TX 78768.

Photos were taken by Mark Wieland

Environmental Effects On VARROA POPULATIONS

J W **Harris** J D **Villa** R G **Danka**

Introduction

Almost all beekeepers rely on acaricides such as Apistan® (fluvalinate) or CheckMite™ (coumaphos) to control *Varroa* mites in colonies of honey bees. Most apply chemicals in the early Spring before the main honey flow or in the Autumn after harvesting the honey crop to avoid contamination of honey. Although acaricides initially provide adequate control of *Varroa* mites, beekeepers should refrain from regimented and indiscriminate use of chemicals in their colonies because chronic use of an acaricide over time leads to the development of acaricide-resistant mites. Some populations of *Varroa* mites in the U.S. are now resistant to fluvalinate, coumaphos or amitraz (Elzen et al. 1998, Elzen et al. 1999, Elzen and Westervelt 2002) Acaricides may also contaminate wax and honey (Wallner 1999).

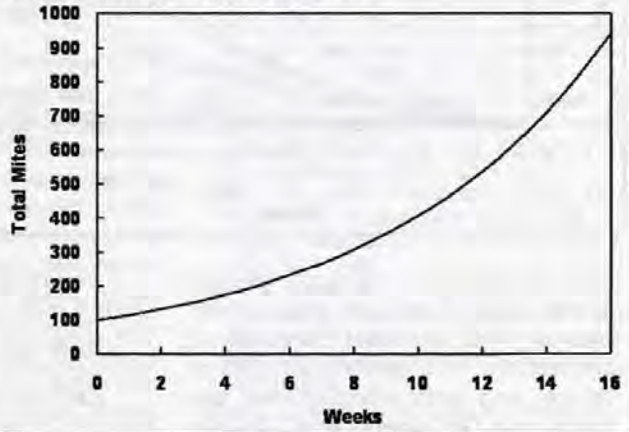
Use of non-chemical controls for *Varroa* mites circumvents or delays the problems of acaricide-resistant mites and chemical residues in wax and honey. Non-chemical controls for *Varroa* mites include use of *Varroa* -resistant honey bees, mite trapping by removal of capped drone brood, screened floors, and sticky traps. These techniques are important components of integrated pest management (IPM). IPM for a beekeeper begins with an understanding that absolute control of *Varroa* mite populations is probably unattainable. Honey bees tolerate low-level infestations without significant economic loss to the beekeeper. Beekeepers practicing IPM manage *Varroa* mite populations with non-chemical methods that slow mite population growth and increase the time to reach a critical or economic threshold when acaricides are needed. The economic threshold is the maximum population of *Varroa* mites below which does not significantly harm a colony, and growth of the mite population beyond the threshold likely results in significant injury to the bees and economic loss to the beekeeper (Delaplane and Hood 1999).

Two important features of IPM are (1) sampling colonies of honey bees to estimate the size of the *Varroa* mite populations, and (2) projecting how large the population of *Varroa* mites will likely grow from the point of sampling to the end of the brood-rearing season. This article summarizes information about growth of *Varroa* mite populations over a 10-year period in Louisiana that we recently published in a scientific journal (Harris et al., 2003). We showed that growth of mite populations varied significantly among years during 1993-2002. The lowest growth rates occurred during periods of hot and dry weather. Beekeepers may have saved treatment costs by monitoring mite populations and not treating colonies during these years.

Growth of Varroa Mite Populations

Populations of *Varroa* mites grow exponentially, at least in the early stages of infestation. A population grows exponentially when its increase is proportional to what is already there. For example, the mite population in a colony of bees can grow from 10 mites to 23 mites during six weeks in Louisiana. If the same colony had begun with 100 mites, the resulting mite population would be 232 mites after six weeks. Similarly, if the colony had begun with 500 mites, the total mite population would be 1,158 mites after six weeks. Although the final mite populations differ in these three scenarios, the growth rate of the mite populations is the same in all three cases.

Figure 1 – A typical growth curve for Varroa *mite populations during Spring-Summer in Baton Rouge, LA (initial mite population = 100 mites). The curve represents the same exponential growth rate (r=0.140 week^{-1}) that was calculated for the three case scenarios given in the text.*



The growth rate is the net difference between the average birth and death rates for a population. The birth and death rates for *Varroa* mites are probably relatively constant if the host colony of bees is strong and healthy and brood-rearing continues without breaks during the beekeeping season. The birth rate is determined by (a) the average number of mature daughters per mother mite per unit time, and (b) the average percentage of female mites that successfully reproduce per unit time. The death rate includes separate mortality rates per unit time for adult female mites when they live in brood cells and when they live on adult bees.

Various factors influence the birth and death rates for *Varroa* mites. *Varroa* mites only reproduce in capped brood cells; hence, the birth rate is zero during periods when colonies do not raise brood. Birth rates are higher for mites that reproduce in drone cells than for

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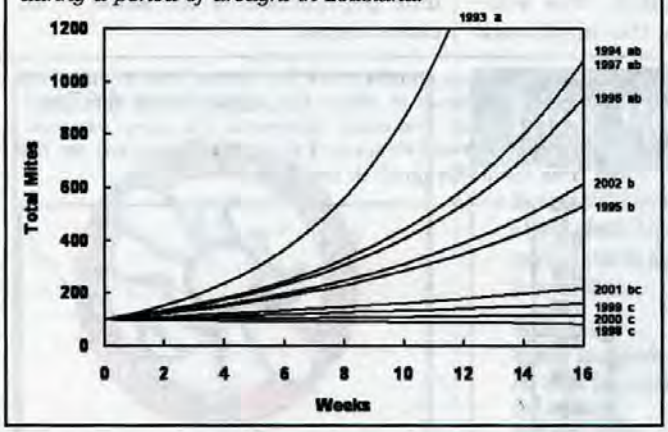
those in worker cells. The reason is that the capped period for drones (14.5 days) is two days longer than the capped period of workers (12.5 days). The longer capped period of drones permits one or two more daughter mites to mature in drone cells when compared to worker cells. Hygienic cleaning of infested brood cells interrupts mite reproduction and increases mortality of immature and perhaps mature mites, and both effects lower the birth rate (Wilkinson et al. 2001). Death rates could be increased by grooming behavior of honey bees that bite and kill *Varroa* mites, but most European races of honey bees do not show effective grooming rates (Wilkinson et al. 2001). Environmental factors also influence the birth and death rates for *Varroa* mites (see below).

Figure 2 – Growth of Varroa *mite populations over a 10-year period (standardized to an initial mite population = 100 mites). Years with the same letter(s) are not statistically different (a = 0.05). The three lowest growth rates (1998-2000) occurred during a period of drought in Lousiana.*



In a typical year in Louisiana, mite populations increase seven to 10-fold in 16 weeks when bees are actively rearing brood (Fig 1). The slope of this growth curve is the exponential growth rate (r). Steep curves reflect high growth rates, while shallow curves indicate low growth rates. A growth rate is negative if the death rate exceeds the birth rate. Growth rates can be measured by estimating populations of *Varroa* mites at least two different times during the beekeeping season. The following equation, made famous by Thomas Malthus in 1798, can be used to estimate the exponential growth rate (r) of *Varroa* mite populations:

$$\textbf{(final mite population) = (initial mite population)} \cdot e^{rt}$$

where r is the growth rate, t is duration of the period (weeks), and e is the base of the natural logarithm (e = 2.71828). The mite populations from any of the previous scenarios can be used as an example of estimating a growth rate (r). The growth rate in the third case would be calculated by rearranging the equation, taking the natural logarithm of both sides and solving for r:

r = [natural log (1,158 mites ÷ 500 mites)] ÷ 6 weeks

r = 0.140 per week

Exponential growth rates for *Varroa* mites have been reported in the range of r = 0.108 - 0.236 per week (Harris et al., 2003).

Estimation of the exponential growth rate (r) can be a useful method for predicting mite populations. However, no population of animals grows exponentially for an indefinite period. If left unchecked, most populations reach a point where increased competition for resources (e.g. food and shelter) and stresses related to overcrowding reduce the average birth rate or increase the average death rate (or both). Thus, the exponential growth equation cannot adequately predict the growth of *Varroa* mite populations for long periods (e.g. 1-2 years). However, it provides reasonable approximations for the growth of mite populations from a few hundred to a few thousand mites over a 4-6 month period during the active brood rearing seasons.

Growth Rates for *Varroa* Mites in Louisiana

We monitored populations of *Varroa* mites in 11-29 colonies of bees in short field trials during each year of the study (1993-2002). Queens used in all tests were purchased or donated from 40 different sources. None of the queens had been bred for resistance to *Varroa* mites. Starting with mite populations of < 900 mites and allowing growth for short periods kept mite populations low enough that the exponential growth equation provided reasonable approximations of the growth rate. We used combs with only worker-sized cells and did not permit colonies to raise drones. Restricting mite reproduction to worker cells simplified the estimate of growth rates because we did not need to measure separate rates for mites reproducing in worker and drone cells.

Uniform colonies with ca. 1 kilogram of bees were established in each apiary in late Spring (April - June) by subdividing a large package of bees (65-70 lbs) (Harbo and Harris 1999, see also http://msa.ars.usda.gov/la/btn/hbb/jwh/SMRD/SMRD.htm). All colonies in a test were located in one apiary, and one to three tests were conducted each year. Estimates of initial and final mite populations and the growth rate were made for a total of 194 colonies during the study. Each estimate of the total mite population was the sum of the numbers of mites living in capped worker brood and mites on adult bees. The growth rates were averaged over each year, and the average growth rates were statistically different among some years (Fig 2). The highest growth rate occurred in 1993, which was the first full season in which *Varroa* mites were known in Baton Rouge. The lowest growth rates occurred 1998-2001.

The growth of mite populations were not significantly correlated to growth of the bee population during the test, capped brood area measured at the end of a test, or to the duration of the test, which varied from 9 to 19 weeks. Extremely low growth rates for *Varroa* mites were related to weather conditions. A significant drought occurred in 1998-2000, which coincided with the years having the lowest growth rates. We examined various climate variables (temperature, relative humidity and rainfall) for each day during an experiment to see if any variable correlated to the growth rate. The average growth rates for *Varroa* mites were not correlated to average daily rainfall during the test periods.

Growth rates were correlated to ambient temperature and relative humidity. For example, growth rates were lowest during years with more hot days during experiments. A hot day was defined as one with the maximum ambient air temperature > 35 °C (95 °F). Each of the three years with the lowest growth rates had 30-40 % hot days during experiments. The highest growth rates occurred during 5 years in which only 0-10 % of the days in field trials were hot days. Because hotter days tend to have lower water vapor content in the air, low growth rates for *Varroa* mites were correlated to lower average relative humidities.

We suspect that the average birth or death rates for populations of *Varroa* mites were affected by temperature and relative humidity. Perhaps honey bees could not thermoregulate their nests properly during the drought, allowing the broodnest to become warmer and less humid than normal. We cannot be sure because we did not monitor environmental conditions within the broodnest. Other studies report effects of temperature and relative humidity on the birth and death rates for *Varroa* mites inside brood cells kept under controlled conditions. The percentage of *Varroa* mites that successfully reproduce is reduced at temperatures higher than the typical broodnest temperature for honey bees (Le Conte et al. 1990, Kraus et al. 1998). *Varroa* mites stop reproducing if the relative humidity is held below 40% RH or above 80% RH (Le Conte et al. 1990, Kraus and Velthuis 1997). Adult and immature *Varroa* mites begin to die if the broodnest temperature exceeds 38°C (Le Conte et al. 1990). The effects of temperature and relative humidity on reproduction and mortality of *Varroa* mites probably relate to desiccation (water loss) of *Varroa* mites under different conditions (Bruce et al. 1997).

What does variable growth of *Varroa* mite populations mean for beekeepers?

The important conclusion is that environmental factors influenced the growth of *Varroa* mite populations. Growth rates for *Varroa* mites may differ between months within the same season, years in which the weather conditions dramatically depart from the normal climate conditions, or even between colonies when some in the same apiary are placed in full sun exposure and others are in total shade. There may be many situations in which growth rates are so low that chemical treatments are not needed to control mite populations.

Find A Sampling Method Find A Threshold *Sample, Sample, Sample*

We encourage all beekeepers to sample their colonies and use non-chemical control methods against *Varroa* mites. A good starting point would be to choose one sampling method and use a threshold population that has been determined for a region with a climate similar to where the beekeeper lives. If no such benchmark is available, consider using the economic threshold determined for the southeastern U.S. by Delaplane and Hood (1999). They suggest that colonies with 25,000 - 34,000 bees need to be treated if the mite population reaches 3,172 4,261 mites by August in Georgia and surrounding areas. If colonies have mite populations well below this level in August, they do not need to be treated until the following Spring. For more information, Goodwin and Eaton (2001) provide an extensive guide for beekeepers that describes various methods used to sample colonies for *Varroa* mites and guidelines for making decisions of when to treat colonies with acaricides.

Conclusion

In this article, we summarized information about the growth of *Varroa* mite populations over a 10-year period in Louisiana. Growth of *Varroa* mite populations was greatly influenced by weather conditions. There were three to four years during the decade in which the growth rate for *Varroa* mites was slow enough that damaging population levels were probably never reached during the Spring-Summer months (assuming that mite populations in the Spring were low and only worker brood was available to the mites). Excessive cost and exposure of colonies to acaricides could have been avoided in those years if beekeepers had monitored the actual pest population and treated only when necessary. BC

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Who Is Siring Your Queens?

. . . and are they any good?

Sue **Cobey**

Who is siring your queens? Are the drones mature, in sufficient numbers and of desirable lineage? Too often the drones are given too little emphasis. The credit for colony performance is largely given to the queen, whether this is outstanding or unacceptable.

Just the name we call them, drones, indicates a lack of appreciation. Though limited to a single function, to mate with the queen, the role of drones is an essential one. How many and with whom the queen mates largely influences her longevity and the colony characteristics.

Geneticist Dr Harry Laidlaw best described drones as "flying gametes." Tom Glenn of Glenn Apiaries referred to them as "studs." I respectfully follow this trend and call them "sires." In the act of mating, honey bee sires lose their lives in fulfillment of the destiny to pass on their genes.

Have you ever watched these "studs" preparing for their anticipated flights? They remind you of young men getting ready for a first prom date. Collecting at the entrance before flight, they engage in intensive grooming behavior; cleaning their eyes and antenna with their front legs. Upon exit, their loud clumsy buzz fills the air.

Following numerous flyways to distinct congregating areas, 10,000 to 25,000 drones from 200 to 300 colonies compete for the opportunity to mate with a queen. This is an impressive genetic resource. The queen will take one to three mating flights over a period of several days and mate with 10 to 20 drones.

If you locate a drone congregating area, this is almost like standing among a swarm in flight. In their mating frenzy, comets of drones will form and chase small objects, even a stone thrown in the air While attracted to queen pheromones, drones also use visual cues and any queen-size object in flight seems to warrant attention.

