Nov 2006

Bee Culture

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Autumn, when the leaves are gone, the grass is brown, and the bees stay home. Mouse guards in, hives protected, now we wait and hope, and long again for Spring. A.I. Root, more than 100 years ago, did what we still do on cold and dreary days. He checks the bees. Just to make sure.

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NOVEMBER 2006 VOLUME 134 NUMBER 11

FEATURES

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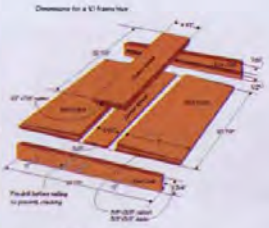

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DEPARTMENTS & COLUMNS

Bottom Boards

I have most of my hives on screened bottom boards and I was wondering what I have to do to overwinter them? Do I need to close off the bottoms or can I leave them open?

Sherwin Koehn
Star City, AR

Editors Note: *It depends on the severity of your Winter, and the exposure of your hive to prevailing winds. If there's a dead air space below your hive because you've closed it in I see no reason to cover the screen. However, if you have routine severe Winter weather, closing the screen from the inside wouldn't hurt. Leave some space open if possible to enhance ventilation – the best part of screened bottom boards. A friend uses discarded floor tiles which cover most of the floor.*

Survivor Hives

In your September issue, James Tew referred to the "Survivor Hive" which up-ended during a storm and had been alive for 16 years without any treatment for mites of AFB.

He also mentioned it was out of the way and difficult to get to. I would almost bet that it had died off several times in this 16-year period, but other swarms had reoccupied it.

Here in the northwest I have found dozens of "wild" hives (colonies) in various places – trees, buildings, and two in old steam shovels. One in the drum and another in the boom (all metal). Every March or April, when we have warm weather, I make it a point to look at these "wild" bees. None of them have lasted for over five years – three years is the rule. I check at this time because *no* new swarm will have moved in at this time of year.

I will check again in July to August and most will again have bees in them, but not the original ones.

Before the mite in the 1950s, I had one "bee tree" that never died out for 25 years and probably longer. I found it in August, 1952 and it was cut down in 1977. I made it a point to check it every April. This doesn't happen now!

James Cowan
Aberdeen, WA

Apiguard Treatment

Earlier this year I had one of my hives infested with a substantial amount of Apistan resistant mites. I did have some reservations about using Apiguard, such as effectiveness. However, I found that Apiguard was easy to use and highly effective with a high Varroa kill rate. After the entire treatment was over and a few cycles of new brood had emerged it was like a new hive, very strong producer.

I would recommend that other beekeepers try Apiguard. I know I will be using this treatment as well as IPM next season.

Andrew Kennedy
Peaceful Valley Honey Farm, NY

Looking For Laws

The Minnesota Hobby Beekeepers Association is requesting help from people around the world in researching current and former beekeeping laws. Several cities in Minnesota are considering ordinances to limit or eliminate honey bee colonies in their city. Through education, we have been successful in stopping any new ordinances. Our goal is to formulate a model ordinance if needed.

To stay ahead of the problem, the association is asking for your help. Please send me an email with links or city ordinances on beekeeping.

Dan Malmgren
Secretary, MN Hobby Beekeepers
St. Paul, MN, U.S.
dmalmgren@mnbeekeepers.com

Meeting Like Grownups

The week of July 14, 2006, the National Cattlemen's Associations met in Reno, NV. Associations, plural. Cattlemen and Beekeepers suffer the same kind of bull-headed thinking. Cattlemen bicker and

fight. Once a year, they agree to meet in one town, all FIVE National Organizations serve on JOINT Committees, seeking common ground to build their industry. Their issues include: Imported Products, Country of Origin Labeling, Purity Issues [ever hear of Mad Cow?], Legislative Issues, Marketing, Prices; in short, our issues are their issues. Their challenges are our challenges.

The lesson they long-ago learned we could apply to our retarded industry. Cattlemen know a lot of other producers of a lot of other foods fight for the same consumers. Cattlemen know boilerplate truths beekeepers seem determined to ignore. Purity matters. Good image matters. Pure Beef is easy to identify. Mostly Pure Honey is not; we now have the funny hunny products to prove the point. Thanks, NHPDA

A full generation ago, obstinate individuals camped across the industry from each other. Since that time, this retarded industry has suffered from multiple-personality disorders; we have the market to prove it. Another generation now steps into industry leadership positions. Some are complete strangers to the truth; others are more interested in the fighting over, than the solution of critical issues now confronting beekeeping. Many are weary of the bickering. We stay away, we drop out; we find more productive things to do, more productive groups to join.

To the Leadership of the American Honey Producers Assn., the

National Honey Packers and Dealers Assn., the American Beekeeping Federation: Consider the industry accomplishments of the past 30 years. Consider the state of the honey market; the ruin of Honey's good name while so called Leadership bickers over everything. Consider the polarization Leadership has fostered and manure-stirred for 30 years. If your supreme mortal experience has been making sure the other camp made no progress, in thirty years; it is now time to check the mirror.

It is now time, past time, LONG past time to meet like grownups. Cattlemen do. We can learn from them. Raising cattle is more difficult than keeping bees. The village idiot can keep bees in a box; and perhaps therein lies the problem.

John Miller
Gackle, ND

INNER COVER

In January I've been invited to speak to a group of beekeeping business owners on the value, and the necessity of being careful, of being protected from harm, and making sure that if you make a mistake, an unintentional mistake, you have someone in your corner that will make sure your are provided all the niceties of due process. The title of the talk is simple – CYA.

However, that concept transcends beekeeping businesses, and includes, with vigor and gusto and enthusiasm, the lowly county beekeeping association, and the unattached beekeeper, too. Think for a moment of your exposure, and probability of exposure, to liability. And think, for another moment, the things your association does that *could*, just simply *could*, cause a problem for somebody.

We deal with bees – live, stinging, venomous insects. Not a big deal, really, but some people think so. And, we sell food (think spinach here). We sell candles that burn – hopefully – evenly all the way down, and then go out. We pick up swarms from places we don't own, often surrounded by innocent people who feel safe just watching. We keep bees on property that is not ours.

If you sell nucs or packages or queens it's implied that they will perform as expected – but what's expected you ask? Finding out in court is a biology lesson you don't want to learn.

You pollinate crops somewhere? Got a contract? A good contract? You sure? Ask an almond pollinator, if you know one, what a good contract is.

Tip your truck over and block a freeway for a few hours while the police, the fire department and the State Patrol have their way with you. That's not cheap. And the bees? And the equipment? And the truck?

Got a web site for your association or business that transacts business – dues or sales or meeting registrations? Does it handle credit cards? What if it's hacked and customer information – credit card information – is stolen? Did you do everything possible to prevent that from happening?

Paid all your taxes this year? Especially you sideliners who tend to do some cash, some on the record? Everything in order and above board? Can't be traced? What's it cost to prove you're right, honest, upstanding, and a good person? A good accountant, that's what it costs.

Well, these are just *some* of the little bits of trouble you may see as a business, an individual, or an association. I don't intend to be completely negative here, but I've answered a phone call for every one of these problems some beekeeper, somewhere, had and wanted to know what I could do to help. But almost always, by the time I get that call it's way, way too late. All I can say is ... CYA ... sooner rather than later.

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The light at the end of the tunnel is, finally, no longer a train, but sunlight shining on the 41st Edition of *The ABC & XYZ Of Bee Culture*. Way, way too long in the making, the next edition is almost ready, and will be available shortly after the first of the year.

Dr. Hachiro Shiminuki, recently retired Research Leader of the Beltsville Bee Lab, took over the editing reins for this edition, but he employed the assistance of a host of specialists to help fill the gaps. Roger Morse, from Cornell edited the 40th edition.

This is a piece of work, I'll tell you. Nearly 1000 pages, and over 1000 photos, most in color, this book has the latest beekeeping, and beekeeper information available. Plus, and this is my favorite part, it has without doubt, the greatest amount of beekeeping history you'll find anywhere. Scores of businesses, beekeepers, scientists and personalities are remembered. The famous, of course, like CC Miller, A.I. Root, CP Dadant, GM Doolittle and more. But the pioneers of modern beekeeping, like Bud Cale, George DeMuth, Karl von Frisch, and Basil Furgala. And a host of names you probably still recall, like Ralph Gamber, James Hambleton, Walter Kelley and Otto Mackenson.

And what do you know about the history of the extractor, or the *American Bee Journal*, or the evolution of Instrumental Insemination equipment?

Plus, there's the latest on pest and disease control; the newest equipment available from all over the world; commercial, sideline and hobby beekeeping styles, equipment, and techniques; and even quality control techniques being developed *today* for honey packers.

Seriously, and I say this with care, there's really nothing else like it. Anywhere. It's been five years in the making, and it's worth every penny. Really.

Want to order one for a Christmas present? We'll send you a Certificate Of Purchase to give now, and when the book arrives here in our warehouse after the New Year, we'll send it right out to you, or the person you select.

It's been 17 years since the last one was completed. Don't wait any longer. This one is a keeper.

(This has been a paid commercial announcement, and I approve this message. – KF)

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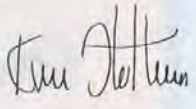
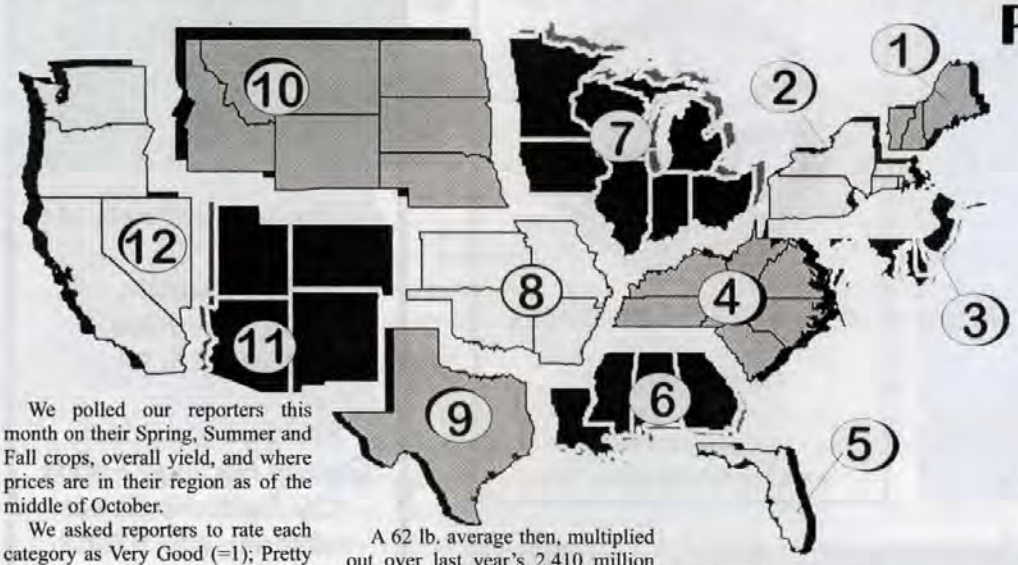
In the mean time, all of us here at *Bee Culture*, and the A. I. Root Company wish you and yours a happy and safe Thanksgiving Holiday. Peace.



CYA & ABC

NOVEMBER – REGIONAL HONEY PRICE AND PRODUCTION REPORT



We polled our reporters this month on their Spring, Summer and Fall crops, overall yield, and where prices are in their region as of the middle of October.

We asked reporters to rate each category as Very Good (=1); Pretty Good (=2); Average (=3); Not Too Bad (=4); Very Bad (=5) and average yield in average lbs./colony.

Below is the summation of each region. Across all regions, average yield/colony came to 62 lbs./colony. For comparison, look at the USDA chart from 2000-2005.

Year	Avg./Yield
2000	84.1
2001	74.0
2002	67.8
2003	70.0
2004	71.0
2005	72.5*
2006	62.0**

*Last year we predicted 60/colony
**Our prediction this year

A 62 lb. average then, multiplied out over last year's 2.410 million colonies comes to about a 150 million lb. crop. Given a 220 million lb. crop as an average, we're off this year by a full third of a crop. There's a shortage out there, somewhere.

Region 1
Spring – 3, Summer – 4, Fall – 3, overall – 4, price – 3, yield – 45 lbs/colony.

Region 2
Spring – 4, Summer – 4, Fall – 4, overall – 4, price – 2, yield – 53 lbs/colony.

Region 3
Spring – 4, Summer – 3, no Fall crop, overall – 5, price – 3, yield – 30 lbs/colony.

Region 4
Spring – 3, Summer – 4, no Fall crop, overall – 4, price – 3, yield – 68 lbs/colony.

Region 5
Spring – 3, Summer – 3, Fall – 4, overall – 3, price – 3, yield – 83 lbs/colony.

Region 6
Spring – 3, Summer – 3, Fall – 4, overall – 3, price – 3, yield – 66 lbs/colony.

Region 7
Spring – 4, Summer – 4, Fall – 4, overall – 4, price – 3, yield – 61 lbs/colony.

Region 8
Spring – 1, Summer – 3, no Fall crop, overall – 3, price – 2, yield – 64 lbs/colony.

Region 9
Spring – 2, Summer – 2, Fall – 5, overall – 4, price – 2, yield – 66 lbs/colony.

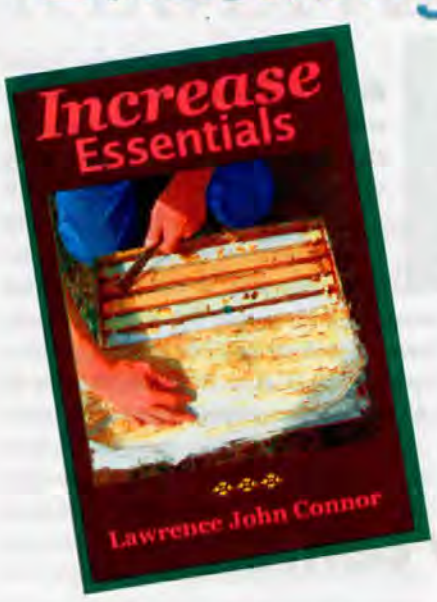
Region 10
Spring – 4, Summer – 1, Fall – 2, overall – 2, price – 2, yield – 77 lbs/colony.

Region 11
Spring – 4, Summer – 3, Fall – 3, overall – 3, price – 3, yield – 116 lbs/colony.

Region 12
Spring – 3, Summer – 3, Fall – 3, overall – 3, price – 3, yield – 73 lbs/colony.