During the small window of time in the early life of a queen, weather and timing are critical. In need of mates, she must find sufficient numbers of drones with sufficient semen loads to fill her spermatheca. If she does not mate well, she cannot maintain a populous colony and will be replaced, either by the bees or the beekeeper

Rearing a large population of healthy, mature drones from select stocks is becoming more difficult. Infestations of parasitic mites, miticide treatments and chemical residues stress colonies. Under stressed conditions, drones are the first to be sacrificed, their brood is cannibalized and adult drones are expelled or disappear Evidence suggests a reduction in the sperm counts of drones is also occurring.

A colony may appear to be supporting a good population of drones, yet this may not be the case. When stressed, it is the older, mature drones that are expelled and disappear During these stressful times, colonies will continue to rear drone brood. This strategy provides some future assurance that their genes will be passed on to future generations.

The rate of attrition among drones is normally high in a colony. From egg to adult an estimated 50% survive to adulthood. Attrition continues as they begin flight, and this can be high dependent upon the climate and colony conditions. Many factors influence the rearing and maturing of drones, as well as the regulation of their numbers throughout the season.

During peak season, a colony will generally care for about 2000 drones, though half of these will probably be immature. Of 100 virgins queen seeking mates, up to 2000 mature drones are required for mating. To assure congregating areas are well supplied, six or seven times this number are recommended. Therefore, you should supply 12 to 14 drone mother colonies.

The partial eversion of the drone endophallus. The contraction of the abdomen and the yellowish-orange color of the horn like structures, the cornua, indicate the drone is mature. At this stage the eversion must be completed.

In recent issues of *Bee Culture*, Larry Connor discussed the topic of drones. Here again I emphasize their importance and encourage beekeepers to more closely observe and care for these essential members of the hive. A first step in this process is to observe their number and test their maturity.

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EVERSION OF THE ENDOPHALLUS

A simple field test will help to determine the maturity and quality of drones. Choose drones that are returning from flight, as generally these are mature. Drones picked from inside the colony are too often immature and will be messy, as they often defecate during the eversion process. If it is necessary to pick them from inside the colony, only choose drones from the outer storage combs, not the brood combs. Older drones tend to be on the honey and pollen frames.

Choose a warm, sunny, low-wind day to practice this technique. Drone flight is inhibited by cool, overcast or windy weather Note what time of day flight occurs, as this will change with the conditions and season. During Spring they tend to fly earlier in the day As the ambient temperature rises, flight will occur later.

The partial eversion of the drone endophallus. The soft abdomen and lack of color of the cornua indicate the drone is immature.

For example, during my early Spring conditions in Ohio drones tend to start flying about 11 a.m. As the season progresses flight begins later in the day. In the heat and high humidity of Summer drone flight will not begin until 4 or 5 PM. In California's dry Summer heat, flight would begin an hour or two later than this.

To easily catch drones returning from flight, lean excluders over the entrances of several colonies. At peak flight, handfuls of drones are easily caught. To obtain the eversion different levels of stimulation are required, based on their maturity and energy level. Most drones require some stimulation, others will simply evert when handled. Mature drones evert more easily and sometimes explode with the force of the eversion. You will learn to recognize these various situations, as the process becomes routine.

The Partial Eversion

The eversion is a two-step process, the partial eversion and the full eversion. The partial eversion reveals the maturity of the drone. If mature, the abdomen will contract and a pair of yellowish-orange horn like structures, the cornua, will appear

Catch a drone and grasp the head and thorax between the thumb and forefinger Hold the thorax, ventro-dorsally with the belly facing up. Rolling or light squeezes of the thorax and head between your fingers will often induce the partial eversion. Crushing the thorax is also effective to stimulate the partial eversion.

During partial eversion the abdominal muscles will contact. The abdomen becomes hard and the horn like cornua are exposed. This is first step of the process. If the abdomen does not contract or the cornua are clear, lacking color the drone is immature and no semen will be exposed.

The Full Eversion

To expose semen, the second stage of the eversion must be completed. The full eversion is stimulated by contraction of the abdominal muscles. The buildup of pressure and compression of the hemolymph and air sacs force the eversion of the endophallus. This actually turns inside out!

Hold the partially everted drone by the thorax and with the other hand, grasp the base of the dorsal abdomen close to the thorax, with the thumb and forefinger Apply pressure along the sides of the drone's abdomen. Start the pressure at the anterior base of the abdomen and work toward the posterior tip. Squeeze and roll your fingers together and forward in one strong and steady motion, forcing the complete eversion. The endophallus will flip up and semen is exposed.

The semen is a creamy, marbled, "cafe au lait" color This rests on an underlying bed of pearly white mucus. Young drones may have only a thin layer of semen. The semen of older drones is darker and more tightly clumped. With practice you will learn to judge semen loads.

The two steps of the eversion process are preformed within a few seconds. Sometimes just the handling of mature drones will stimulate a full eversion. With practice you will gain proficiency in judging maturity and quality of semen loads. This is a valuable technique for the queen producer Evaluating the quality of honey bee "sires" is good management. A good population of mature drones also indicates colonies are strong and healthy. BC

Sue Cobey is a Queen Breeder, working with the New World Carniolan project, in Columbus, OH.

The full eversion of the drone endophallus with semen exposed. The semen is a creamy, marbled, "cafe au lait" color, resting on an underlying bed of white mucus.

Dancin With The Bees . . . Again

Dewey **Caron**

Imagine walking into the multipurpose room of an elementary/secondary/middle school auditorium to greet 300 students, their teachers and several parents with the express purpose of getting them excited about honey bees. Cliff Sunflower does that four days a week, over 140 times a year, reaching over 60,000 students annually to teach environmental awareness. Cliff does it because it is still fun and he still succeeds in getting *everyone* in the room, even teens and self-conscious parents, to join him in *'Dancin' with the bees.'*

Cliff doesn't talk or lecture to the student assembly – he dominates and conquers it. His energy controls it. The audience willingly joins the "show." You follow his eyes and his darting hands. You jump to his bee sounds, you become enthralled with his commanding presence and his use of props keeps you involved. You laugh, sing, clap your hands and eagerly become part of the drama. Before the hour ends, you and the rest of the students, teachers and parents will be "bees" and "flowers." Along the way you recite the words and learn the basics of bee life with Cliff's prompting.

As the presentation unfolds you learn about keeping honey bees, honey bee social existence, duties of adult bees, the honey bee life cycle and especially about the need to **SAVE THE BEES.** You repeat, at Cliffs urging, the basic words of beekeeping, like Queen, nurse bee, field bee and pollination. This last concept starts simply by students raising their hand when asked to indicate if they like to eat. The kids eagerly respond to the next request asking if they know an adult who likes to eat. The association of bees pollinating flowers thereby producing food for us to eat is then made as we watch Cliff juggle the bee pollinated apple to make his point. He now has 300 new converts thinking about safeguarding the environment so bees are safe and humans have food to eat.

Dancin' with the honey bees is not merely an enjoyable performance by Cliff Sunflower it is clever integration of kinetic movement theory designed to teach youngsters how to think. It works as an assault on all your senses and you learn from participation. It imparts the basics about honey bees and the important environmental message in a meaningful and fun experience. You both enjoy the experience and you learn vitally important environmental concepts. Think what school would be like if this happened every day!

Cliff Sunflower has developed and perfected his participatory *Dancin' with the honey bees* program over the last 27 years. A family man first, he prefers to visit schools convenient to where he lives in Eastern Pennsylvania and his 100+ colony operation; he estimates he has given his program to over a million youngsters. He carries his concept theater technique directly to students but also trains teachers in how to implement this powerful participatory teaching technique through workshops.

I joined Cliff as he brought his program to the Whitaker Center for Science and the Arts in Harrisburg, PA. Cliff did two "shows" to a mixture of youngsters and their parents/guardians. He also set up a booth to sell his honey and beeswax candles at an educational display/sales booth.

Cliff opens the show with his trusty bear. (Hub Wilson photo)

Dress-up is always entertaining. (Hub Wilson photo)

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Soon, he gets people involved in the 'hive' activities. (Hub Wilson photo)

And in the end, kids, parents and teachers all play a role. (Hub Wilson photo)

The performance began with the appearance of Honeybear, a hand puppet bear. It was hard to resist toe tapping to Honeybear's dancing on Cliff's right hand as he plays the harmonica with his left. We next investigated a bee hive. A volunteer became his "beekeeper" – dressed by Cliff in veil, gloves and holding a smoker to see the insides of a "real" beehive. We are teased to stay around to make a pure beeswax candle at the end and to taste real varieties of honey produced by the bees. Cliff cleverly uses the Study Prints, available from bee supply dealers, to "magnify" our view of brood, hairy worker bodies, the queen and the comb structure itself. We participate by repeating the important words at Cliff's urging – Queen, bro-ooo-od, larrr-va, beeswax, and honey.

The main show eventually will use all the audience. A "queen" and her court are gathered before the group. The student volunteer who is the queen goes through the motions of what a queen does (lays eggs of course, by a squat, sideways movement to the next "cell," another squat to lay another, more sideways movement and another squat, etc). Three to five additional volunteer students become queen attendants and are quickly instructed by Cliff to bow into their queen with their finger's raised like antennae from the sides of their head. Thus we have the Queen and her court – repeat after Cliff the queen and her court. On this command the student queen repeats her motions and the attendants attend their queen, distributing the queen pheromone throughout the hive.

Without giving it all away, additional students are recruited to be brood (they have to squat in "cells"), nurse bees are taught to attend brood, funeral bees are identified and must remove a dead worker (student volunteer prone on the floor of course), while guard bees (more students) guard against intruders. After each worker group is created, Cliff reviews (and we join in with their names) each activity while the student actors reenact the appropriate "bee" behavior. Then a large number of field bees are recruited and they must be taught to leave the "hive" and then do bee dancin' when they return. Of course drone bees (my part in the show) are sought but then they do nothing but stand to the side and belch a noise. Those remaining in the audience become "flowers" (they stand waving hands of "pollen") to be visited by the field worker bees. We are closed in total but completely organized disarray with the Pollination and Save the Bees message.

Depending upon the contract Cliff will then have a series of workshops, stations of interest for subsets of the larger audience. Students get to make a candle, taste honey, determine the difference between bees, wasps and hornets, try on beekeeper's equipment, look at an observation bee hive and even make paper hexagons to test their superior strength. Since Cliff is so enthusiastic, the students (and especially teachers and parents it seems) ask Cliff many questions abut bees and their products. He is asked back year after year to the same schools to give the program to a new crop of 1st-8th graders (his preferred age group) and his program is always eagerly awaited from the buzz he created the previous year's visit.

Dancin with the bees is fun while it is educational. What better entertainment for our youngsters! BC

See Cliff Sunflower motivate hundreds of beekeepers – turning them all into hive inhabitants at the 2004 EAS Conference August 9-13 at 7 Springs Resort in Champion, PA.

Check out the Short Course and Conference Programs at www.easternapiculture.org or call Kim at 330.725.6677 ext. 3214 for additional information. Cliff will be Dancin' With The Bees at EAS 2004. Come Join the party.

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BUZZ EXTRA

NO 2 MAY 2004 THE WORLD VIEW OF BEES AND BEEKEEPING

Profit is a four letter word – bees

The first record of man harvesting honey from bees is over 8,000 years old

There are over 25,000 species of bee in the world

This compares with about 9,000 species of bird and 4,000 mammal species.

About 80% of what is on offer in the local food market is there because, at some point in the chain, bees have pollinated a crop.

A bee uses the equivalent of her own body weight in honey as fuel to fly for 6 ½ hours

Bees have travelled the equivalent of three times around the world to produce a single jar of honey

The success or failure of many agricultural crops depends on pollination: bees add billions and billions of dollars to the agro-economy as they pollinate these crops.

Without bees the whole human race could starve to death.

***Apis mellifera* on part of its "round the world" journey to produce a pot of honey**

Thomas Strömberg

Honey bees foraging – only 21 days until a very permenant retirement

What a record of achievement but how many know or appreciate these facts of life?

A bee farmer with just 200 hives can claim to have at least 1 million workers in his organization. And not just any old labour force but an extremely hard working one with no management or union disputes to overcome. Indeed someday when you feel over worked and cannot find time to do all the things in the schedule you may like to consider the life of a worker bee.

For a start it is a short one of about 42 days from hatching. It goes something like this:

Clean cells and hang around, apart from the cleaning bit this is rather like being a student but lasts just 3 days. The next 3 days are spent feeding older larvae and then seven days of feeding young larvae and even the queen.

More demands are made when wax has to be produced, comb built, nectar ripened and pollen stored – five days hard labour but this is only the beginning. There are a further three days of hive duties which include cleaning, guarding the hive entrance and fanning as part of the air conditioning system. This is also useful as it strengthens the wings for the next phase of activities.

The hive bee becomes a field bee and sets out to collect water, pollen, nectar and propolis. This lasts for about 21 days or until the bee drops dead from over work! No day off or weekend break and even though she lives in the realm of a monarch the poor worker does not even have a day off to celebrate the queen's birthday.

EDITORIAL

As it is Spring, going into early Summer, this issue has concentrated on bees and pollination. I apologise to our readers in the Southern Hemisphere and can only hope that as they are harvesting their crops they are enjoying the benefits of successful pollination when it occurred in their Spring.

Thanks to our friends at *Bee Culture* this issue of *The Buzz Extra* is getting wider circulation than usual. Can I say to all those extra readers:

Thank you for your interest. All the items in this newsletter are based on information held at IBRA. We have been in existence for over 55 years and from the very beginning have been pleased to count very large numbers of American and Canadian beekeepers and bee scientists in our ranks. Professor Roger Morse and Dr Hachiro Shiminuki are among our more recent illustrious past Presidents.

We produce three journals every quarter – *Bee World*, *Journal of Apicultural Research*, which is edited by Professor Delaplane of the University of Georgia, and *Apicultural Abstracts*.

The purpose of this newsletter is to keep our supporters informed with interesting snippets and to give a taste of what IBRA does and can offer anyone interested in bees.

If you love your bees and wish more people understood their value to the environment and the economy then help us in our task of spreading that educational information all around the world. Details are on the back page.

Details of our other services and journals can be found on www.ibra.org.uk

Richard Jones
Director.

"Say, this fellow von Frisch really has our number, hasn't he?"