	REPORTING REGIONS												SUMMARY		History	
	1	2	3	4	5	6	7	8	9	10	11	12			Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS													Range	Avg.		
55 Gal. Drum, Light	1.00	1.01	1.02	1.05	1.04	1.03	1.14	1.13	0.85	1.03	0.89	1.13	0.85-1.14	1.03	0.92	1.06
55 Gal. Drum, Ambr	1.03	1.00	1.15	1.28	0.77	0.92	1.11	1.10	0.75	0.83	1.03	1.29	0.75-1.29	1.02	0.86	0.99
60# Light (retail)	109.50	114.25	105.00	99.50	100.00	110.00	103.14	99.00	140.00	120.63	119.00	105.00	99.00-140.00	110.42	103.85	111.89
60# Amber (retail)	98.00	107.75	105.00	99.50	100.00	97.75	103.80	107.50	140.00	122.01	119.00	115.00	97.75-140.00	109.61	96.19	105.89
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	42.38	52.00	38.40	39.49	48.50	40.25	39.36	48.50	48.50	35.76	37.50	53.80	35.76-53.80	43.70	50.10	46.35
1# 24/case	63.42	75.02	60.00	59.50	63.00	61.00	62.15	62.40	76.35	77.56	85.00	81.40	59.50-85.00	68.90	60.71	67.21
2# 12/case	62.56	62.52	57.30	52.70	58.50	53.00	58.21	65.00	45.00	57.84	48.00	66.40	45.00-66.40	57.25	57.30	58.20
12.oz. Plas. 24/cs	61.56	62.06	48.00	48.20	48.00	52.50	51.79	49.80	60.00	49.50	66.00	57.00	48.00-66.00	54.53	52.60	53.53
5# 6/case	63.81	69.29	66.75	57.70	88.00	63.00	64.65	50.00	67.76	56.43	56.00	81.00	50.00-88.00	65.37	60.59	60.85
Quarts 12/case	90.00	110.18	97.20	80.93	75.00	74.75	82.77	78.24	84.00	110.88	83.40	116.67	74.75-116.67	90.33	83.27	90.26
Pints 12/case	48.00	54.98	51.00	50.00	62.00	42.50	57.73	44.26	54.00	49.50	48.00	69.00	42.50-69.00	52.58	49.20	53.11
RETAIL SHELF PRICES																
1/2#	2.63	2.72	2.29	2.74	3.15	2.46	2.36	2.26	2.86	2.20	2.43	3.07	2.20-3.15	2.60	2.59	2.44
12 oz. Plastic	3.43	3.46	3.41	3.30	3.39	3.25	3.21	3.44	3.40	2.97	3.13	3.99	2.97-3.99	3.36	3.20	3.24
1# Glass/Plastic	3.66	4.21	4.04	4.13	3.66	4.00	3.98	4.07	3.45	4.16	4.02	4.92	3.45-4.92	4.02	3.85	3.98
2# Glass/Plastic	7.09	6.71	6.30	6.36	6.16	6.29	6.22	8.25	5.50	6.58	6.45	8.66	5.50-8.66	6.71	6.68	6.63
Pint	5.00	7.58	5.00	5.49	6.93	5.33	6.18	5.42	5.25	7.00	5.29	6.19	5.00-7.58	5.89	5.77	5.99
Quart	7.50	10.98	9.50	8.88	7.92	8.50	10.21	9.03	8.88	11.15	8.37	11.15	7.50-11.15	9.34	9.16	9.84
5# Glass/Plastic	13.21	14.26	14.65	14.66	15.00	13.00	18.09	16.00	18.45	13.25	13.36	14.99	13.00-18.45	14.91	13.20	14.70
1# Cream	4.88	5.19	4.99	4.99	5.73	3.80	5.89	4.51	5.73	5.07	4.67	5.13	3.80-5.89	5.05	4.69	5.05
1# Cut Comb	5.18	5.38	4.89	5.73	5.31	4.12	6.10	4.62	5.31	5.00	5.15	6.55	4.12-6.55	5.28	5.61	5.43
Ross Round	4.95	4.15	4.98	5.08	4.58	3.00	5.63	4.17	4.58	3.00	5.00	4.84	3.00-5.63	4.50	4.85	5.11
Wholesale Wax (Lt)	3.50	3.17	1.75	1.58	1.70	2.71	2.27	3.00	3.50	2.90	1.85	3.55	1.58-3.55	2.62	1.99	2.71
Wholesale Wax (Dk)	2.58	2.80	1.70	1.36	1.40	1.75	1.06	1.75	3.00	4.95	1.35	2.60	1.06-4.95	2.19	1.73	2.28
Pollination Fee/Col.	50.00	68.25	50.00	35.00	40.00	47.50	47.00	60.00	35.00	76.58	28.00	110.00	28.00-110.00	53.94	55.86	55.38

Something New For Young & Old



Increase Essentials, Larry Connor. 128 pages, black and white. ISBN 1878075217. Available from Wicwas Press and other bee book sellers.

If you have been waiting for a bee book to help you become a better, more successful beekeeper, the new paperback *INCREASE ESSENTIALS* by Larry Connor is for you. *Increase Essentials* is about THE major challenge of beekeeping -- starting new colonies that yield strong, healthy, and productive hives.

Increase Essentials is a 'cookbook' approach to setting up nucs and handling new colonies but additionally includes easy-to-understand bee biology basics of establishing new colonies. If you already know how to make nucs that consistently yield productive units then you do not need this book. If however, nucs in your experience are just another colony to manage, then this book should be a MUST-READ this winter with application next bee season. In the preface Kim Flottum, *Bee Culture* Magazine editor, endorses the book as "essential to my survival and success as a beekeeper."

• Chapter 1 observations on disappearing bee forage, the state of our beekeeping industry. The author introduces Brother Adam, and his 'Rule of the Golden Mean.' Six skill sets of successful beekeepers.

• Chapter 2 Four major ways of increasing bee colonies – swarms, package bees nucs and full-colony divisions, why swarms are such good comb builders, why it is important to feed, buildup differences between swarms and packages.

• Chapters 3 Langstroth, the father of modern beekeeping who wrote the Hive and the Honey Bee in part to explain his new hive and to manage Italian queens and nucs for successful beekeeping. The author's 14 step outline of exactly what to do to make a small nucleus for queen mating/holding.

• Chapter 4 early season increases Summer nucs. Meet successful beekeepers Richard Adee (Mississippi splits), Ted and Becky Jones (Connecticut nucleus) and Rollie Hannah (Summer increase). A 12-step process for making a Summer increase. G. M. Doolittle's guide to making nucs.

Chapter 5 over-wintering with double nuclei.

Chapter 6 swarms Chapter 7 more detail about package bees. Larry forecasts that the package bee industry and beekeeper use of packages will change with further Africanization of our managed bee population. Chapter 8 on queens, 9 on pollen final chapter on nectar.

There is no index for *Increase Essentials* but a glossary of almost 100 key terms provides a definition and the key pages of the text where they are discussed. Most of the illustrations include a generous text caption to more fully explain the tightly cropped photos to help readers focus on salient features.

Yes you will find this an easy book to read and understand and it will increase your appreciation of honey bee biology.

Review by Dewey M. Caron, University of Delaware

HONEY, A Gift From Nature. Yumiko Fujiwara, Illustrated by Hideko Ise. Published by Kane Miller Publishers. Color, soft cover, 28 pages. ISBN 978-1-929132-94-2. $7.95 at bookstores.

First published in Japan, this stunningly beautiful, and elegantly written children's book takes a child, his father and the bees from Spring to Winter. Examining bees, harvesting honey, bears and wasps and honey on bread.

"Thank you for the opportunity to read *Honey A Gift From Nature.* It was a really good book. I really liked the illustrations. They were all hand painted. I think it also has a lot of information about what bees do during different seasons.

Katie Newcombe, 10 years old

Don't Forget Christmas Is Coming

More That's New

City of Bees: A Children's Guide To Bees Video. Distributed by Choices, Inc., 421 Beverly Drive 5th Floor, Beverly Hills, CA 90212, Fax 310.203.0607, www.choicesvideo.net. $49.95

Choices Inc. proudly announces the release of a new documentary exploring the life of bees – from a child's point of view. The filmmakers employ remarkable up-close video footage of bees inside the hive. "We are telling a story about the life of bees, not about the work of beekeeping."

Bee Culture employed our own small focus group, aged five to 10 to review this hour long DVD. "While the interest of the younger participants faded after about 40 minutes, others (myself included) found it fascinating and wonderful. (I watched it a second time, which is more than I can say for Spiderman.)"

Filmed in Denmark, with an English voiceover, it is visually pleasing – soft and natural, with soothing background music and beautiful photography. The information presented is simple, understandable, and suitable for any audience interested in bees.

It presents a detailed but not technical overview of the structure of a colony, examining the role and function of the queen, drones, and the stages of ages and responsibilities of the workers. All of the hive products are introduced, with an explanation of their function within the hive as well as what beekeepers do with them.

There is a great deal of information given, but without a sense of urgency that pressures or stresses those that can't keep up. As one of our reviewers wrote, "I really, really liked the movie. It was really interesting and full of facts. I really learned a lot. Sincerely, Katie Newcombe.

Sharon Garceau

HoneySuperCell

This is a deep frame, made from Food Grade Polypropylene, with fully drawn cells. Unique is that the cells are 4.8-4.9 mm in width – commonly called Small Cell Comb. Each frame weighs just about two pounds, so is durable enough to extract without worry or warp. Brood Comb is the intended general use for these frames, however, with small cell comb reported to contribute to *Varroa* control in a colony. For more information contact SuperCell, P.O. Box 762, Westmorland, CA 92227, 866.343.7191, Fax 888.396.8245 or email office@honeysupercell.com

New Honey Container

Gamber Container has released their new CL-180 Classic Container, which is taller than their standard classic jar. But what's more exciting is the new closure they have released. Shown here, this lid has that unique nipple valve closure for no drip, no mess, no fuss dispensing. This lid, coupled with this bottle, will make your honey stand out

RESEARCH REVIEWED

The Latest In Honey Bee Research

Steve Sheppard

"The subspecies in question were introduced into the United States in the past and are, thus, part of the genetic heritage of our own beekeeping tradition."

In places where the honey bee is an introduced insect, such as the United States, we may seldom think about the issue of honey bee conservation, other than to consider the potential loss of our own managed populations to misused pesticides, novel parasites or diseases or to loss of habitat. Of course, with the introduction of *Varroa destructor* to the U.S. in the late 1980s, we can speculate that we have lost some amount of the genetic variation that resided in our feral honey bee population. This unmanaged population was composed of the modern day descendents of the eight Old World honey bee subspecies brought to North America during the last few hundred years. The subject of this month's column is recent activities by beekeepers and conservationists related to two honey bee subspecies in the Old World. In both cases, the subspecies in question were introduced into the United States in the past and are, thus, part of the genetic heritage of our own beekeeping tradition.

The honey bee subspecies *Apis mellifera caucasica*, known to beekeepers as the Caucasian honey bee, is a mountain adapted honey bee native to the Caucasus Mountains. The native range of this subspecies includes parts of the countries of Azerbaijan, Georgia, Russia and Turkey. This subspecies was one of the last to be introduced into the U.S. in the late 19th century and was especially favored because of its adaptation to cool climates and lack of defensiveness. In a remote village area of the Caucasus Mountains of northeastern Turkey, there is a resurgence of interest in this native honey bee, as local villagers participate in a breeding project sponsored by the TEMA foundation, a Turkish non-government organization. The specific project is the "TEMA-Macahel Rural Development Project for the Conservation of Natural Heritage." The Macahel area endures some of the most severe Winter weather in the region, including more than six months of snow-induced isolation from the rest of Turkey. The Summer population of the Macahel is around 350 families. With a local effort centered in the village of Camili, TEMA has been assisting villagers to set up mating apiaries and produce pure Caucasian honey bee queens. These queens are then sold to areas outside of the Caucasus region, where queen producers often use them to produce hybrids with the more widespread *A. m. anatoliaca* of the plains. The current productivity of this isolated setting exceeds 12,000 queens per year which, at $20 per queen, brings in much needed cash to assist the local economy. In July 2006, a Caucasian honey bee breeding workshop was held in Camili and included researchers from a number of countries (including other *A. m. caucasica* source locales such as Russia and Azerbaijan), local queen producers, Turkish conservation officials and TEMA foundation representatives. The combined goals to promote local development and to conserve a specific honey bee germplasm resource provided a unifying theme among the participating groups that improves the prospects for continued preservation of *A. m. caucasica* in this region.

In September 2006, the 7th conference of SICAMM took place at the University of Versailles in France. SICAMM is the International Society for the Conservation of *Apis mellifera mellifera*. This subspecies, also known as the Dark bee of northern Europe (sometimes called the German

A beekeeper's shed near Camili, Turkey in the Caucasus Mountains. Note the use of local hives made from hollowed chestnut logs and some moveable frame hives.

Mating nuclei in Camili. In harmony with traditional agriculture, recent development efforts have led to the annual production of more than 12,000 caucasian honey bee queens from this region.

Beehives with distinctive covers on display at Luxembourg Park in downtown Paris, France were visited by the members of the International Society for the Conservation of Apis mellifera mellifera. *France is one of the countries where this subspecies is being protected in various genetic conservatories.*

black bee by old timers in the United States) had an original distribution that ranged from southern France, northward through Europe to the Ural mountains of Russia. In some places, such as Germany, the subspecies has almost been completely replaced by introduced non-native bees (in the case of Germany, *A. m. carnica*) while in other countries, such as France and Ireland, substantial genetic reserves remain. The purpose of this Society is to promote the conservation and reintroduction of the native honey bee to its original areas of endemism in northern Europe. The 2006 SICAMM meeting brought together about 100 beekeepers, researchers and conservationists from 10 European countries, including Norway, Sweden, Latvia, Poland, England, Ireland, France, Germany, Switzerland, and Finland. The status of the conservation efforts ranged from a fledgling preservation program based on about 200 breeding colonies (Germany) to a plan to establish multiple genetic reserves based on scientifically validated pools of genetically representative *A. m. mellifera* (France). The overall timbre of the conference was one of growing optimism, based on increasing public awareness of the issue and improved understanding by beekeepers that locally adapted honey bee populations have a lot to offer, by providing a basis for continued selection and breeding under local conditions. According to the SICAMM participants, the dated idea that a "superior" honey bee lies just over the rainbow in some other country is becoming less entrenched, although it still can be heard by some proponents of particular strains or subspecies.

Interestingly, the subspecies *A. m. mellifera* was the only honey bee present in the US for much of our early history. It was introduced by European colonists and present in Virginia as early as 1622. The next subspecies to be introduced (*A. m. ligustica*) did not arrive in the U.S until 1859 and, in that intervening 237 years, descendents of the Dark Bee spread far and wide in keeping with their adaptation to the temperate climates found in North America. Between 1859 and 1992, another six subspecies were introduced from Europe, Africa and the Middle East. However, as the clear preference of U.S. beekeepers for many years has been to keep descendents of Italian honey bees, these early introductions have been largely forgotten.

It can be argued that the efforts of conservation minded beekeepers in the Old World to maintain the genetic diversity of locally adapted honey bee subspecies are, in fact, quite useful for the future of beekeeping in the Americas, Australia and other places where the honey bee is an introduced insect. Why? A basic tenant of animal breeding is that the genetic diversity of a species represents a pool of possible gene forms and combinations available as a starting point from which breeders can select, as they strive to develop stocks exhibiting "desired" characteristics. Thus, the success of efforts to maintain diverse populations of *Apis mellifera* subspecies throughout temperate Europe and Asia will provide us all with a future worldwide resource for breeding honey bees. BC

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Malcolm T. Sanford

Wikipedia and the Beekeeper

"The Human Information Revolution continues to mature."

Perhaps one of the major reasons many humans are fascinated by honey bees is the many ways they communicate. These include sound (the piping of young queens about to emerge from their cells), sight (the basis for what many call the "dance" language), and odor (the attraction of the queen's pheromonal complex to drones and her ability to reproductively control her daughters). It is this communication that makes a honey bee colony the "social animal" it is, and allows these insects to cooperatively go about their business efficiently and effectively from one generation to the next.

Humans, too, have this social drive, although sometimes we don't admit it and may even go to great lengths to deny or even destroy it. Social insects have "matured" their communication to a high degree over millennia, whereas humans appear to be only "maturing" in this arena.

This phenomenon is now evolving in a different realm outside the human body, that of the personal computer. Once a stand-alone unit with the ability to crunch numbers far more quickly and efficiently than any human brain, the technology has become more powerful linked together first in offices through "intranets" and then through out the world via the "Internet," delivered to the user via the World Wide Web. This so-called "information revolution" continues today with almost frightening speed. It promises to totally revamp much of what many of us have come to hold as sacred cultural icons. Among the most time-honored are the traditional ways we receive information through paper-based documents such as newspapers, magazines and encyclopedias.

Who does not have a set of encyclopedias at their disposal, often in their home and/or certainly in the public library? These handy books may also be sold as part of supermarket or other commercial appeals. As great a resource as they are, however, there are limitations. They are by necessity voluminous and not particularly portable. In addition, they are set in stone (on paper) and not easily changed, a fact that is more and more problematic in our modern information environment. Finally, they are expensive in time and money to reproduce.

With the personal computer, it became a "no-brainer" that sooner or later the encyclopedia would migrate off paper and become available on magnetic media, first tape, then hard disks, and now compact disks (CDs) and other storage tools. And it was similarly inevitable that it would also become an important part of the World Wide Web.[1]

An encyclopedia is often superior to other forms of information because of its organization. It is costly, however, and often generalized. Those looking for more in-depth information invariably have to search for other resources. For example, if one wanted to find information on honey bees, a broad brush approach would be to consult an encyclopedia, but then one would have to look at beekeeping books and magazines, and increasingly the World Wide Web with its cacophony of sites, some good, some not so good, and increasingly filled with advertisements and personal opinions (all too often couched as facts).