The cartoon is taken from *Bee Culture* April 1957. The IBRA journals library has copies of every issue from the very first in 1873 when the opening page bore this legend:

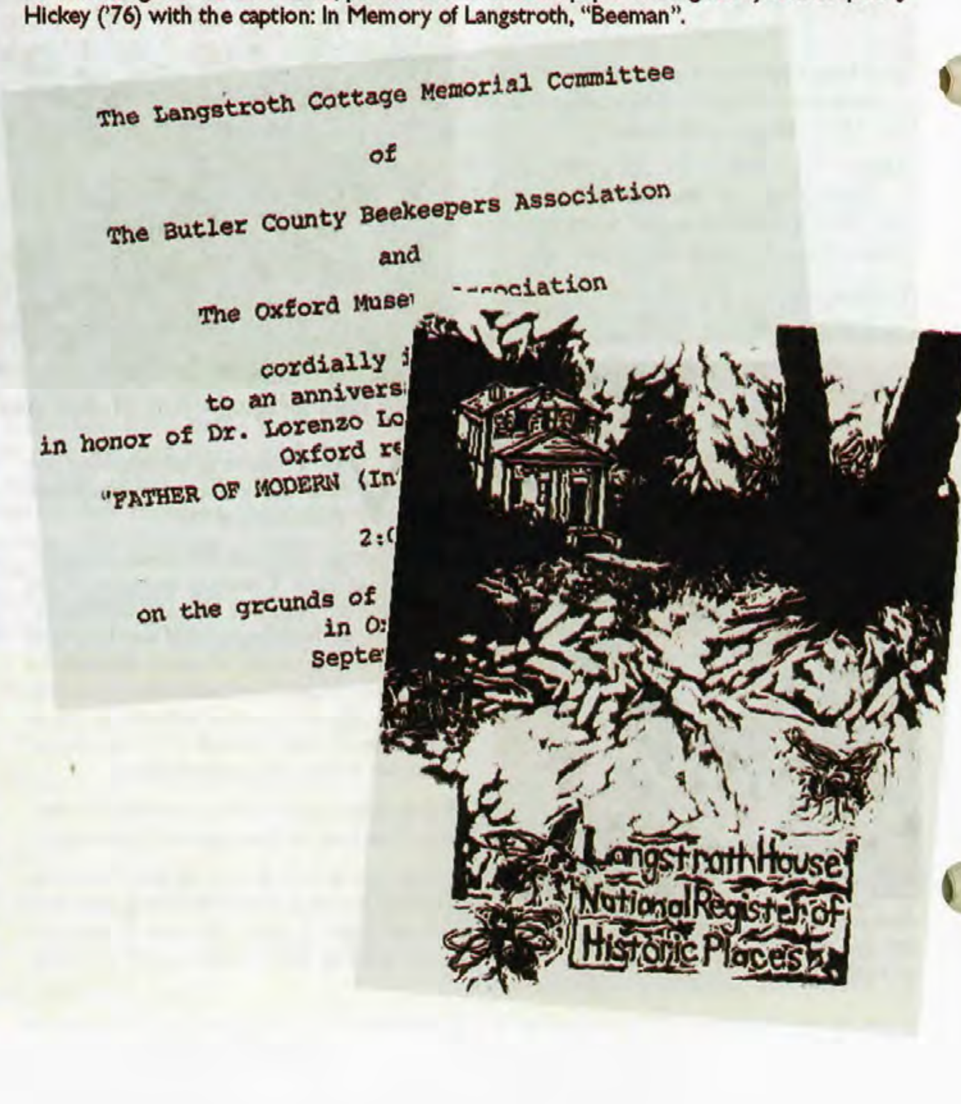
"Novice's Gleanings in Bee Culture or How to Realize the Most Money with the Smallest Expenditure of Capital and Labor in the Care of Bees, Rationally Considered." The library has similar full sets of almost 100 other bee journals from around the world!

Karl Von Frisch (1886 – 1982) was awarded the Nobel Prize in 1973 for his work on the ways in which bees communicate. He was President of IBRA between 1962 and 1964.

● Cartoon caption: "Hey, this fellow von Frisch really has our number, hasn't he?"

From the archives

The IBRA Historical Collection contains a veritable treasury of items and memorabilia from the world of beekeeping. Recently an item, although not particularly old, advertising an anniversary celebration held on September 7 1975 in L L Langstroth's cottage, caught my eye. It was accompanied by this black and white print of the cottage. Obviously a limited edition being numbered 4 of 25, printed on hand made paper and signed by Christopher J Hickey ('76) with the caption: In Memory of Langstroth, "Beeman".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Don't go under the apple tree without a thought for the bee

Bees are recognised as very efficient pollinators because grains of pollen get picked up and later brushed off their hairy bodies as they move about the flowers. Furthermore, bees are consistent and diligent foragers. They will visit hundreds of flowers of the same kind in a single day. Because of this they have a vital role in increasing food production. It has been shown, but is often forgotten, that we depend for a huge percentage of our food production on the unmanaged pollination services of wild bees.

Pollination is essential to the reproduction of many flowering plants and involves the transfer of pollen from the male part of the flower (the anther) to the female part (the stigma). This then results in seeds and to gardeners and farmers seeds mean crops which can be sold and eaten: beans where the seed itself is eaten and fruits like apples and plums which develop around the seed.

In North America one sometimes hears the term "pollen bees" What are they? This inclusive term was coined in 1992, to describe all the bees other than honey bees that help to pollinate our crops and wild flowers. They have also been called "native bees", "wild bees," "other bees" and "non-*Apis* bees. They are valued only for their services as pollinators. Although they do make honey from nectar, they make only a little of it, and it is mixed up with pollen and other substances, such as glandular secretions and plant oils, to make the bee bread used to feed their brood.

Scott Bauer

Blue orchard bee, *Osmia lignaria*

http://www.gardensafari.net/

The Tawny Mining Bee – *Andrena armata* formally known as *fulva*

They are solitary having neither queens nor workers. Each female bee builds a nest by herself, lays eggs, seals the nest, and goes about her business as a hard working single mother dying of old age and hard work before her offspring emerge from their cells. She receives no help from other bees, so there is no colony or "hive" as in honey bees or bumble bees. Although totally independent of one another solitary bees are attracted to similar sites and will choose or construct their tunnels close together in lawns, walls or wood. Rather like strangers living in a densely packed housing estate or apartment block going about similar business each day but living totally independent lives.

Solitary bees are gentle and shy. They have a stinger (actually it is an egg guide), but they use it only when they are in serious danger, as when they are purposely caught in the hand. They do not attack to defend their nest or arouse each other in alarm. Most of these bees are adapted to a cool climate and can fly in chilly, even drizzly weather. Thus, they are often busy pollinating when honey bees remain inside the hive.

Here are two examples of these "other" bees.

Mining Bees – *Andrena* Species

Many solitary bees make their nests in the ground and seal their nests with soil. Not surprisingly these are known as Mining Bees. The Tawny Mining Bee (*Andrena armata*) is about the size of a honey bee but is covered with dense red hairs. It can be seen on lawns and golf courses where the soil is well drained. Tiny mounds of excavated earth show where the female has made a tunnel with several egg chambers or cells. Each cell is lined with a glandular secretion to make it waterproof and then an egg is laid on a ball of pollen. The cell is sealed with a mastic of earth made by the bee.

Mason Bees – *Osmia* Species

The Blue Orchard Bee (*Osmia lignaria*) is a gentle, beneficial insect found throughout North America usually in wooded areas but also around towns and cities. It has many similarities with the Mason bee (*Osmia rufa*) found in Britain and elsewhere.

They are very hard working bees well adapted to a cooler climate and excellent pollinators of many crops especially apples and cherries.

Yet the general public has a confused and often paradoxical view of bees. They see them as nasty stinging beasts to be zapped before they zap you or as gentle, fuzzy creatures whose contented buzz is symbolic of leisurely summer days.

Bees need some PR as their world is under considerable threat. Habitats are being destroyed by large-scale agriculture and the remorseless spread of houses, roads, factories, business parks and so on. The thoughtless use of pesticides and herbicides can have a drastic effect on the lives of these quiet, shy, gentle creatures.

Indeed the life sustaining relationship between certain bee species and their environment is so tenuous that some species are threatened with extinction.

http://www.gardensafari.net/

***Osmia rufa* emerging from nest hole**

This is the publication of the International Bee Research Association. It is made up of original articles and features that are peer reviewed and serves as the link between beekeeping science and beekeeping practice.

It is a truly eye-catching international journal that is both readable and learned. Check it out for yourself with a free down load from our website: www.ibra.org.uk/whatsnewatibra

If you like it why not become a full member of IBRA and receive your 4 copies *Bee World* and 4 copies of the *Buzz Extra* every year? Details are available on our web site.

Apple and honey crumble with honey lemon cheese sauce

Recipe by Jane Jones

Serves 4 to 6.

The filling
5 Medium cooking apples
2.5 cms – 1 inch Fresh ginger finely chopped
1 tblsp Soft brown sugar
1 tblsp honey (the amount is according to taste)
Grated rind and juice of one lemon
Pinch of cinnamon

The crumble
175 gms – 6 ozs – ¾ cup Butter
200gms – 8 ozs – 2 cups Plain flour
75 gms – 3 ozs – ¾ cup Soft brown sugar
50 gms – 2 ozs – ½ cup Oats
1 tblsp Thick honey

The sauce
The grated rind and juice of 3 lemons and the juice of 1 orange
100 gms – 4 ozs – ⅓ cup Honey
50 gms – 2 ozs – ¼ cup Butter
100 gms – 4 ozs – ½ cup Soft cream cheese
2 Eggs – well beaten

The method

Pre heat the oven to Gas Mark 5, 375°F, 190°C.

Peel and chop the apples into small chunks and cook for 10 to 15 minutes until just soft with the juice and rind of the lemon, fresh ginger, sugar, honey and cinnamon. Pour into a greased ovenproof dish.

In a separate bowl rub the butter into the flour and add the sugar and the oats. Sprinkle on top of the apple mixture and dot with blobs of thick honey. Bake until golden brown – approximately 30 minutes.

To make the sauce put the rind and juice of the 3 lemons and the juice of the 1 orange with the beaten eggs, butter, cream cheese and honey into a heatproof bowl. Heat over a pan of simmering water and whisk well until the mixture thickens. Take care not to over heat or the sauce will curdle.

Sarah Owen

Become a Friend of IBRA and receive *Buzz Extra* quarterly

The development work of the International Bee Research Association is funded from the generosity of our members and supporters.

If you'd like to help with that work, you can become a **Friend of IBRA** through a regular annual donation. **Donate more than $10 per year, and you'll receive *Buzz Extra* quarterly as our way of saying thank you.**

Due to overseas mailing costs there is a minimum charge of US$10.

Buzz Extra will be printed in the first week of February, May, August and November.

By becoming a Friend, you'll be helping ensure our vital work throughout the world continues – enabling IBRA to stay at the forefront of bee science and beekeeping.

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Understanding Queen PHEROMONES

New discoveries explain some things, and ask more questions.

Larry **Connor**

New Information On The Queen Retinue Pheromone

What are Pheromones?

To understand queen bees – indeed to understand many beekeeping manipulations – you should have a good working understanding of pheromones produced by bees. Pheromones (Greek *pherein* = to transfer, *hormon* = to excite) are chemicals that are produced by an individual, released into the environment, and cause a change in another individual of the same species. More specifically, they start as liquids produced by specialized cells or glands and enter the environment as liquids or gasses. The excitement they cause in another individual is species specific. In honey bees, pheromones are involved in a complex and diverse array of behaviors: mating, swarming, brood rearing, egg-laying suppression of worker bees, and more.

Pheromone systems are common in many animals, especially in other insect species. They are found in mammals, and proposed human pheromones are linked to sexual attraction and arousal as well as mother-newborn interactions. Of the pheromone systems discovered to date, those present in the honey bee are among the most complex, if not the most complex humans have identified.

Queen Mandibular Pheromone

Information about the queen bee's pheromones is growing and ever-changing, and initially I will concentrate on the pheromones produced by the mandibular glands of the queen. The *queen mandibular pheromone* (QMP) is often called the *queen substance*. The term "queen substance" can be taken back to Dr Colin Butler's proposal of such a substance in 1954, and it's identification in 1961 as the chemical 9-oxo-2-decenoic acid, commonly called 9-ODA. This chemical was isolated from the mandibular glands of queen bees. These glands are connected by a duct that connects to the mandibles of the queen. There are two glands, one for each mandible.

The mandibular gland secretions are not limited to one chemical molecule. In fact, 17 different compounds have been isolated from the mandibular glands that have been shown to provide some level of excitement in other bees. When Dr. Dewey Caron and I prepared his textbook *Honey Bee Biology and Beekeeping* (Wicwas Press 1999), he listed five molecules as the "most important" These five molecules work together, and the removal of any of them cuts the level of 'excitement' by half. The first three molecules are acids, and the last two are aromatic compounds:

9-ODA	9-oxodec-2-onoic acid
9-HDA	cis-9-hydroxydec-2-enoic acid
9-HDA	trans-9-hydroxydec-2-enoic acid
HOB	methyl-p-hydroxybenzoate
HVA	4-hydroxy-3-methoxyphenylethanol

Bees in the retinue lick, feed, clean and attend to the queen.

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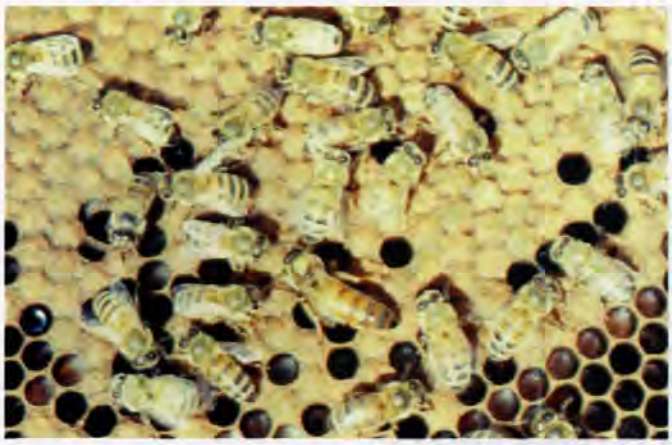

Getting ready to feed the queen.

These molecules, and their role as pheromones, were discovered in a series of research projects conducted since 1961. Importantly, not one of these molecules works alone (no better than the solvent control) but always as part of a blend of pheromones.

Queen Retinue Pheromone

A laying queen honey bee apparently performs two major functions in the colony. Ideally, she will oviposit about 200,000 eggs in worker and drone cells over the year, thus serving as the biological mother of the hive, passing her genes to her daughter workers and queens and to her drone sons. Secondly, she is the producer of pheromones from various glands and cells on her body. These pheromones allow her to perform many of her queenly duties in the colony.

In 2003, a great deal of information was added to our knowledge of queen pheromones in a paper titled *New components of honey bee (*Apis mellifera *L.) queen retinue pheromone* by Christopher Keeling, Keith Slessor, Heather Higo and Mark Winston of Simon Fraser University and published by PNAS. In this paper we transition from the idea of *mandibular* pheromone to *queen retinue* pheromone, which allows other molecules from the queen's body to contribute to the behavior we see in bees that visit the queen, groom her, and receive her pheromone.

Most beekeepers have watched the queen surrounded by her retinue of nurse worker bees. This occurs when the queen is resting from egg laying; during active egg-laying the retinue is non-existent or poorly defined. The bees in the retinue are not the same, but constantly changing. Some bees only make contact with the queen with their antennae. Apparently, enough of the queen pheromone is transmitted by antennal contact that the worker bee can walk through the hive with an excited level of pheromone on her body. By doing this, she lets the rest of the bees biologically "know" – via trace amounts of queen pheromone – that the queen is alive and well in the hive.

Other retinue bees lick the queen (see photo) to obtain pheromone. Other bees feed the queen while others remove her feces. The queen rectum produces pheromone, and pheromone-loaded feces is found in other organisms, (including the naked mole rats of Africa, which have queen moles which control daughters from breeding by using pheromones found in her feces).