We all have to wade into this messy sea of information as we get increasingly educated on any topic. Some of us are better than others at assembling what we see as the "golden nugget" of information delivery, the age-old calling of the writer. I was drawn to the Cooperative Extension Service for which I worked over 20 years because of this.[2] I continue to do so today, writing my *Apis* newsletter and penning this column from my office in a Northwest suburb of Gainesville, Florida.[3]

No matter how much I read, muse or write, however, it is never enough. The information changes so quickly in the modern electronic environment that I find myself consistently behind. The World Wide Web has been a Godsend to me, providing a community of folks who give me information access, no matter where I might be. But we authors and web developers are still often isolated spirits, working alone, ironically, amidst incredible information richness. What if I could rely less on myself, and more on my community as the honey bee does? Where is my centralized encyclopedia of knowledge similar to that enjoyed by *Apis mellifera* itself, and how can I get to it fast, or as a Hawaiian might say "wiki wiki," usually reduced to the single word "wiki."

Due to an experience in the Honolulu airport when he needed a cab fast, "wiki" became the word software designer Ward Cunningham used to develop the first site on the World Wide Web that allows visitors themselves to easily add, remove and otherwise edit and change content. The word is also sometimes interpreted as "What I Know Is," which describes the knowledge contribution, storage and exchange function of the wiki; it is a classic "backronhm."[4]

There are now a great many wikis found on the World Wide Web. But clearly the most visible and perhaps better called the "mother of all wikis," is the one that is also billed as "Wikipedia - The Free Encyclopedia."[5] I found it quite by accident one day not long ago and as is my wont entered "beekeeping" in the search box. The

"Is Wikipedia perfect? Of course not. There are a great many questions about this new kind of technology. The open nature of it can materially suffer from vandalism, egotism, commercialism, human error, or just downright stupidity."

main page for the honey bee contains links to nine different *Apis* species and says, "there are only six to eleven species (depending on the authority) within the tribe Apini, all in the genus *Apis*, and all of which produce and store liquified sugar ("honey") to some degree." The contents of the page includes the following:

- 1 Origin and distribution of the genus Apis
- 2 Beekeeping
- 3 Honey bee life cycle
- 4 Products of the honey bee
  - 4.1 Pollination
  - 4.2 Honey
  - 4.3 Beeswax
  - 4.4 Pollen
  - 4.5 Propolis
- 5 Hazards to honey bee survival
- 6 Environmental problems
- 7 Social choice lessons from honey bees
- 8 Honeybee predators
  - 8.1 Insects
  - 8.2 Spiders
  - 8.3 Reptiles and amphibians
  - 8.4 Birds
  - 8.5 Mammals
- 9 Honeybee communication
- 10 Trivia
- 11 Designated state insect
- 12 See also
- 13 Sources
- 14 External links

Using the above tree as a guide, one is off and running exploring the collective mind of current and presumably potential information contributors. Most of the topics above would be common on many web pages, but perhaps those states with the honey bee designated as state insect might not (17 are listed). If your state is one, you could be the one to add to the list. This list might also be used to make a case that this insect should be the official one for your state.

At the bottom of the page are several other links, including one to the "Wiki Media Commons," where a number of high quality photos of honey bees, plants and apiaries are found. According to the Commons philosophy, " All these efforts, and more, are done to counter the effects of what Creative Commons considers to be, in the words of chairman of the board Lawrence Lessig, a dominant and increasingly restrictive permission culture, 'a culture in which creators get to create only with the permission of the powerful, or of creators from the past'. Lessig maintains that modern culture is dominated by traditional content distributors in order to maintain and strengthen their monopolies on cultural products such as popular music and popular cinema, and that Creative Commons can provide alternatives to these restrictions."[6]

Another class of information is found off the beekeeping main page at a link called "Wikibooks." This open-content text book, according to its introduction, "is being designed as an all-purpose broad scope reference book pertaining to apiculture, including information regarding bees, beekeeping and associated practices. Although *Beekeeping* is being written with the initial intent in aiding the hobbyist, it is a growing resource that could also aid commercial beekeepers similarly. This Wiki book however, is not being written in a completely linear manner. Because of the writing style of this book, through the act of simply reading it chapter-by-chapter content will be lost. Reading in this manner should still prove to be worthwhile, but more topics and greater depth may be uncovered by following links within the text. Much like other Wiki based texts, *Beekeeping* is dependant on the collaborative effort of the community. If you have read your fill of this book and have some extra information that you can add, we request you do so, but before submitting please visit the Editing Guidelines and Information page."[7]

A look at contributors reveals that a Robert Engelhardt (Username: Artic) began the project, and hopes to see it through to its success. Robert is a first-year beekeeper. Following the link to a description of Mr. Englehardt's activities, we find he, "has been interested in bees and beekeeping for a while but has not yet had the ability to actually keep bees until this year (2005). Right now his intentions are to remain a hobbyist, but he would like to introduce the world to such an entreating and possibly even profitable hobby by beginning a Beekeeping Wiki Book and adding to other such Wikis." He also has worked on a wiki cook book, "tends to (or wants to) post recipes in regards to honey; after all it is a spectacular substance that he believes is quite underrated. One recipe Robert enjoys in particular is Honey Taffy, why not give it a try."[8] This reveals a dynamic missing in many information resources, the voice of the regular person, someone who is not necessarily an expert, and candidly admits it, yet still has something to offer the larger human community.

And then there's Wikiversity. Learners and teachers are invited to join this community as editors of this website where anyone can edit the pages. It is a community for the creation and use of free learning materials and activities; a multidimensional social organization dedicated to learning, teaching, research and service. Its primary goals are to: 1) Create and host free content, multimedia learning materials, resources, and curricula for all age groups in all languages. 2) Develop collaborative learning projects and communities around these materials.[9] Traditional universities had better watch out. Some are apparently opting to join

the wiki movement rather than fight it.

So what is Wikipedia? Perhaps a better question to ask is what is it not?[10]

- o 1.1 Wikipedia is not a paper encyclopedia
- o 1.2 Wikipedia is not a dictionary
- o 1.3 Wikipedia is not a publisher of original thought
- o 1.4 Wikipedia is not a soapbox
- o 1.5 Wikipedia is not a mirror or a repository of links, images, or media files
- o 1.6 Wikipedia is not a blog, webspace provider, or social networking site
- o 1.7 Wikipedia is not a directory
- o 1.8 Wikipedia is not an indiscriminate collection of information
- o 1.9 Wikipedia is not a crystal ball
- o 1.10 Wikipedia is not censored

And what the wiki community is not?

- o 2.1 Wikipedia is not a battleground
- o 2.2 Wikipedia is not Anarchy
- o 2.3 Wikipedia is not a Democracy
- o 2.4 Wikipedia is not a Bureaucracy

Is Wikipedia perfect? Of course not. There are a great many questions about this new kind of technology. The open nature of it can materially suffer from vandalism, egotism, commercialism, human error, or just downright stupidity. *Nature*, one of science's most prestigious journals, however, recently found that Wikipedia came close to the *Encyclopedia Britannica* in the accuracy of its scientific entries.[11] *Britannica* took offense, and issued a response calling the results "Fatally Flawed."[12] Nature, however, demurred, declaring it would not print a retraction.[13]

Contributors and consumers it seems are left to make their own decisions about the value of this technology. I have consulted many web sites over my career, and so far have seen nothing to compare with the depth and accuracy I find in the Wikipedia pages that relate to honey bees and beekeeping. I'm betting this resource will get better and better. Ignore it at your peril. BC

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What Every Beekeeper Should Know About Contracts

Sylvia A. Ezenwa

You may not realize it, but as a sideline or commercial beekeeper, contracts play a big role in your business operation (e.g., a contract for the sale of package bees and queens, or a commercial lease for the rental of a warehouse for use as a honey house). So it is very important that you, as a business owner, understand the basic elements of a standard contract; the kinds of contracts that are commonly used in the beekeeping industry; and finally, the power that *you* have, even with a relatively small-scale operation, to bargain with the large businesses for more favorable contract terms. This article discusses those topics.

Basic Elements of a Standard Contract

A contract is formed when two (or more) parties agree to a promise or a set of promises that: (1) impose a legal duty on each party to do, or not do, a specific thing; and (2) give each party the right to seek a legal remedy against the other party if the other party breaches or fails to perform his or her duties as promised.[1]

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

(1) Competency or capacity of the parties

Both parties to a contract must be competent (i.e., each must have the capacity) to enter into the contract.[3] And to be considered *"competent,"* each party must possess the mental capability to understand his or her rights and duties under the contract.[4] Minors are not considered legally competent to enter into contracts because they generally do not possess the mental capability required to understand a contract's terms.[5] That is why, when a minor does enter into a contract, he or she may later void the contract at will.[6]

(2) Subject or topic

A contract must possess a *"subject"* or topic, which is simply the matter or material that a particular contract is about.[7] For example, the delivery of honey bees to an orchard for pollination is the subject of a pollination contract.

(3) Legal and sufficient consideration

The *"consideration"* for a contract is the cause, reason, or motive that induces each party to enter into the contract (e.g., to make a profit, or to secure a certain price).[8] Moreover, a valid contract requires *"legal and sufficient consideration,"*[9] which means that the cause, reason, or motive stated by the parties for entering into the contract must be: (1) legal and moral; and (2) of sufficient value (usually, monetary value) to support the parties' contention that the reason they gave for entering into the contract was in fact their true reason for doing so.[10] This requirement is mainly to keep parties from using a contract to circumvent the law. For example, suppose a beekeeper and his son enter into a sales contract in which the beekeeper sells his entire beekeeping operation, worth about $30,000, to his son for a price of $30. Now this contract is invalid, because the consideration or price paid by the son is clearly insufficient compared to the true market value of the operation, which leads to the presumption that the contract was probably entered into for some other reason; perhaps, to preserve it from the beekeeper's creditors.

(4) Mutuality of agreement or assent

"Mutuality of agreement or assent" requires that: (1) both parties to a contract agree or assent to all the terms of the contract; and (2) there is no disparity in the way that each contract term is understood by both parties.[11] The evidence of mutual agreement or assent is an offer and an acceptance; an offer alone cannot make a contract.[12] One party's offer (or promise) to do, or not do, a specific act becomes a contract only after it is accepted by the other party.[13] Acceptance may be in the form of either a reciprocal promise to perform some other act, or the performance of that other act itself.[14]

(5) Mutuality of obligation

As previously mentioned, each party to a contract is induced to enter into the contract by a stated cause, reason, or motive (i.e., consideration);[15] and so, *"mutuality of obligation"* requires that each party to the contract be obligated to perform the acts that form the basis of the other party's reason for making the contract.[16] If only one party is obligated to perform, and the other party is not, then the law negates the obligation of the first party to perform, which makes the contract invalid.[17]

Kinds of Contracts

In business, oral contracts or handshake deals are usually never a good idea, particularly now, with the continued attrition of the family-owned, generational beekeeping operation, and the advent of the new, large agribusinesses. So what follows are the kinds of *written* contracts that are (or at least, should be) commonly used in the beekeeping industry: (1) sales contracts; (2) commercial leases (for land, buildings, vehicles, and equipment); (3) employment and brokerage contracts; (4) pollination contracts; and (5) insurance contracts.

(1) Sales contracts

A sales contract (or contract for sale of goods) can be either: (i) a contract for the present sale of goods (e.g., the sale of a 3 lb bottle of honey

to a passerby at a roadside stand); or (ii) a contract to sell goods at some future time (e.g., a promise to sell 300 lbs of honey to a certain packer at harvest).[18] Sales contracts should be used:

- to sell hive products (honey, candles, beeswax) in bulk to corporate product distributors and processors, such as honey packers, honey cooperatives, and natural food retailers
- to sell package bees or queens to beekeepers, or to suppliers.

(2) Commercial leases

A *"lease"* is a contract in which one person who owns real or personal property grants to another person the right to possess, use, and enjoy that property for a specified period of time in exchange for the payment of a stipulated price at regular intervals, known as *"rent."*[19] When the subject of the lease is *"real property,"* which is the land and whatever buildings or structures are affixed to it, the relationship between the parties is landlord and tenant. However, when *"personal property"* is involved, which is everything other than real estate, the relationship between the parties is lessor and lessee.[20] Leases should be used:

- to lease a parcel of land for a holding yard
- to lease a building or structure (e.g., warehouse or other building) to use as a honey house or for the storage and repair of beekeeping equipment and supplies
- to lease large pieces of beekeeping equipment, such as forklifts
- to lease vehicles, like flatbed trucks, for the transport or shipment of hives

(3) Employment and brokerage contracts

An *"employment contract"* is a contract between employer and employee, which provides the terms and conditions of employment, including hourly wage, salary, benefits, duration of employment, and whether the employment is at-will (i.e., able to be terminated at any time by either employer or employee, with or without cause).[21] Employment contracts should be used:

- to hire migrant or seasonal agricultural workers
- to hire temporary agricultural workers with H-2A Visas

A *"brokerage contract"* is a contract between employer and broker (i.e., an employment agency) in which the broker is hired to make employment contracts with potential workers on the employer's behalf, and for which the broker is paid an agreed upon commission.[22] Brokerage contracts should be used:

- to hire migrant or seasonal agricultural workers through a farm labor broker

But be careful, particularly when hiring workers directly and not through a farm labor broker, because employment contracts for migrant and seasonal agricultural workers must comply with the federal Migrant and Seasonal Agricultural Worker Protection Act; and for temporary agricultural workers with H-2A Visas, with the federal Immigration and Nationality Act of 1952. Hire a labor and employment attorney or agricultural Human Resources Agency to help you draft employment contracts that comply with these laws; and also, to periodically audit your operation's hiring and employment practices to ensure continued compliance.

(4) Pollination contracts

A pollination contract is a contract between a beekeeper and a grower in which the beekeeper promises to deliver to the grower's orchards a certain number of honey bee colonies, of a certain strength, for a certain period of time, in exchange for a stipulated rent paid by the grower, for the purpose of pollinating the grower's crops.

(5) Insurance contracts

An *"insurance contract"* is a contract in which, for a stipulated consideration or *"premium,"* one party (*"the insurer"*) undertakes to compensate the other party (*"the insured"*) for loss on a specified subject (e.g., business or home) by specified perils (e.g., fire, water, wind, burglary, vandalism, and theft).[23] A written insurance contract is called a *"policy."*[24] Insurance policies relevant to a beekeeper include:

- a standard homeowner's insurance policy
- a business owner's policy
- worker's compensation insurance

Exerting Your Bargaining Power

Bargaining power is the amount of power that a party has during the contract negotiation or bargaining process. The party with the greater bargaining power is more likely to persuade (or rather, intimidate) the party with less power into acquiescing or agreeing to certain contract terms that may be unfavorable to the latter. This may happen when beekeepers with small to mid-sized operations (and thus, less bargaining power) are negotiating pollination, honey supply, and/or product distribution contracts with large-scale, agribusinesses, such as growers, honey packers, or other large honey users.

Too often, an agribusiness (with greater bargaining power) will get a small to mid-sized commercial beekeeper (with less bargaining power) to acquiesce or agree to contract terms unfavorable to the beekeeper by using an adhesion contract.[25] An *"adhesion contract"* is basically a form contract that contains standardized, boilerplate language, and it is typically used because its complex legal language gives the beekeeper the false impression that its terms cannot be negotiated or modified.[26] That is just not true; ALL contract terms should

For a complete discussion of pollination contracts, read my article, *Negotiating and Drafting Effective Pollination Contracts*, Bee Culture, Vol. 133, No. 3 (March 2005); or Chapter 8 of the book, ***Honey Bee Law: Principles and Practice by Sylvia A. Ezenwa, J.D.***, available at http://www.beeculture.com/store/ or call 1-800-289-7668.

be negotiable between contracting parties, regardless of the inequities in their bargaining power.

What you should remember is that – no matter the size of your beekeeping operation – when negotiating any kind of contract with a large business, you should absolutely assert your right to negotiate each and every contract term. Hire an attorney, if necessary, to act on your behalf, especially if there is a potential for a substantial business profit or loss. The hope is that, by simply asserting your right to negotiate, the agribusiness will agree to reopen the bargaining process to reach contract terms that are, if not favorable, then at least fair, to your smaller operation. BC

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DISCLAIMER: The information in this article is not intended to constitute legal advice. Please consult an attorney regarding your specific situation.