An earlier research team at Simon Fraser University had found that the mandibular glands of a mated, laying queen contained a mixture of these amounts of pheromone, and defined this mixture as a *queen equivalent* (Qeq).

Chemical	Amount
9-ODA	~200 micrograms
9-HAD (both forms)	80 micrograms
HOB	20 micrograms
HVA	2 micrograms

A queen secretes one Qeq every 24 hours. She moves the pheromone to other parts of her body by her own self-grooming, and by worker grooming. Virgin queens produce significantly less 9-HAD, HOB and undetectable amounts of HVA; as a result, they are much less attractive to worker bees than mated queens. This provides us with useful information about the relative freedom virgin queens receive until they are mated. However, virgin queens are not completely free of pheromone, and they must be treated as a queen whenever introduced to a colony. In other words, they cannot be dropped into a colony without introduction, in spite of a number of noted authors who have suggested doing this as a means of queen introduction.

The next step in this story is the discovery that different colonies had a genetically controlled variation in their response to QMP The Simon Fraser team found that the variation was not affected by the queen's QMP production, the worker's age, the worker's fostering colony, and the dose used in the bioassay. The researchers realized that anytime you discover a genetic component providing variation in a behavior for a trait, you can select for or away for that trait, and that is what they did. Two strains were developed from a two-way selection technique resulting in colonies with a high QMP response and other colonies with a low QMP response. The difference between these two strains was measured by a factor of nine; the high strains were nine times more excited by the QMP than the low strains when evaluated by the same testing methods.

Because colonies with a low QMP response still treated their queen normally, it was suggested that there were other molecules produced by the queen which added to the queen retinue response by worker bees. After looking at the tergite glands (located between the plates on the top of the queen's abdomen) Keith Slessor and his research team concluded that the pheromonal activity was due to translocated head pheromone and not a pheromone secreted by the tergite gland. This went against the popular opinion that the tergite glands were the source of the remaining pheromonal activity of the queen bee; this is expressed in John Free's summary of bee pheromones (*Pheromones of the Social Bees*, Cornell University Press, 1988), and the work of other researchers.

Keeling et al. then looked for pheromones produced in the head of the queen bee, but not by the mandibular glands. His research is very detailed and I am not going to

repeat his work here (a web-link is listed at the end of the article). It involves the use of pseudoqueens in a bioassay, queens which responded strongly to a queen extract and poorly to synthetic QMP (from PheroTech), analysis of extracts using gas chromatograph, liquid chromatography, dissection of queen and worker bees for the body section containing the greatest retinue activity and analysis of the bee blood (hemolymph) using gas chromatography-mass spectomography.

Although they did not give up their identify easily, Keeling identified four new compounds. None of them worked alone, but always as part of a synergistic interaction with QMP to excite worker bees. The resulting nine chemicals do not combine to provide the same retinue response of queen extract at higher doses, suggesting that there are still additional molecules to locate and identify.

The new molecules are:

Methyl oleate	Methyl (Z)-octadec-9-enoate
Coniferyl alcohol	(E)-3-(hydroxy-3-methoeytphenyl)pproop-2-en-1-ol
Hexadecane-1-ol	
Linolenic acid	(Z9,Z12,Z15)-octadexa-9,12,15-trienoic acid

Keeler et al. successfully selected colonies that had a low response to QMP and a high response to queen extract response. These selected colonies varied in their level of excitement to the new components. "*For example, some colonies could be classified as low or high MO (methyl oleate) responders.*" Other key observations include:

- Mated queens had more methyl oleate than virgin queens, but both had MO throughout their bodies, including the hemolymph (blood)
- Coniferyl alcohol was found in the mandibular glands of mated queens but not virgin queens.
- Coniferyl alcohol was not found earlier because it is very sensitive to light in methanol.
- Hexadecane-1-ol was located in the Dufour's gland and the cephalic labial gland of mated queens. In virgin queens it was found primarily in the abdomen.
- Linolenic acid was found in all three sections of the queen's body, but primarily in the thorax and abdomen.
- Because these pheromones arise from different glands in the queen's body, their production may be influenced by the metabolism of each gland. "*...other glandular components may change significantly when a mated queen begins to fail and starts laying unfertilized eggs. Because the retinue pheromone is used to facilitate the dispersion of other queen signals throughout the colony, changes to the retinue attraction may influence such things as queen rearing, swarming and worker reproduction. Further study of each gland involved is needed to understand its role in the queen.*"
- Queens contained several aliphatic esters previously found on honey bee brood. These brood esters have a profound effect on colony function. "*Thus the queen seems to act in concert with her brood to modulate the behavior and physiology of worker bees, the retinue pheromone, which elicits the workers to lick, antennate, and groom their queen, entices workers to pick up these other control sociochemicals from their queen.*"
- "*During this study, no colony was ever found that had a retinue response significantly higher for QMP than the queen extract, suggesting that queen recognition cues may only increase, and not inhibit, retinue response.*"

Keeling et al. conclude with the following: "*Our study has increased the total number of components known to be involved in retinue attraction to nine, originating from several glandular sources. This is the most complex pheromone system known for a single behavior in any organism and provides an example of the complexity to be expected for pheromone communications in other social insects. Not all of the components involved need to be unique to the queen because synergy and the contextual presentations are critical to elicit a response. This emphasizes the necessity of a bioassay-guided approach to pheromone isolation and identification. QMP should no longer be considered a distinct retinue pheromone but rather a larger portion of a complex queen retinue pheromone. In addition to QMP and the four new components, the queen also possesses compounds that, although not essential for retinue attraction, may be crucial for the control she exerts on her colony.*"

As beekeepers, we cannot help but appreciate the work of the Simon Fraser University researchers as very important effort to increase our ability to replace queens and manage bees in multiple queen systems. Of course, many beekeepers dream of using some yet-discovered pheromone that allows them to coat the queen and drop her into the hive. We are not there yet, and it may never be that easy. But the better beekeepers understand the role of pheromones produced by our queens, the better we will be able to manage colonies using the information available to us today.

Further Reading

This is strong stuff, but I suggest you will greatly increase your beekeeping knowledge if you stick with it. I am not a chemist, but survived organic chemistry in college yet much of this work makes my head spin a bit, just trying to keep everything straight. It helped me to review the information as it was discovered, and I strongly recommend these books, from your local library or your local new/used bee book seller. Please email me at LJConnor@aol.com if you need help finding these publications. BC

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James E. Tew

Bee Culture's Beeyard

Equalizing Colonies

Small hives visited and revisited

I have frequently said during some of my presentations that, "I must feel like a minister" when I write for you. Those of you who honor me by reading my monthly pieces already know that I tend to write what is on my mind rather than a selecting a topic from a previously developed list. As it were, whatever is moving me at the moment seems to become the topic of the month. Not being a minister, I can only suppose that's what ministers do.

Try as I might, this month the subject of assisting, subsidizing, and managing small colonies keeps coming up in my mind. Why am I trying to prevent these extemporaneous thoughts? Because I have addressed them in previous articles[1] to the point of belaboring the point. Yet, I am inspired yet again to pursue the topic but from a different perspective. I'm sorry. I tried.

Small colonies - they will always be with us

While most of my hives have respectable adult bee populations, many of my hives are not at full size. They are, in fact, small. In my earlier article, *In Defense of the Small Hive*, I went to extremes to defend some of my hives being smallish. I still like smaller, albeit productive hives, but what if I have small hives mixed with stronger colonies in my yards? Should accomplished beekeepers allow their colonies to express themselves? Some large. Some small. Some productive. Some not productive – but all in the same yard. Ideally, no, the smaller colony should be evaluated and addressed. An accomplished beekeeper would standardize his/her colonies. In general, more honey is obtained from two good colonies compared to the honey crop from one excellent colony and one small colony. Plus, if it does not grow, the small colony will go into Winter weak with all the inherent wintering survival problems. Finally, it is easier to anticipate equipment needs and management procedures if colonies are equalized. Colonies can be equalized any time they can be safely opened but warmer seasons are best.

Why are some colonies small?

Through many years of bee breeding and selecting, we now have colonies that are actually considerably larger than they would normally be in the wild state. In a contorted way, smaller colonies may actually be more normal than large colonies. Are all people the same height? Obviously not. Then why do we expect all beehives to naturally house populations of the same size? So, some colonies are genetically predetermined to be smaller than others. Depending again on the vagueness of genetics, smaller hives may be as productive as larger hives. True, larger hives would hypothetically gather more nectar, but simply by having more bee mouths to feed, they would also consume more honey. So the answer to the question, "Do larger populations always produce more honey than small populations?" is begged but remains unanswered.

Is the small hive sick?

Evaluate the small hive. Does it appear to be suffering from the effects of a disease or pest? If yes, you can be helpful here by doctoring whatever problem is present. Again, colony genetics should be considered. The colony's queen may have a genetic predisposition toward her offspring being affected by some disease or pest. Not much you can do about that other than requeen and address the problem.

But don't overlook this point – the colony's recovery from a disease or pest will be slow. Many times the entire honey production from the present season will be lost. The colony will spend the current nectar production season convalescing[2]. But if after having a look, you find that there is no

[1] Tew, James E. 2003. *Saving Runty Colonies.* Bee Culture 131(8) pp 43-45 www.beeculture.com/beeculture/months/03aug/03aug3.htm

Tew. James E. 2003. *In Defense of the Small-Sized Hive,* Bee Culture 131(12) pp 59-61www.beeculture.com/beeculture/months/03dec/03dec5.htm

[2] For more information on diseases and pests, read Dr. N. Calderone's discussion of brood diseases at: www.beeculture.com/beeculture/months/01may/01may3.html and look at a discussion of I did on mites at: www.beeculture.com/beeculture/months/01sep/01sep3.htm

obvious disease or pest present, blame the queen – the beekeeper's universal remedy.

Requeen, Requeen, Requeen

My current opinion is very nearly completely changed from what it was in years past. In many previous articles I have defended marginal queens – hoping that things would improve. Additionally, newer beekeepers may be intimidated when attempting to supplant a failing queen with another "Get over it" has recently become my present opinion. I and countless other authors have addressed the subject of queen failure and replacement. For instance, re-read *101 Reasons a Queen Gets Replaced*[3]. I routinely tell audiences that I am tender-hearted. I don't like killing a queen for anything but the very best reasons. But routine queen replacement should be the norm. *"Don't waste either your time or the colony's time with a marginal or failing queen."* So, in my imaginary yard, I have a strong colony positioned by a smaller colony – a smaller colony that is apparently disease-free. What to do?

Dramatically equalizing two colonies – one small, one large

Very importantly, be patient. A profound equalization can take several trips before the task is completed. If you requeen, transfer brood and adult bees and exchange hive positions at one time, so much change will be going on at once that too much confusion may result. Be patient.

I suspect the queen in the smaller hive should be retired. In fact, while you are buying queens, should you proceed with requeening the larger hive, also? Probably. I am much more comfortable now with annual requeening than I was just a few years ago when the general recommendation was to requeen every two years. You will need to give yourself and your queen producer time to get the replacement queens to you. It will probably take a couple of weeks, during the warm season, to get the replacement queens. It's true. While you wait, the season is passing, but little can be done about that. Once you have received the new queens, proceed with the requeening process.

Which colony could use some help?

In a perfect bee world, the nectar flow is still ongoing. Any hive manipulation is simpler during a nectar flow. However if there is no flow, expect more colony defensiveness and watch for robbing.

Your options

The common procedures for colony equalization are: (1) moving capped and/or uncapped brood, (2) moving adult bees, (3) transferring frames of honey, and (4) exchanging colony positions. All are imprecise and will require you to use your best guesses.

Moving brood

Everything is a variable – the time of the year, nectar flow on or off, how many hives are in the yard, your ability, how dry it is, how many bees are flying – everything is a variable. Use your beekeeping experience. If you must absolutely guess, then guess conservatively. There's no other way to gain experience.

Open brood Early in the season, you would not want to overload the smaller colony with uncapped brood. Such brood will need feeding and incubating. So something like eight frames of open brood would overwhelm two frames of adult bees in a cool climate in early May In a warmer climate, you and your colony could get away with a heavier open brood shift – but still not eight frames. More like two – three frames. Remember – be patient.

Capped brood Capped brood is more forgiving. It has already been fully fed and much of the incubation requirement is past. In May most truly cool nights have passed, but if you give too many frames of capped (or open for that matter) brood and the colony pulls back into a cluster, brood may die from exposure to cool temperatures. Again, I'll bet that something like one three frames will be about right.

Adult bees Adult bees can be shaken from brood frames into the smaller hive. Watch for several things. Don't accidentally shake the queen from the stronger colony into the smaller unit. Since you may damage developing larvae, don't harshly bounce the brood frames on other woodenware. Just give the frame a good shake just above the smaller colony. Realize too that many of the shaken adult bees will soon return to the parent colony so shake more than is necessary. Finally, if you are concerned about the safety of the queen in the smaller hive, recage her for a day or so until things have settled back down.

Continued on Next Page

[3]www.beeculture.com/beeculture/months/97feb/97feb5.htm

My brother's equalized yard in Tennessee.

Strictly for the sake of discussion

Due to the number of variables, I will make up a hypothetical situation between a large hive and a small one, two hives that I intend to equalize. The larger hive has a queen of unknown age, 10 frames of brood, 17 frames of adult bees and 10 frames of capped honey. My make-believe smaller hive has a queen that is producing a spotty pattern, two frames of brood – some capped and some uncapped, three frames of honey and seven frames of adult bees. It is about 30% of the size of the larger hive. The brood nest area of both hives is two deeps.

First, in the smaller hive, I replace the queen with a new queen and wait until I see eggs. That's my cue that the new queen has been accepted by the bees in the smaller hive. This may take about two weeks tops. Due to the trauma I am about to cause the larger hive, I decide NOT to replace the queen in the larger unit at this time, but I make a mental note that she should be replaced yet this season. I smoke both colonies meaningfully and open both units up. I look at both hives for a perspective of how each is doing. It is late May, but I still have a nectar flow underway. It's just after lunch on a nice day and bees are freely flying. I remove the (imaginary) two supers from the parent colony and set them aside. I pull the center three frames (yes, I should have taken the frames from the side first, but I am a beekeeper in a hurry.) and look for the queen but I do not see her In order not to have the queen jump frames, as I "look" at these three frames, I temporarily set them in an empty deep that I brought along for this purpose. My smaller hive is not really using the top deep so for the present, I set it to one side. It is essentially empty except for about 500 bees strolling about looking bored. The three frames I pulled out of the larger colony were all capped brood. I take two of them and put them beside the brood nest of the smaller colony but I leave one space open in the center I check for my new queen on the three empty frames I remove from the smaller hive. She's not there, but I commonly see eggs in other brood frames so I feel pretty good about her future. Since these frames from the small hive are essentially empty, I set them aside. I return to the larger colony and search for a frame of uncapped brood which I reposition pretty much in the center of the smaller hive. So far, in the smaller hive, I have replaced the queen and given the colony two frames of capped brood and a single frame of uncapped brood in addition to the original two spotty frames of brood. I consolidate the brood nest in the center of both hives and put the three empty frames from the smaller hive into the larger hive at the edge. I have checked the smaller hive for diseases like American foulbrood and found none. A quick glance at the frames I was transferring to the smaller hive were also disease-free. I considered moving some frames of honey but a nectar flow is on so I don't sense that the smaller colony will need it.