For a complete discussion of standard homeowner's and business owner's insurance policies, read my article: *Insurance Protection for Beekeepers,* Bee Culture, Vol. 133, No. 6 (June 2005).

HONEY BEE NUTRITION

Do You Want FAT Bees Or Skinny Bees?

Dewey Caron

Bee Nutrition is a neglected aspect of bee biology – maybe even to being labelled the Lost Science? Recently the Australian Government published a booklet *Fat Bees Skinny Bees A Manual on Honey Bee Nutrition for Beekeepers*[1]. The manual is designed to assist Australian beekeepers who rely on unique, yet a very limited number of plants for pollen and nectar resources. Beekeepers everywhere who pollinate, build nucs, make increase colonies, rear queens, or who rely on early nectar flow sources for a majority of their season should also consider their bee's nutrition needs.

The publication *Fat Bees Skinny Bees* includes pollen analysis of 183 plant species (nearly ½ of which are in the two genera *Eucalyptus* or *Acacia*). There is also testimonials from 42 Australian and two New Zealand beekeepers on how they analyze nutritional needs and how/when they seek to supplement colonies via feeding of sugar and/or pollen supplements. No two are exactly the same, reflecting the individuality of beekeeping and the varying needs of bee colonies at different apiary sites.

How do we know the bee's nutritional needs? Unfortunately there is no simple signal that bees need nutritional attention. But in Australia, at least where the major sources are known to be deficient (short nectar flows and pollens often below 20-25% crude protein levels), nutritional management is listed as one of the four 'Golden Rules of Beekeeping' – other three are pest/disease surveillience, regular requeening and a system of comb replacement.

The availability of food to forage for does not always follow bee needs. Adult bees need protein early in their life and then only carbohydrate; larvae have high protein needs for the short six-day feeding period in their life cycle. All food input comes from three sources; *carbohydrate* from nectar or a small number of other foragable sugar sources, *protein and vitamins, minerals, cholesterol, etc* from pollen and finally water from water collected outside or recycled within the bees body.

Bees that are **skinny** (exhibit nutritional stress) are actually smaller in body size, have less body reserves to utilize and have been shown to rear less brood. Less brood rearing in turn leads to less Brood Pheromone and therefore from studies by Tanya Pankiew and Zachery Huang in the U.S. have:

- Fewer pollen foragers
- Slower colony growth in Spring
- Less success with over Wintering
- Produce poorer pollination colonies with smaller forager populations.

Bees that are Fat (i.e. have adequate nutrition):

- Produce colonies strong in young bees to make nucs/packages
- Yield strong pollination units
- Are more responsive to stimulation such as for Spring development of colonies
- Help insure better Winter survival
- Are more adequate for queen production (both queen and male sides)
- Are better able to overcome pesticide damage
- Help in recovery from mites/disease

Basic Nutritional needs

Carbohydrate or sugar is provided by nectar or sugary fluids such as extra-floral nectary secretions, honey dew from plant sucking insects and other natural sugars occasionally available to foragers (such as oozing sugar syrup from sugar cane cutting or industrial processing affluent/spills of carbohydrates). Bees convert such carbohydrates, mostly sucrose, but potentially a mixture of an additional 22 or more sugars, into the two simple six-carbon sugars fructose and glucose, with some residual sucrose also persisting. Conversion is facilitated by the enzyme invertase added from salivary glands and by the active behavior of water evaporation. Further water loss occurs in the drying hive environment (termed passive evaporation).

Beekeepers can supplement carbohydrate needs by feedlot feeding or through feeding of sugar within colonies. Feeding can be used to stimulate, sustain colonies during winter or nectar dearths as well as facilitate management such as rearing queens (or drones). The sugar to use depends upon management, equipment and reason for feeding. As the Manual illustrates, with the 44 beekeeper

[1]Rirdc # 05/054 – see website www.rirdc.gov.au

keeper interviews, beekeepers can supplement nectar in a number of ways.

High fructose corn syrup (HFCS) is often the beekeeper sugar source of choice for it is relatively cheap and readily available (see bee supply catalogues for example) but table sugar, invert sugar (good source but often twice the price of other sugars) and drivert sugar also are options. Sugar is usually fed as a liquid using hive top feeders, hive insert feeders or a variety of commercial/homemade devices. Dry sugar or sugar candy might be the best option during winter confinement so as to avoid increase of Nosema levels or to use when stimulation of the colony is not warranted.

Protein and all the other dietary inputs needed for growth of bee larvae and development of adult glandular systems is supplied by pollen. Not all pollen sources provide what bees require. As a minimum, pollen is needed for development of body tissue, muscles & glands (such as hypopharyngeal or brood-food glands and their products). Pollen is their source of nitrogen, supplies the vitamin needs of bees, and is their required source of fatty acids, minerals and cholesterol. Newly emerged adult bees begin feeding on bee bread one to two hours post emergence and within 5 days their bodies register a high nitrogen content. Up to 70% of adult bees can still have high hypopharyngeal gland activity at two to three months of age with continuous brood rearing which signals continued feeding on bee bread.

The Protein level from collected pollen has been shown to range from 8 to 49%, with 20-25% considered a minimum level for bee needs. Protein quantity, in addition to quality, is important to produce **fat** bees. Ten amino acids are considered essential for bees, with an additional 17 commonly present. Some common sources, although providing a good level of protein, lack one or more essential amino acids so by themselves do not support brood rearing. In Australia, the essential amino acid isoleucine is often absent in foraged pollen. Dandelion, which lacks arginine, is an example of a deficient pollen source in our country. When a diet of pure dandelion pollen is fed to bees, brood rearing can not be sustained. But simply adding arginine is sufficient for producing healthy **fat** bees.

Colonies need a lot of pollen. Consider the following:

- 10 pollen loads needed to rear a single bee
- 1 pound is required to rear 4000 bees
- 44+ pounds must be collected in a season for a "normal" colony to rear 200,000 bees.

Pollen supplies bees with necessary fat (= lipids) in the form of fatty acids, sterols and phospholipids. Bee collected pollen has as little as 1% to as much as 20% lipid content. In artificial diets, 5-8% is considered ideal. Pollen also supplies the bees sterol requirement – when artificial diets lack cholesterol they do not support brood rearing. Cholesterol is additionally needed for production of molting hormone (so bees can advance through

Feeding a protein patty.

larval stages to pupal and then into adult form), and is needed for queen development and reproduction. Fatty acids in diets perform some antimicrobial function and are largely responsible for the attractiveness of the pollen to foragers.

Bee-collected pollen also supplies the mineral needs of bees. Although not well studied, bees must secure certain minerals (more than 27 different minerals have been found in adult/larval bodies) from their bee bread diet with 3% of solids considered normal. Pollen may have as little as 1% to as much as 7%; too high a mineral content will reduce brood rearing. In studies of artificial diets, the common salt mixture included in diets for other animals has proven to be too high in sodium and too low in potassium for bees. Studies of nectar as sources of such minerals have demonstrated that nectars with elevated sodium, salt (sodium chloride) or calicum quickly become unattractive to foragers.

Bee-collected pollen is usually high in water soluble vitamins (the B-complex vitamins thiamine, riboflavin, pyridoxin, panthothenic acid, niacin, folic acid & biotin), plus vitamin C, but is generally poor in the fat soluble vitamins A,D,E & K. Microflora in the gut may help bees produce some vitamins such as panthothenic acid. Gibberellic acid and inositol, common in pollen, are also necessary for brood rearing. Vitamins have the greatest effect on the hypopharyngeal gland but have been shown to have little effect on adult longevity. As regards Vitamin C, pollen is high in C content but its function or requirements in bees is not well understood. Apparently all vitamin requirements are met by pollen, although vitamins will deteriorate with pollen storage.

It is apparent however that bees can not assess the overall protein, mineral or vitamin content of different pollens to enable them to concentrate on those with greatest usefulness for brood rearing or adult body needs. However, beekeepers can supplement the bee's protein needs with supplemental feeding. Total substitution, using artificial diets, has been used by researchers to understand the basic dietary needs of bees and pollen substitutes, such as Beltsville Bee Diet (no longer available), Mann Lake's BeePro or the recently available Feedbee ® have

Feeding sugar syrup.

been developed.