I brought along two ratchet straps and I reassemble both hives (minus the honey supers for the present) and ratchet-strap them individually I grunt and groan – using the straps as handles – and switch positions of the hives so the larger hive is now where the smaller hive was sitting and vise versa. Bees are flying everywhere. Since I have a nectar flow underway and the bees are not particularly aggressive, I elect not to recage my new queen. I have been occasionally smoking both hives and have seen no indications of bees fighting. For precautions, I put entrance reducers in both hives and now, after the moving is finished, I put the two honey supers back on the larger hive and the empty deep back on the smaller hive and reassemble the hives. In this new position, the smaller hive has been given a new queen, three frames of brood, and the field force from the larger hive. The larger hive got nothing out of the deal but three empty frames.

A week later I return on yet another nice day when bees are flying. I look at both hives and remove the entrance reducers. Both colonies are queen-right, but as I expected, the larger hive is still somewhat larger The nectar flow is waning. I remove three frames of either capped or uncapped brood – checking all frames for the queens – and once again bump up the brood population of the smaller hive by giving it three frames of brood. As before, the larger hive gets three empty frames. This time, I don't reposition the hives nor do I transfer adult bees. By now, my second queen has arrived and I proceed to requeen the larger hive. I remember to be patient. While I and my two colonies have made good progress and both are now similar in size, they are still not twins. I decide to wait until after the Summer dearth to see how well the smaller unit responds. I can check my second requeening project in about two weeks.

I got a bit of a honey crop from both hives, but at this point, I am

not certain that it is surplus honey. If all does not go well during the fall flow, I will need to leave them that honey for wintering purposes. I have essentially spent much of the Spring and Summer equalizing these two colonies.

From start to finish, this entire episode has been fictional, but I hope it gives you an idea of the decision-making process and the hurdles to be faced by the two colonies and you.

Package bees and small swarms – a variation

It's not a big jump to envision a package of bees or a small swarm being the smaller hive in the fictional episode above. A package colony can be subsidized from a larger hive in exactly the same way – except easier – the queen does not need replacing. Nearly on a different subject, if you install multiple packages at the same time, you can expect some package colonies to acquire more bees than others as disoriented bees fly around looking for a home. It is not uncommon to return to the yard a few days later and equalize package strength among the new colonies.

Swarms can be equalized in the same manner as described above. The swarm queen will be suspect and should be replaced as soon as the colony has stabilized. Normally, colonies initiated from swarms develop quickly, but if you feel it is necessary, a swarm colony can be given help also.

Minimally equalizing two colonies

Once the colonies are similar and queens are comparable, simple brood frame transfers are normally enough to approximate equalization. However, rarely (never?) will all the colonies in your yard be clones of each other As I said earlier, everything varies. Something as mundane as where a particular hive is positioned is important. It is commonly known in beekeeping that colonies on the ends of rows pick up forager bees from colonies in the center of the row. Who knows why some colonies thrive while others languish when all are being exposed to the same resources?

The cold truth

I rarely go to much effort to equalize colonies that are *mostly* similar Put yourself in the real yard. In the real bee world, there are not two colonies but say, for example, there are 20. Which colonies become the standard? Do you equalize hive #3 with hive #12 or #7 with #9? A more traditional approach would be to mentally evaluate colonies, determine the disease and queen status of small colonies, and make general changes in brood sharing. It's always relative.

Additionally, all this brood sharing recommendation assumes that you, the beekeeper, are proficient at American foulbrood recognition. A topic for a future article, I must say that beekeepers are the primary way diseases are spread. So after having written nearly 2600 words, I now tell you that doing the right thing – equalizing – can sometimes be the wrong thing.

Speaking of small colonies, do you remember?

For those of you who have read some of my past articles, do you remember the 35 nucleus colonies that came back to me from caged pollination studies late last Autumn? I wrote about experimentally feeding them commercial fondant to see, if by some miracle, they could survive the Winter I told you, upfront, that my chances for success were very slim. Results? As was predicted, the project was a disaster All but five were dead by the last day of Winter. I suppose I was happy that all were not dead, but wait. After surviving a dreadful Winter on essentially no food in a desperately small cluster, the last five died after spring officially arrived. Five nearly made it. That hurt. What can I say? I tried.

I learned a lot about feeding fondant. But I spent nearly $200 and had many hours of uncomfortable, cold work dinking with them. Literally, it was a dead loss. If I had it all to do again, in my Northeastern Ohio climate, I would combine the nucleus colonies into about five colonies, feed these larger colonies and then try to keep the surplus caged queens alive in my lab (where I would be much more comfortable). Feeding small colonies in a cold climate was not worth the effort. Anyone surprised? My generalized year-round recommendation – equalize small colonies with larger ones. There is no merit in weak colonies at any time of the year.

The fondant caper

But the fondant caper worked reasonably well and could be used for bee feed anytime during the year. I quickly learned that it was a pain to cut cold fondant in the field. Jason Ferrell, my student helper worked out a procedure of heating 1# chunks of fondant in a microwave oven on disposable dinner plates until it flowed smooth and flat. It only took a few seconds. It quickly cooled and solidified into manageable disks. D. Sausser from Delaware also feeds fondant. He wrote to tell me that he put fondant in plastic bags (shirt bags) and used a cement block to press the patties to a thickness of ½ inch. He cut the plastic bag on the bottom side to allow bees access. The upper layer of plastic prevented the fondant cake from drying and prevented the fondant from sticking to the inner cover All in all, if I must feed bees, I like this stuff. BC

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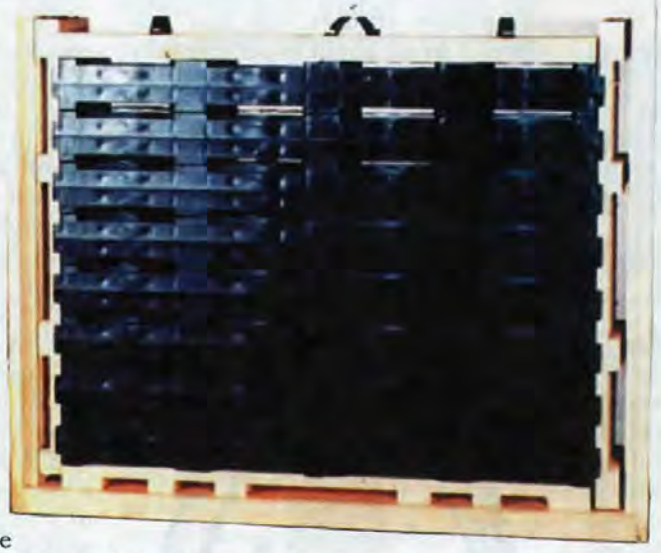
ROUND COMB VENTILATION

Lloyd **Spear**

You need all that wood for better ventilation

One of the questions I receive most often is "Why do Ross Rounds supers have all the extra wood inside them?" The answer, like most matters dealing with production of comb honey, has to do with matching equipment to the natural instinct of honey bees.

To successfully produce comb honey, a beekeeper needs to understand and adapt to the natural instincts of honey bees. While everyone will get lucky (from time to time) with a season and honey flow, only those who are careful observers of honey bees will be successful at producing comb honey almost every year Instead of having a failure in years of drought or excessive rain, those who take the time to really understand their bees will still produce comb honey, albeit less than they will produce in a normal or very good year Careful observers know that honey bees require good ventilation in their brood nest and their supers.



All beekeepers who have put a package or a swarm of bees into a hive with nothing but frames and foundation have observed that the bees first make cells on the foundation in the center of the hive and only move outwards when the center frames of foundation are well drawn into cells. Moreover, the first cells drawn on the center frames are in the middle, and the last cells drawn are along the ends toward the front and back of the hive. Studies have shown that the bees want to maintain a good air flow around all four sides of their brood and honey/pollen storage area. Since drawn cells will inhibit that flow, foundation in these areas are the last to be drawn. When bees are drawing foundation to use as a brood area, if we have frames with drawn cells we put them along the outside, next to the sides of the hive, and we put foundation toward the center of the hive. When we are hiving a package or swarm on frames with only foundation, the bees first draw the center frames. We then take those and put them along the outside of the hive, moving more frames with foundation into the center where the bees will quickly draw them. These practices are necessary because the bees' instinct is to not produce cells on combs next to the outside of the hive to leave plenty of room for air circulation.

During the 1800s *most* of the honey produced in the U.S. was in wood section boxes and almost all beekeepers had low yields as bees did not want to complete the cells in the boxes near the outside four walls of the hive or in the box corners. Sections against one of the four walls of a hive often had few cells filled and capped.These sections would not be saleable and were only good for seconds or home use. Of course, this meant that the yield of first class, saleable sections from supers was often relatively low.

During the early 1900s, one of the greatest comb honey producers of all time, Carl Killion, recognized that honey bees did not fill the sections against the four walls of the hive because building cells in these areas would decrease air circulation. Recognizing the need to respect the bees' need for ventilation, he made an innovation that significantly increased production

of good comb sections. Simply, he created an inner wall on the inside walls of the hive. The space between this inner wall and the outside wall of the hive provided the air circulation the bees wanted. Thus, the bees readily filled the adjacent sections, greatly improving the yield from each super More than 50 years later, this innovation would well serve Ross Rounds.

During the early 1950s a hobbyist beekeeper in Michigan invented the first practical round sections. In concept, these were far superior to the square wood sections. One of the principal reasons was because the bees did not like to fill the corners of the square or rectangle wood sections (because there are no right angles in nature?) while they readily filled every cell in the round sections. However, there were still difficulties with getting a good yield from supers. As originally designed, a super was capable of holding nine frames, each of which was capable of producing four sections. Thus, it was theoretically possible to obtain 36 sections from a super However, it was rare to get more than 24 of those that were first class. This yield of 66% was wholly unsatisfactory.

At one time, there were four manufacturers of round comb section equipment and one of the latest entries into the market was Tom Ross, a hobbyist beekeeper from Ohio. Tom was correctly convinced that one day round sections would almost wholly replace the wood square sections, and that he, unlike his competitors, could successfully market the equipment. One of his early triumphs came in the mid-1970s when he sent a set of equipment to Eugene (Gene) Killion, son of the famous Carl Killion.

Gene quickly realized why the yield was so low. As designed, the frames for the round sections took up all the space in the super, leaving little room for the required ventilation. The bees would not draw out the combs adjacent to the sides of the super because if they did, ventilation would be reduced to an unacceptable level. Gene proceeded to make the same changes his father had made to the supers for wood sections. He dropped one frame (going from nine to eight) and setup fences (or inner boards) along the ends of the hive. Although the total number of potential sections in a super decreased from 36 to 32, the actual number of first class sections produced went from 24 or fewer to 28 or 29!

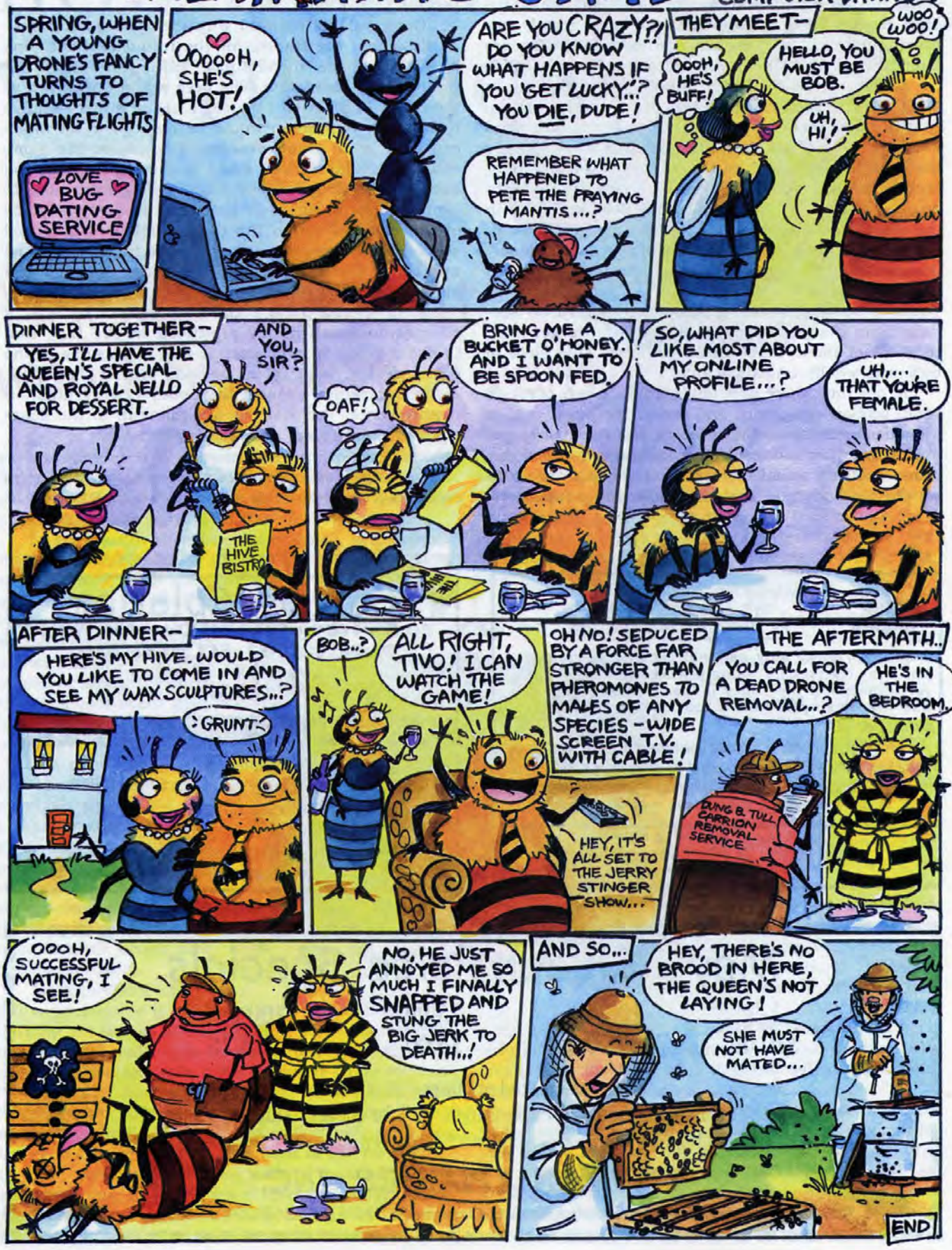
Ross Rounds today account for better than 90% of all section comb honey produced in the U.S. and Canada. While a large part of this is because of the round design, a significant reason is that the equipment is designed to meet the honey bees' ventilation requirements. For that, we are thankful to the acute observations of Carl and Gene Killion. BC

Lloyd Spear is a sideline beekeeper who produces round comb honey each season. He owns and operates Ross Rounds.

LADC'04

THE ~~D~~MATING GAME

WHAT IF QUEENS AND DRONES TRIED COMPUTER DATING?



CRABAPPLE

Without bees, there's no apples. And other things are missing, too

Chuck **Norton**

It is midwinter here in the Piedmont of the Carolinas, just past Groundhog Day. Winter this year seems to have brought more cold and snow than normal. It's been very cold since the end of December, and snow has been on the shaded ground for over three weeks now with no promise of leaving. The other day my wife said to me, "Honey, I've noticed that the crabapple tree has had a whole lot more berries on it lately" She called them "berries"; they are too small to be called apples; and because she is from Japan, I smile at the unique way of her English. The rusty red and brown mottled fruit indeed covers the tree. Little snowbirds, cardinals, blue jays, and the ever-territorial mockingbird all visit the tree and dine upon its bounty of fruit in the safety of its thick array of branches.

I thought about the birds. I thought about how much I enjoyed seeing them flutter about, and hop from branch to branch looking with a keen eye for just the right berry to pluck from the tree. It fascinates my curiosity and wonder to see them eat so much of the sour fruit. Sometimes two or three cardinals can be found upon its branches, when covered with snow and bright sunlight the scarlet red of the males instantly catches your eye while the rusty reds and maroon browns of the females and juveniles blend in with the apples and branches. Often the mockingbird swoops down upon a guest to reclaim territory lost. Sometimes the neighbor's cat will wait under the boxwoods that surround the front porch, lying on its big fat belly, silently, looking up, waiting.

About two days later while bringing foundation from storage into my office to warm, it hit me. It hit me right on top of the forehead; my wife was really talking about my bees!

Indeed, my bees were responsible for the prodigious amount of crabapples on that tree, six hives in the backyard; but like many husbands, it took me even a longer while to understand what she really meant.

When we moved to the city in the Fall a little over nine years ago I decided to keep my "backyard" bees in one of the outyards about 20 miles away as I was concerned about having them in town. However, by April while making splits, having missed watching my bees on a daily basis as they went about their busy business I brought a split to town to see just how things would work out. This was a way to let the hive grow, and for me to observe the effects that it had on the neighborhood. Soon I had another split sitting side by side facing south with the rear facing a six foot high dog eared fence about four feet away, just enough room for me to work the hives from the rear Everything was fine, for a while.

Five years went by and during this time, my honey bees paid no bother to any of the neighbors or the woman who came by to read the electric meter for the power company 20 feet away and almost directly in front of the hives. The only person who they would bother was my wife; they loved to fly directly into that beautiful head of shiny black oriental hair About three years ago at the end of May; I was in a very bad automobile accident and during my recovery, both hives had swarmed leaving queen cells with virgin queens, which hatched and later mated with local drones. It was at least three months until I had healed enough that I could work my hives by myself. A great beekeeper friend of mine pulled supers of Spring honey from all my yards, helped me extract, and then put on my sourwood supers in time to catch the flow. The hives on strawberry pollination were not moved until Fall; but they all got worked. Of all my hives I think that only those two next to my neighbor's fence had swarmed. I took pride in having all my hives kept with gentle bees from queens purchased down in Georgia. I also mark my queens to the color of the year I noticed that these two hives had new queens; and much more noticeable was the temperament of the hives, as time went by they went from aggressive to nasty. By mid-September, it took a good smoking and only the slowest of motion to avoid a cloud of honey bees attacking as I gently lifted off the inner cover. A whiff of my breath brought on even more clouds of bees and the sounds of them striking my plastic helmet was like popping popcorn on a Winter's eve. These hives needed requeening badly. It was late September and most sources of queens had sold out or it was too cold to ship. Even if I requeened, these hives would not change their disposition until next Spring after all the workers borne from the queens disposed by new had died.

Then the strangest thing happened early one Saturday morning in mid-October, bees started flying around my head as I worked in my yard and they did it

Continued on Next Page

in a manner that showed that they were aggravated. I was clear on the other side of the house; out of sight of the hives. I knew then that I had a serious problem. I went straight to the house to put on the veil, suit and light the smoker My wife was going out the door to her car on her Saturday morning trip to the flea market as I went in; they popped her hair! They popped her good! I checked out the hives and could find no signs of any varmint visiting during the night; but the bees were literally all over me trying to sting me through my heavy cotton work suit. I had only smoked the hives, my hive tool still in my pocket. Much to my dismay, I heard young voices over on the other side of the fence and then there was quiet except for the sound of angry bees in the air. My neighbor's little girls had been outside in their backyard for just a few minutes but now had gone back inside. All was quiet for a while, but I did notice a whole lot of honey bees flying, buzzing, and searching around the house and yard. Must be robbing going on, I thought, must be robbing.

My wife was back home when I went in for lunch; she was upset. Before she could say anything, I heard the little girls next-door shriek and cry "mommy the bees are chasing me." These girls had the fairest of skin and hair the color of dandelions and daisies; the bees were after them just as they were earlier after my wife and me. I was now faced with the reality of two hives of mean nasty bees and I knew that they had to be moved that night! I went to my neighbor who was planting trees on the north side of his home and apologized. They too, over 150 feet away and separated by a fence and their two story home from the hives were being buzzed by one of my bees. I felt horrible and I was afraid that more harm than a neighbor being stung might come to me. This looked like it could be one of the worst days of my life. I assured my neighbor that the bees would soon be gone and gave a twenty-dollar bill to pay for their supper and inconvenience. Then in the still of twilight I closed up the hives, drove in staples, and strapped the tops to the bottomboards and everything in between down tight. Lifting the hives heavy for Winter was hard on my mending body; but they were my responsibility and I hoisted them over to the tailgate of my old truck and pushed them forward. That night they were gone.

Next Spring those two hives from the house were still hard as nails to work; but they were great producers; they gave me over110 pounds of Spring honey each. After the honeyflow was over I requeened them and nothing exciting has ever happened about them since.

The Spring that the bees were gone left the crabapple barren of fruit for the next Winter; no honey bees for pollination, no fruit. It was as simple as that. The other apple trees in the yard suffered as well leaving set very little fruit and, what did make was stolen by the squirrels.

The next Summer in the cool of an early morning my bees quietly returned, grown from splits with year old queens taken from hives of a different outyard. I had worked those hives the previous year and that Spring and early Summer as well. The workers in those two hives were as gentle as butterflies and I knew well that here would be no further problems with rouge bees so long as I was able to work them and provide queens bred for gentleness and productivity.

I was stronger now and my body had mended as much as possible; my neighbor and I mended as well. After a long talk, he understood gentleness in honey bees was a genetic trait; and he knew in his heart that I never wanted any harm to come to him or his family. My wife was not excited about the return of my hives; but she knew that it was as much a part of me as was anything. A year went by without incidence; even my wife with her raven hair was not bothered as she went about her business in the two backyard gardens. Then Spring came with a prolific bloom on all the fruit trees and flowers around the neighborhood. My bees cooperated by heavily pollinating the crabapple tree filling it with fruit for the birds and squirrels to Winter on. Two hives turned into four hives and two nucs. Despite a year with only 12 percent yields on Spring honey and no sourwood at all there were two full Illinois supers full of city honey in each hive. And, several times during Summer I was able to coax her into donning hat and veil and following me to a hive where I had found something exciting to share with her We had applesauce frozen in the freezer for the first time since I planted the Lodi and had grafted a Yellow Transparent scion from a tree my grandfather planted onto a standing red delicious. Yes, my wife was talking about the bees that day when she said that she noticed a lot more berries on the crabapple tree lately; she was also saying that she accepts them living here in our backyard, and she is grateful for all that they bring. I am too. BC

Chuck Norton keeps bees and apple trees in Reidsville, North Carolina.

CATCHING

Darin **Kerr**

To bee or not to bee? Like many beekeepers I got my start by catching a swarm, and after catching that first swarm I was hooked. Many of the swarms I have caught over the years have been just out of reach,

hanging from branches eight to 12 feet off the ground, even though the trees they are in are much taller.

Usually I'm ill prepared when I find a swarm and depend on imaginative tactics to retrieve it, like climbing the tree with a brood box clenched between my teeth then trying to shake the swarm with one hand, holding the brood box in the other while squeezing the tree trunk between my knees. This lust for swarms could kill a guy!

I've always been intrigued by the inventive nature and creativity of beekeepers and the many commercial devices available to aid in retrieving a swarm. I have noticed over the years how attracted a swarm is to the brood comb in an empty hive box and that once a few bees start to settle in, the rest of the swarm usually follows.

While changing a light bulb in the vaulted ceiling at my office I got an idea bout how to retrieve those out of reach swarms. Perhaps I have reinvented the wheel but I have not seen anything like it before and I'd like to share this idea. It's simple, inexpensive and takes little room to transport and store.

Take a carpenter's clamp, one that looks like a giant clothes pin, and securely attach it to an extension rod, like one used to change light bulbs, with duct tape. Then place a frame of brood comb securely in the clamp and lift this up to the swarm. Allow the bees to crawl onto the frame. If necessary use a gentle sweeping motion through the bottom portion of the swarm to dislodge them from each other, thus encouraging them to crawl onto the honey comb.

As you slowly lower the frame to place it into the hive body waiting on the ground, a stream of bees will follow from the swarm above. Continue this process with several more frames of brood comb until some of the swarm is retrieved. Make sure the frame is securely attached with the clamp so you don't have a frame full of bees slipping out of the clamp and landing on your head.

After you have several frames of bees in the hive the rest will usually settle in if you leave the top ajar.

I hope you find the simple, unpatented "Doc's Swarm Retriever" helpful. Mine paid for itself this past Spring allowing us to successfully hive 20 of the 26 swarms we found. Remember, not all swarms will stay in your boxes. Some will take off for parts unknown the minute you start to work with them. May all the swarms you catch find a happy home in your hives. To bee or not to bee? There really isn't any question. To bee! BC

Dr. Darin Kerr catches all his swarms near his home in Driggs, ID.

SWARMS

Peter **Sieling**

Lester Spink, a local dairy farmer, called. Lester hates telephones. Nothing less than finding a two headed duckling or news of a nuclear attack can get Lester to use the phone. Indeed, his voice was an octave higher than usual.

"Pete, there's a huge swarm of bees in our maple tree."

I asked the usual questions. The size – they might fit in a five gallon bucket or bushel basket, but bring a second, just in case. Height – seven or eight feet from the ground. Yes, he was sure they were honey bees rather than a nest of hornets. It sounded like they'd be worth snatching.

Nancy looked up as I hung up the phone. "Was that Lester? Did he find a two headed duck or something?"

"He's got a big swarm in front of his house."

"I suppose you'll take the forty foot extension ladder and a quart jar to put the bees in."

"Aw, don't be such a cynic. Lester knows about bees. He's had a colony in his house for decades."

Lester invited me over several years earlier to advise him on removing bees from his house. When I explained how I could fasten a wire mesh cone to their entrance and attract them into a hive, he felt that would take too long. He was painting the house and expected to do that side in a few weeks. He decided to handle it himself. He has been spraying various agricultural pesticides into the entrance every year since.

The bees not only survived but swarmed into a second colony on the same wall. They apparently mutated into a super pesticide and mite resistant strain. I bet I could breed them and sell the stock to the Ohio State entomology department.

I loaded the van with swarm catching gear and drove over to the Spink's. Lester had a scaffold more or less permanently parked in his yard. He had been painting the house as long as the bees had lived there. In his spare time, it took so long to finish the rambling old farmhouse that the first side was peeling and faded by the time he made it once around. He was just preparing to paint the side with the colonies.

As I pulled into his driveway, he was wheeling the scaffold under the tree. I looked up into the foliage. There was a little cluster of honey bees about 20 feet up.

"Is there another swarm up there?" I asked.

"I think the rest must of gone back into the house. I just emptied a can of Raid into the hole."

I climbed to the top of the scaffold with the funnel and a swarm box, wishing I'd brought a quart jar and the extension ladder The metal scaffold supported ancient knotty pine boards that groaned as I teetered on the topmost plank. I reached up and grabbed the tip of the swarm branch, pulled it down to eye height and shook the tiny swarm into the box. I carried it to the ground and watched as stragglers gathered on the screen. The next morning I picked up the box and took it home.

This experience reminded me that beekeepers and non-beekeepers use language differently When responding to a swarm call, beekeepers should understand what non-beekeepers are really saying. To that end, I've prepared a non-beekeeper/beekeeper lexicon. Keep this handy list by your phone during the swarm season and refer to it as the caller describes a swarm:

When a non-beekeeper says...	He really means...
Bees	A large group of insects that includes flies, beetles, wasps, hornets and yellow jackets.
Honey bees	This more precise term is restricted to stinging insects such as yellow jackets, hornets, bumblebees and rarely, honey bees.
Swarm or "bunch of bees"	any group of 6 or more insects
Size of swarms:	
Football sized	the size of a peach
Basketball sized	the size of a soft ball
Beach ball sized	the size of a melon
Height:	
3 or 4 feet high	8-9 feet high
6 or 8 feet high	12-16 feet high
10 or 12 feet high	over 50 feet high
Position of swarm:	
On the side of a house, just over head height	They've already moved into the house, usually in the peak
On the main trunk of a pine tree	They have been living in the tree for three years. This is the first time anyone noticed.
Hanging on the end of a thin drooping limb low to the ground	Clustered around the trunk inside Aunt Luella's prize winning azalea
Ladders:	
"You can use my step ladder."	"I have a wooden step ladder lying in the weeds behind the garage. At least it was there five or ten years ago."
"You'll need a step ladder."	"You'll need a forty foot extension ladder. You'll have to lean it against a one inch diameter branch."
"I have a swarm of bees. Are they worth anything to you? How about $40 or $50?"	These bees are in the peak of the caller's roof behind the chimney and will cost the beekeeper about one week of his time, the cost of a professional contractor to replace the siding, two days in the hospital setting the leg, and physical therapy after the cast is removed. The colony has foulbrood.

Peter Sieling avoids swarm calls from his home in Bath, NY.

CITY BEEKEEPING

Before you begin, do your homework. Here's some good tips.

Dana **Oliver**

Even living in the city, you can indulge your favorite pastime of raising honeybees. The main things you need are a good relationship with your neighbors, an understanding of the local regulations, and a place to keep your hives. You don't necessarily have to keep the hives on your own property; bees' efficiency as pollinators make them welcome tenants in all but the most densely populated parts of town.

Bee Neighborly

The mechanics of keeping bees in the city are the same as raising them in the country, but the presence of the hive is a much more sensitive issue in urban areas. The worst thing you could possibly do is march out to your unfenced backyard, set up the hive in the middle with no screening, and wait for your neighbors to ask what the heck is going on.

Start by talking with them about your plans long before you set up your first hive body. Explain about your hives and bring them some honey once in a while to thank them for their tolerance. Knowing and being on good terms with your neighbors is more important than a good knowledge of bees, although both will be necessary to successfully keep your colonies going.

Be discreet with your bees and keep them under control. You might want to consider some shielding shrubbery or setting the hive beside or behind a shed where it is out of the way and not visible to people passing on the street. Also, watch carefully for swarms leaving your hives. Even very tolerant neighbors will not appreciate a large clump of stinging insects directly above their barbecue grill! And they won't appreciate bees in their swimming pools, either, so make sure you keep a source of water close by the hive. An inexpensive birdbath not only provides water, but enhances the yard décor All that's really needed, though, is any container with shallow, sloping sides to allow the bees access to the water, while not forcing them into it and wetting their wings. Don't neglect the water source though. If it goes dry, your bees will find another source.

However many hives you keep in your yard, be prepared to move them around within your yard, create additional screening, or even temporarily move them off-site if your neighbors are bothered. Even though it may be perfectly legal to keep bees in your yard under local regulations, every city has laws which forbid maintaining a nuisance (broadly defined usually as anything that will disturb your neighbors or affect the general public). Then, too, city politicians live for the chance to "solve" a "problem" by making it go away – for everybody One very dissatisfied neighbor with constant complaints can trigger a city councilman to push an ordinance banning beekeeping within the city.

A Place to Call Home

You need to decide exactly where would be the best home for your new hive. This may or may not be in your own backyard – there may be subdivision restrictions, a lack of space, or not enough flowering plants in the area to properly support your hive.

Most people think of a city as being nothing but apartment buildings, office complexes, and pavement, but nothing could be farther from the truth. Outside of the dense city center, urban sprawl has given rise to large subdivisions with sizable backyards. Many of these homeowners keep a backyard garden or extensive landscaping and already know the advantages to having a hive nearby, thus presenting lots of opportunities for boarding your bees to the mutual benefit of you and the hive host. It has been noted in the past that the more upscale the area, the more favorable the residents are to bees being kept in the vicinity, because they are generally well-educated and knowledgeable about the ecological importance of bees. Look to these areas first for an accepting host.

Keeping a hive away from your house may seem to defeat the purpose, but caring for a hive that is only 10 minutes away will be much easier than driving an hour each way to reach your bees. And one that is 10 minutes away in the city is still a different proposition from one whose nearest neighbor is a

half mile away.

First and best choice to find a separate home for your bees is to cast around among your friends and acquaintances for an avid gardener willing to host your hive. Knowing your hive host or hostess will make the whole process go a lot easier, as it will still be pretty important for the host to speak to his neighbors about the hive in his yard. All the same rules apply, or even more so, for the bees to get along with the neighbors and not cause trouble for either you or your hive host. Don't forget the honey at Christmas for them, too!

For no extra expense you can make your host feel like a real part of the action. Bring along an extra bee suit when you set up the hive. When you get to the point of placing the bees into the hive, let your host or hostess suit up and stand right there with you to observe the process! Not only will they get the thrill of a lifetime, but you'll find them much more tolerant of your bees and their foibles in the future. If you can arrange for a picture to be taken of them in the bee suit as well, it will be invaluable public relations in the days to come.

If you don't know anyone willing to host your colony, or would prefer to rent out your bees' services for some return on your investment, you might need to advertise the services of your bees. Be sure to specify an area that is not too far from your house to make maintenance easier An alternative to advertising would be to hunt up some likely-looking households and offer your services by printing up some fliers or by contacting them directly You might also contact your county agent or state Department of Agriculture; several of these agencies maintain lists and try to match up willing farmers with beekeepers. Through this route, however, you will have less control over the location of your host; most of these farmers will be larger landowners farther out from the city.

Regs, Regs, and More Regs ...

Most states have regulations regarding honey bee maintenance. Some are quite prescriptive, such as Arkansas, which requires that all persons owning or leasing any hives register the location of each hive with the state; the state also regulates how close hives belonging to one person may be placed to hives belonging to others. Other states are less restrictive, like New Jersey, which only requires registration of beeyards who overwinter bees and conducts a voluntary inspection service when requested by hive owners. Most states have strong restrictions on bringing bees or beekeeping equipment into the state from outside. Louisiana strictly forbids this for anyone who is not a resident, banning migratory beekeepers totally.

Counties within the state often have their own regulations, and cities, too, may get into the act. And don't forget individual subdivision restrictions. There's a veritable maze of regulations out there!

If you already have colonies set up in various areas outside of the city, you are probably already quite familiar with the regulations for your state, and possibly your county. If your hive sites are in a different county, however, you will have to research the county as well as city and local restrictions. If you do not have any other hives, you will need to become familiar with all the regulations from the state down. Note that there are no federal regulations of keeping bees, only on handling honey for sale to the public. Regulations on actually keeping the bees are handled at the state level through each state's Department of Agriculture.

Begin your search by contacting the county agent's office and the state Department of Agriculture. These agencies will have the state and county apiary regulations, and possibly the city regs for the larger cities in the area, or can guide you to their location. They are most likely to have the city regulations if there is a branch office located in your city. In addition, they can help you locate the local beekeeping association or bee club, or you might find it from a community information source, such as the library or newspaper. The diverse members of this group will have already threaded the regulatory maze and will have many of the answers you need, and lots of other advice.

If all else fails, you will need to individually search the relevant regulations for your particular state, county, city and subdivision. This is really not as difficult as it sounds, as most states have their regulations accessible through the Internet, and many counties do also. Because different cities have different governmental structures, the appropriate office may have a different name, and it might take a few phone calls to identify the correct office. If your city covers most or all of the county, the information you need may actually be located at the county level, in the County Clerk's office or equivalent (Clerk of Court, County Recorder). Otherwise, it should be the City Clerk or City Courts Office. Subdivision restrictions will be found in the division of the Clerk's office which deals with deed records, and so should be able to be found along with any city restrictions on the same visit.

Many Happy Returns

Do your homework, gain acceptance from your neighbors and be a good neighbor in return, and your hives in the city should provide enjoyment, honey, and perhaps even a profitable sideline for many years to come. BC

Dana Oliver carefully keeps his bees in Baton Rouge, Louisiana.

Honey Plant Plans

Ann **Harman**

It's about time you played the role of a scout bee. Your job is to find nectar sources that will provide not only a honey crop but also enough food to sustain the colony year around. Actually you, as a human, have a much more difficult task than a scout bee from your hives. Four wings and a good sense of smell are much better than your two eyes.

You can't sprout four wings or even improve your sense of smell but you can help yourself to discover nectar sources if you will put a pair of binoculars and a good field guide to wildflowers and another for trees into your truck. No, the field guides will not tell you whether a particular tree or plant produces nectar or even pollen but you should have some knowledge of bee plants anyway. If not, see if your state beekeepers association has a list.

Cotton Flower (Jaycox photo)

Various field guides to plants exist. Every bookstore carries the Petersen series or the Audubon series. In addition two quite spectacular books can be bought (not cheap but extremely valuable): Weeds of the Northeast by Uva, Neal and DiTomaso, and Weeds of the West, edited by Whitson. These books will not give information on use by honey bees but you can discover what the plant is and see if you can find bees on it. A number of regional books are in print and readily available, but these do not necessarily indicate whether bees find them useful.

Of the two famous books on bee plants, the one by Pellett has been out of print for a long time. You can try searching for it in the secondhand market.

The other, *Honey Plants of North America* by Lovell, also long out of print, has been reprinted in the original 1926 form. Although it does not have very many pictures, and those it has are not in color (in 1926 books did not have color), the information is accurate and truly informative. This book needs to be in your truck along with that field guide and you will be all set to go plant exploring.

One problem in determining if bees use a particular plant is that the plant may provide the nectar and/or pollen at a specific time of day. Now, there is no point in sitting by a flowering plant for eight or 10 hours waiting for a bee visit. However, you can check a plant during morning hours, early afternoon hours and even evening hours. Sometimes finding other insects busy on a blossom gives a clue to the time the plant is producing something edible.

Keep in mind that plants and their flowering are affected by the weather

Drought reduces nectar – why should a plant lose water in nectar when it desperately needs water to stay alive. Too much rain and the nectar produced is dilute or sometimes even washed out of the blossom.

Beekeepers are always eager to plant something for their honey bees.

Well, it takes about two million blossoms or so to make a pound of honey That is a mind-boggling number So the landscaping around your house and the contents of your vegetable garden will bring you hours of pleasure as you watch the bees work, but not a honey crop. However that should not discourage you from planting flowers that appeal to bees. Every drop of nectar counts!

Some plants are very particular about where they put roots down. Some do not like acid soil, some do not like alkaline soil. But, some plants are not very fussy, at all. Soil profiles and an understanding of water conditions will help you determine where certain honey and pollen plants can be found. Remember that soil conditions can change drastically in a small area.

Today we recognize a number of plants that are major honey producers.

Because of the different soils and climate, honey plants are regional. Let's take a trip around the country, starting in the Northeast.

The Northeast encompasses New England and parts of New York State. Some areas will be good for clover honey but the acres of the native blueberries bring in a big crop. Basswood trees are also found throughout this area. At one time buckwheat was a widely-grown crop but it is no longer popular and the acreage of buckwheat has diminished greatly However, one plant – an invasive alien – has appeared on the scene – purple loosestrife. You won't find this plant mentioned in Lovell's book since it was still very localized then. However, like many alien plants, purple loosestrife has taken over wetlands throughout New England, the midwest and is still spreading. Efforts are being made to eradicate this plant, not only from the New England states but other states as well.

Alien plants, that coexist nicely without man's controls in their native lands, tend to form a

Continued on Next Page

Orange flower (Morse photo)

monoculture when moved to new countries. Beekeepers take offense at any eradication projects of a honey plant. However, the native plants, that have been usurped often provide nectar and pollen for our bees too, frequently giving a better all-around source of nectar and pollen.

Coming south we will find some areas of northern Pennsylvania where the major crop is goldenrod. Beekeepers in other areas of the U.S. will usually leave the goldenrod honey on for Winter stores, but with this plant in abundance a large surplus can be made.

As we reach the mid-Atlantic states we hear of beekeepers making desirable crops of honey from black locust and tulip poplar trees. But we have also entered a region where houses bring a better income than honey. In one county of Virginia only one small patch of tulip poplar trees exists today. Houses have sprouted up in their place.

The Blue Ridge and Appalachian mountains feature a small understory tree, the sourwood. This honey, admittedly delicious, has now acquired a mystique designed to place it above all other honeys. Requests for sourwood honey come from all over the country The result unfortunately, is that more sourwood honey is sold than actually produced.

Some of the reliable honey plants of the coastal south are the gallberry and palmetto. Moving a bit farther south, beekeepers can gather tupelo, made famous by the film Ulee's Gold. Requests for tupelo almost rival those for sourwood. Going still farther south citrus crops can provide a spectacular honey crop, weather permitting.

Citrus honey from Florida has a good market up the East Coast. However acreage of citrus has declined over recent years, both from expanding cities and towns, competition from citrus grown outside the United States, and freezes.

Florida also has eucalyptus, melaleuca and Brazilian pepper All of these are introduced plants and are therefore under attack. The eucalyptus does give a good honey crop but the other two produce only bakery honey, not table grade.

Eradication of these is proving to be difficult and is, of course, causing problems for beekeepers who have made good use of these plants.

As we move westward we find one of the most successful crops of the South – cotton. Cotton, from both floral and extrafloral nectaries, produces good quantities of nectar and gives a nice, light-colored, mild honey that unfortunately crystallizes rather quickly

Brazilian Pepper Plant (Cutts photo)

Previously cotton had a terrible reputation as the crop most heavily dosed with insecticides. With the advances made in boll weevil control and GM cotton, beekeepers can take advantage of cotton honey with more success than in the past. But hot spots of boll weevil still exist, so be careful of the fields you don't know about.

Time to move north into the plains states all the way to the Canadian border You will pass through acres of sunflower, not considered much of a honey plant in Lovell's day. Now it is grown for oil, hence the widespread acres.

Here, in the northern part of the Midwest, is really the honey pot of America. Unimaginable acres of alfalfa and sweet clover dominate the landscape and thousands of colonies are moved into this region each year And indeed if you ask the average person what kind of honey is preferred, the answer will be – clover

While in the plains states you will find another plant not mentioned by Lovell because it was not a crop at that time. Canola, grown for oil, is a major honey plant although beekeepers find its rapid crystallization most disagreeable.

Back south to Texas where we will find citrus honey again but also the Texas answer to the sourwood of the East and the star thistle of the far west – huajilla honey Although the area where huajilla grows is not large, the plant is a profuse nectar producer and those who live in huajilla territory are lucky indeed.

On to California, a large state with a variety of climates. Californians are proud of their star thistle honey. However, this plant, as well as the productive eucalyptus, are considered invasive alien plants and are under attack. They also produce a great deal of citrus honey there.

The Pacific Northwest is not generally thought of as producing large quantities of honey However the beekeepers there are quite proud of the fireweed honey that seems to have the same appeal as sourwood in the east and huajilla in Texas. The vine maple is a good honey-producing plant but does not capture the interest that fireweed does.

Now you have met just a few of the major honey plants. In each area of the United States numerous plants exist in the category of "wildflower " Some of these plants will yield a crop of honey but it is up to you to discover where they are growing, when they bloom, and whether you can move your bees to the plants.

Remember – two million blossoms per pound. A few roadside weeds will not be enough. So start your truck and start searching. BC

Ann Harman is looking for bees somewhere near her home in Flint Hill, VA.

DO YOU KNOW

Swarming

Clarence Collison, Mississippi State University

Effectively dealing with honey bee swarming in the Spring is a difficult and time consuming task for many beekeepers. The behavior of swarming is complex, many aspects of it we do not fully understand and it goes against our basic principle of developing strong, productive colonies in the Spring. To effectively stop a colony from swarming, once it has developed the "swarming impulse," requires regular colony inspections and extensive hive manipulations. Capturing swarms that have emerged from a bee tree or a neighboring apiary is a potential source of new colonies. If the swarm emerges from your own colonies, then it may be an indication of management failure. To the general public, the sight of a swarm is often terrifying.

Take a few minutes to answer the following questions to see how familiar you are with this topic.

The first nine questions are true or false. Place a T in front of the statement if entirely true and F if any part of the statement is incorrect. (Each question is worth 1 point).

1. ____ Swarming is a form of reproduction at the colony level.
2. ____ The primary swarming season is normally a four to six week period, usually in late Spring or early Summer.
3. ____ Up until approximately 1-2 weeks prior to a swarm issuing from a hive, the queen is fed more frequently and there is a great increase in egg laying.
4. ____ About a week before a swarm issues from the hive, the queen is often treated roughly.
5. ____ Bee are packed tightly together in the center of a swarm cluster.
6. ____ The intensity of dancing on the swarm cluster surface is related to the quality of the potential homesite.
7. ____ Colonies most commonly swarm the day of or a day after sealing their first queen cell.
8. ____ Workers engorge with honey for about 10 days prior to swarming.
9. ____ Colonies time their queen rearing in preparation to swarming to coincide with peak brood rearing.

(Multiple Choice Questions)

10. ____ The race of honey bees that has the highest tendency to swarm.
    A. *Apis mellifera mellifera*
    B. *Apis mellifera capensis*
    C. *Apis mellifera caucasica*
    D. *Apis mellifera scutellata*
    E. *Apis mellifera carnica*
11. ____ The two pheromones that are involved in the movement of a swarm cluster to a new homesite.
    A. Nassanoff + Isopentyl Acetate
    B. Isopentyl Acetate + 2-Heptanone
    C. Footprint + Queen Substance
    D. 9-oxodecenoic acid + Nassanoff
    E. 10-hydroxy-2-decenoic acid + 2-Heptanone
12. About ____ percent of the bees in a swarm are involved in scouting activity associated with finding a new homesite.
    A. 5
    B. 8
    C. 1
    D. 3
    E. 7
13. When scouts find a new potential homesite, they convey the information to the swarm cluster by doing the _____ dance on the surface of the swarm.
    A. Round
    B. Wag-tail
    C. Sickle
    D. Shaking
    E. Jerking (D-VAV)
14. What is the primary reason a swarm cluster does not exhibit strong defensive behavior? (1 point)
15. What is considered to be the primary factor that causes a colony to begin swarm preparations? (1 point)

When a colony is committed to swarming, you expect to find queen cells.

16. Where in the hive would you expect to find these queen cells? (1 point)
17. How many queen cells would you typically find in a colony preparing to swarm? (1 point).

The best way to treat a colony with queen cells is to make a division or split the colony within the same hive by using a double screen. Place the old queen with three to five frames of unsealed brood in the bottom brood chamber. Add an extra hive body with empty combs and honey. Place the double screen on top of the second hive body with the entrance facing to the rear of the hive. Above it put the second brood chamber containing five or six frames of brood, mostly sealed, and two combs of pollen and honey on each side. Shake additional bees from the lower hive body into the upper portion.

18. After the colony has been split with the double screen, what happens to the queen cells in the lower half of the hive? (1 point)
19. What happens to the queen cells in the upper half of the hive? (1 point)
20. Why should you add additional bees to the upper half of the hive? (1 point)
21. Why do colonies handled this way rarely swarm? (1 point)
22. In the construction of the double screen, why is it necessary to have two layers of screen at least ½ inch apart? (1 point)
23. The "Demaree Technique" is another swarm control technique. Please explain the basic principle associated with this method. (1 point)
24. Please explain why the presence of queen cups in a hive is not an indication of swarm preparations. (1 point)

Swarming preparations begin when the mated queen lays fertilized eggs in queen cups leading to developing queen cells.

25. What stimulus causes the queen to lay eggs in the queen cups? (1 point)

Answers On Next Page

?Do You Know? Answers

1. **True** Swarming is an instinctive desire of honey bees to increase their numbers by reproducing at the colony level, giving them twice the chance to survive. By swarming, new colonies are established, thereby replacing those that perish from adverse living conditions.
2. **True** Swarming typically occurs during a particular season that varies considerably according to climate, but varies little within each geographic area. The "swarm season" is normally a four-to six-week period, usually in late Spring or early Summer.
3. **True** Swarming is preceded by a great increase in egg laying. After several weeks of intensified brood rearing there is a "population explosion" within the colony when massive quantities of brood emerges as adults at about the same time.
4. **True** About a week before the swarm issues from the hive, the queen may be pushed about and treated roughly, which tends to keep her moving. Sometimes workers even bite at her legs if she stops moving.
5. **False** A swarm cluster consists of an outside, compact layer about three bees in thickness. The swarm interior is less compact and consists of hanging "chains" of bees that are connected with the outer layer in many places. The outer compact layer protects the swarm against outside influences, e.g., rain, and provides the necessary mechanical strength to support the cluster
6. **True** The better the potential homesite, the more lively is the dance of the scout bees. Inferior nest sites are less stimulating and produce less vigorous dances. The clustered bees are likely to be influenced by the more vigorous dances of the searchers from a better site. These bees may "inspect" the better nest sites and upon returning, dance according to the quality of the new location.
7. **True** Colonies most commonly swarm the day of or a day after sealing the first queen cell, usually 8 to 10 days after queen rearing commences. By swarming at or after queen cell sealing, colonies are ensured of having at least one virgin queen emerge after swarming.
8. **True** Because of the unpredictability of the day and time when swarming will occur, workers engorge with honey for about 10 days prior to swarming, to ensure that they will be carrying sufficient honey reserves when the swarm finally issues. This extra load of honey, which is approximately 40% of the total worker weight, provides food reserves for the swarm while in transit and during the first few days at the new nest.
9. **True** For swarming to succeed, colonies must time their swarming efforts to coincide with a period of growth in the adult population to compensate for the loss of adult workers in swarms. Queen rearing begins precisely when worker brood rearing is at its peak, and there are almost no unoccupied cells in the central brood area.
10. D) *Apis mellifera scutellata*
11. D) 9-oxodecenoic acid + Nassanoff
12. A) 5
13. B) Wag-tail
14. Most swarms are quiet and easy to handle, since they no longer have a hive or food stores to defend. However, they can be aggressive if they have been disturbed several times or they have used up most of their engorged honey.
15. Congestion within the broodnest.
16. Swarm queen cells commonly are found on or near the bottom bars of the combs in the upper brood chamber(s). In comparison, supersedure queen cells generally are found on the face of the comb.
17. In preparation for swarming, a colony usually starts more than six queen cells. It is not unusual to find as many as 15-20 queen cells.
18. Bees in the lower hive body with the queen destroy any queen cells that are present.
19. The bees that are queenless in the upper part of the hive raise a new queen from the queen cells.
20. Additional bees should be added to the upper portion of the hive from the bottom portion, since any field bees transferred to the upper part of the hive will know the landmarks and will return to the front entrance of the lower hive, rather than the rear entrance of the upper hive.
21. When a colony is split by a double screen, first there is less congestion in the brood area, since the brood area is split up. In the portion of the hive with the old queen, each bee is receiving more "queen substance" then they did in the original hive, so they destroy any queen cells and lose the desire to swarm. Also, the queenless portion loses the desire to swarm since there is no "queen substance" present, so they respond by raising a new queen. Once she has mated and begins laying eggs, each bee receives more "queen substance" than they did in the original hive.
22. With a double screen, it is important for the two layers of screen to be at least ½ inch apart so individual bees cannot pass "queen substance" from the hive portion that has a queen to the queenless unit.
23. To separate the sealed and most of the unsealed brood and eggs from the area in the hive where the queen is housed.
24. The presence of queen cups in the hive is not an indication that the colony is preparing to swarm. Queen cups are present in the hive throughout the year Queen cup construction, however, is more prevalent in the spring, a response due to photoperiod and abundant resources. The first outward sign of swarm preparations is the development of queen cells.
25. The queen is receiving too little "queen substance," which is part of a normal feedback mechanism.

There were 25 points in the test. Check below to determine how well you did. If you scored less than 12 points, do not be discouraged. Keep reading and studying, you will do better in the future.

Number Of Points Correct
25-18 Excellent
17-15 Good
14-12 Fair

GLEANINGS

MAY, 2004 • ALL THE NEWS THAT FITS

CANADIAN HONEY RECALL

Canada issued a mandatory recall order for a blend of Canadian and Argentinian honey saying it may be contaminated with nitrofurans after voluntary recalls for other product from Australia and Turkey.

The mandatory recall was for Labonte brand Natural Honey from Blueberry Blossoms and requires all persons selling, marketing or distributing the product to recall it.

Agriculture and Agri-Food Minister Robert Speller issued the mandatory recall order after the Canadian Food Inspection Agency issued a health hazard alert warning the public not to consume Labonté brand Natural Honey from Blueberry Blossoms Canada No. 1 Golden Liquid.

The affected product is sold in a 500-gram container with the lot code 033196. The product, packed by Labonte Inc. of Victoriaville, Quebec, is a blend of Canadian and Argentine Honey and may have been distributed throughout Canada.

The agency issued a similar alert for other honey from Canada, Australia, Argentina and Turkey saying that it may also contain nitrofurans.

It said the importers and packers had voluntarily recalled the product – much of it involving Argentinian honey.

The voluntary recall included Labonte brand natural honey from blueberry blossoms Canada No. 1 Golden Liquid in 375ml and one kilogram containers. They are also a blend of Canadian and Argentine honey.

Also recalled were 375 ml, 500g and 1kg lots of Billy Bee brand pure natural honey Canada No. 1 white. They were all a blend of Canadian and Argentine Honey packed by Billy Bee Honey Products Ltd. of Toronto, and distributed nationally.

Originally the recall mainly involved Argentinian honey blended with Australian product but the agency later widened the recall to include Argentinian product blended with Canadian honey.

Queensland-based Capilano Honey Ltd., which packed and exported some of the recalled Australian-Argentinian blended product, said it tested their honey twice without finding any nitrofurans.

"We test everything," a spokesman said. "We really don't know what is going on."

Capilano chief executive Roger Masters hinted at legal action in Canada and said it would not be the first time Australia has had to defend its honey.

"For example in the UK, where we had a similar false complaint against our product," he told the Australian Broadcasting Corp. "We took legal action there. We gained an apology from the company concerned and we also gained legal costs.

"We weren't out there seeking damages or retribution. We just wanted a fair go."

Nitrofurans are banned from use in Canada in food producing animals. Consumption of foods contaminated with nitrofurans may pose a human health risk related to the inherent toxicity of the drug and the potential to cause allergies. The agency said there have been no reported illnesses associated with the consumption of the recalled honey.

The Canadian agency said it is monitoring the effectiveness of the recalls.

"The CFIA is continuing its investigation in cooperation with the various importers to identify and recall the affected products from the marketplace," it said.

One recall involves No Name brand natural unpasteurized liquid honey in one kilogram, three kilogram and 375 gram sizes. The honey is listed as product of Australia and is a blend of Australian and Argentine honey.

The honey was imported by the big Canadian supermarket chain Loblaws Inc. and distributed in northwestern Ontario, Manitoba, Alberta, Saskatchewan, British Columbia, Yukon, Northwest Territories and Nunavut.

A second recall involved Green World Best Food, Honey No. 1 White and No. 3 Amber in 375-, 500-, 750-gram and one-kilogram sizes. The product originated in Turkey and was packed For Green World Food Express Inc., Mississauga, Ontario. It was distributed in Quebec, Ontario, Manitoba, Alberta and British Columbia.

Yet another recalled batch was Sweet Nature brand pasteurized honey Grade No. 1 white in 500-gram packaging. It involved honey imported from Argentina by Kofman-Barenholtz Food Ltd. of Concord, Ontario. It was distributed throughout Canada.

Also taken from the shelves was No Name brand pure unpasteurized creamed honey, Canada No. 1 White, in three-kilogram lots. It was a blend of Canadian and Argentine Honey prepared for Sunfresh Ltd. It was distributed in northwestern Ontario, Manitoba, Alberta, Saskatchewan, British Columbia, Yukon, Northwest Territories and Nunavut.

In Australia, Food Standards Australia New Zealand said it has been in contact with Health Canada who agreed that the level of nitrofurans found in the honey was not a safety issue. It said it had confirmed that none of the batch of imported honey sent to Canada that tested positive was distributed in Australia.

Australian Honey Bee Industry Council chief executive Stephen Ware said testing methods for honey were still being refined and this could mean some false positive test results.

"We stringently tested the honey both local and Argentinean product, in Australia where it was blended prior to export and it was fine," he said.

Ware said the industry would tighten up export certification to allow a traceback on all products and would perform a risk assessment on all honey exports.

– *Alan Harman*

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On our budget, being a cheapskate helps.

Six weeks ago, Linda bought a new front door for the house. She's been talking about one for years, but last week she returned it. "I got $430 back," she crowed.

She's muttered about buying a horse and a Baldwin grand piano for 10 years. She adores horses, and she's a musician by trade, so why not? We could afford both. We really could. But when it comes down to actually laying out the money, Linda won't pony up.

She's always been like that.

This Summer I'm sharecropping 400 honey bee hives up by Steamboat Springs. This is a huge expansion of my little beekeeping operation, and I knew I'd need to invest in a real truck. I asked some guys who know trucks what they recommended. In January I started shopping for a 1995-99 one-ton 4WD Dodge Cummins diesel with a long-bed and manual transmission. I initially budgeted $15,000, but Linda immediately put up a squawk.

"Ed," she exhorted, "You don't know how this Summer is going to work out for you. Fifteen thousand dollars! Trucks don't appreciate in value, you know."

Normally Linda and I drive beaters, but I wanted a reliable truck. I'd haul bees with it, and the last thing I needed was a breakdown on the road with bees on board.

I don't like to kick tires, so we use Jeff Weiss, a car buyer in Boulder, Colorado. He visits two auctions a week and comes up with some really good deals. You tell him what you want, and he'll buy it for you wholesale, plus his fees. He knows car and trucks, and he'll buy a vehicle on your word alone, over the phone. I know and trust the guy, and this is the way I like to do business.

After I told Jeff I could go $13,500, plus fees and taxes, Linda went ballistic. I reluctantly called Jeff back and told him to drop it to $10,400, which would bring my bottom line to around $12,000. I told him I really only needed a cab and chassis, because my former beekeeper boss Paul said he'd build me a custom flatbed for "under $1,000." So we're really talking $13,000, but I decided to leave the custom bed off budget, in order to buy as much truck as I could get away with.

For a while I thought I had Linda on my side, but I should have known. The problem was, Jeff couldn't find any Dodges in my price range. There just aren't a lot of used Dodge diesel one-tons out there. I expanded the search to Fords, but still no luck. February slipped away, and now time was running out. Paul said that after March he wouldn't have time to build me a flatbed. Every time I mentioned the truck search to Linda, she made it clear she didn't really approve of such a large expenditure. Still, she didn't come right out and say "no."

I still wasn't smart enough to shut up. When I mentioned to Linda that Paul was unloading his old bee truck fleet, she said, "Well, why don't you buy one of those?"

"They're junk," I said, "He's selling them because he's tired of spending money to repair them. That's exactly what I don't want."

Linda said, "Well, just because you spend $12,000 for a truck doesn't mean you won't have to pay to fix it, too."

You have to admit she had a point here.

Paul's 1983 one-ton 4WD flatbed Ford has a new automatic transmission, new tires, and 40,000 miles on a rebuilt 460 engine. The sign in the window read "$2,500." The cab on the driver's side is creased like the truck's been tipped over. It wasn't exactly showroom clean, but Paul had thoughtfully removed all of the empty pop cans, hunting regulation books, fishing gear, bee veils, bee suits, and leftover lunches from the cab. When we got out of the car for a closer inspection, I groaned, but Linda said, "That's a good looking truck. And hey, the price is right."

I drove this truck when I worked for Paul last Summer. It is what it is. It wasn't what I was looking for, but I knew the vehicle, and I'd be buying it from Paul, who at 56 still hasn't figured out how to tell a lie. Plus, buying a cheap rig would have two immediate paybacks: the warm glow that comes with landing what arguably is a really good deal, along with short-term marital bliss. You can't put a price tag on short-term marital bliss.

I'm a free man, but I've been married long enough to understand my options. Every action has its consequence. Did I want a carrot or a stick? Paul agreed to come down $200, and we sealed the deal over the phone. I felt a sense of relief that this saga was finally over

As Linda, Paul and I walked down Paul's driveway to get the title, I said, "How's your new '97 Dodge working out?"

Paul said, "The transmission went out two weeks after I bought it, and it cost $3,700 to fix."

Linda looked at me knowingly Maybe she gave me a wink. "See?" she said, "You were smart not to buy a Dodge."

Cheapskate

Ed **Colby**