The best diet is of no value however unless the bees consume it so most beekeepers use a pollen supplement. Supplements use a generous portion (up to 10%) of bee collected pollen and/or sugar as an attractant. Although a wide variety of animal/plant proteins might potentially serve the nutritional needs of bees, cost and availability are the primary factors that have lead to supplements using a mixture of soybean and brewers yeast. (The yeast adds B Vitamins missing in the soybean). But not all soy sources are the same; processing method plays a big role in their usefulness. Careful studies are needed to determine if other "waste" (and therefore "cheap") sources of protein might be useful and, as important, non-toxic to honey bees. Toxicity of lactose sugar is one reason milk-based protein sources are not suitable to bees. This sugar is only one of several toxic to the honey bee.

If not utilizing one of the excellent commercially available supplements, beekeepers should plan on collecting their own pollen from healthy colonies. It is usually the most expensive ingredient in a feeding supplement. With storage, pollen becomes less attractive and with time it loses its nutritive value. For example pollen that is one year old has been demonstrated to be 76% less effective in rearing brood evidenced by irregular and spotty brood in feeding tests. Beekeeper collected pollen should be dried, cleaned and then stored with each step potentially meaning loss of nutritive value. Major factors leading to loss are

- Drying conditions
- Temperature of storage
- Relative humidity at collection, after drying and during storage
- Time in storage
- Floral source of pollen itself.

Pollen may be stored dry after collection or in sugar but the best storage condition is in the freezer. Properly dried and frozen pollen was still in good condition 11 yrs later in one study. Pollen mixed w/sugar and covered with sugar to keep airtight was still able to rear some brood two years later. Pollen collected and dried but left at room temperature was not adequate in a very short time.

Bees of course do not use pollen directly – they store it as bee bread. Such pollen has been subjected to lactic acid fermentation so spoilage is reduced. How long can properly stored bee bread be used by bees? We don't know for sure but bee bread over Winter still is adequate for rearing brood the next spring. Therefore some beekeepers like to subject collected pollen to the same lactic acid fermentation as their method of storage. To duplicate what bees do place clean pollen in a sealable, airtight container and add a starter culture of *Lactobacillus xylosus* or Lactobacilli contained in whey. The ratio to use is as follows: 10 parts pollen, 1.5 parts honey, 2.5 water, .02 parts whey (or dried lactic acid bacteria). To promote lactic acid producing bacteria and to exclude other naturally occurring bacteria, place a filled container in an oven at 28-32°C [high 80°sF] for two to three days. Then remove to 20°C (68°F) for eight to12 days. Store at room temperature in sealed container until needed.

Finally, bees, like humans, need *water* in their diet. Larvae and adults die quickly without water. Water is needed to carry dissolved materials within body cavity. It assists removal of waste products. It is needed in digestion and absorption of food, and it is used for dilution of honey (including crystallized honey). Water is also useful to maintain hive temperature and helps maintain the elevated relative humidity needed for bee eggs to develop and properly transform into larvae. Beekeepers should consider supplemental water where sources are more than a quarter mile away or sources likely to be contaminated with pesticides or other objectionable materials. BC

NOTE: As a result of a number of studies by Elton Herbert, USDA Beltsville, now deceased, an artificial diet, the Beltsville Bee diet, was developed but it is no longer commercially available. There are ongoing studies at Tucson USDA lab on a liquid diet and recently a Canadian diet Feedbee® has been developed from grain sources (See January & August *Bee Culture* for information). The best review of Bee Nutrition remains the Chapter with same title in *The Hive and the Honey Bee*, authored by Elton.

Material for this article developed from comments presented at 2006 EAS meeting at Young Harris College in Georgia. The 2007 EAS meeting will be August 6-10 at the home University of the author, The University of Delaware, Clayton Hall Conference Center. EAS features the latest information on bees and beekeeping and the short Course is an excellent means of learning successful beekeeping. *Dewey Caron is program chairman for EAS 2007.*

Feeding Winter Colonies

When does it help, and when is it hopeless?

James E. Tew

I am several days late getting this article to Editor Kim. I have written and rewritten my opening sentences several times and have discarded each thought for one reason or another, but still I remain discombobulated. Last month, I told you that during the waning Summer/early Fall season here in Ohio, it became very clear to me that about 40 of my 80 colonies were dangerously light in Winter stores. Should I not have a clear plan by now? Probably, but for several reasons, I remain unsettled.

1. How much time, money, and energy should I spend on my bees before I deem it hopeless?
2. Though a large part of my life, beekeeping is only a *part* of my life? How do I keep all aspects of my life balanced – including the beekeeping segment? I can't work my colonies all the time.
3. When are some of my procedures helping my bees and when am I actually causing damage to them?
4. What equipment should I use to address their food shortage?
5. How long should I wait on the Fall flow before giving up on it?
6. How severe will the upcoming Winter season be?

Three plastic drums of corn syrup.

Beekeeping as a hobby or beekeeping as a burden

Before I make any effort to discuss my pending plans with you, I need to discuss some aspects of my *Beekeeping Philosophy (for lack of better wording).* Were it not for my university responsibilities in beekeeping, I suspect I would be a traditional hobby beekeeper with five to 10 colonies. Due to various expectations of my program, I need to maintain about 80 colonies. That's not a hobby – that's work. If you have only a few colonies, and they are going into Winter light in stores, feed them. No big deal. But, as do many of you having 80 or more colonies, the guesses we are required to make can become expensive.

In all my beekeeping years, I have never had much luck feeding bees – in a cold climate – for most of the Winter. You folks in warm climates fare better when Winter-feeding your colonies. In past years, I have tried and I (mostly) failed, but at least I tried and felt better about having attempted to do something. But a looming question that we must address in cases like this is, *"When is it better to give up on light colonies and just start again next year?"* This past Spring, I invested several thousand dollars in splits and packages. I nurtured them all Spring, Summer, and Fall. Apparently due to excessive rain, the Spring flow was non-existent. I hoped for a Fall flow, but that has not happened. About half my colonies are too light to withstand any kind of Winter. Do I put even more money in them? Not surprisingly, I have indications of *Varroa* in some of the colonies, requiring even more money and more work. Should I move some of them to warmer locations in Southern states where they have a better chance of surviving? No. The small hive beetle is not yet an established problem in this area and bringing this new pest back next Spring will only cause more confusion. I and my bees will have to stay where we are. So, I now say again, as I said just a few paragraphs ago, these are not easy guesses. I feel responsible for my bees, but I also feel uncertain about the colonies' future. What to do?

No guarantees next year

Obviously, I have no guarantee that letting these light colonies die off and restarting them again next Spring will be any better than the spring of 2006. I, and the hungry colonies, have already come this far. I suppose I might as well finish what I have started; therefore, I plan to feed the colonies and hope for a mild Winter.

What to feed?

Human labor – for me – is in back-breaking short supply. Last month I told you of my investigative work in finding local sources of granulated sugar. Since that time, I have found a source of corn syrup and have bought

three drums (@ $140/drum + $125 shipping). Though corn syrup is a way of life for most beekeepers who feed, the old literature strongly supported the continued use of granulated sugar as a better food source, but time and labor are short so I went with the liquid corn syrup.

Could things be any more confusing? Yes, they could. The syrup came to me in plastic drums. I am not sure that my traditional drum trucks will fit the novel-shaped plastic drums. If the syrup crystallizes in the drums, can I use traditional drum heaters to re-liquefy the product?[1] I may (or may not) pump the syrup to standard metal drums. I don't know yet.

A traditional comb filler.

Feeding bees

Some bees are smart and some bees are not. In my list of concerns that I presented at the outset of this article, I asked when was I helping and when was I hurting? In the past, some colonies took the feed admirably while others never seemed to figure the feeders out. Division board feeders, of which I have many, have frequently been death traps for bees trying to use them. Top feeders and entrance feeders can encourage robbing behavior. As much as I would like to, I cannot assume that all colonies will be able to store the feed as winter foodstuffs.

Some comments and questions on hive feeders

Bluntly said, there is no perfect feeder design for beehives. In my equipment holdings, I suspect I could come up with 20 different styles of feeders – none perfect for all conditions. Clearly, feeding hungry colonies has been an issue for concerned beekeepers for many, many years. In addition to a number of entrance feeders, I primarily have division board feeders, top feeders, and pail feeders. I plan to use all but the entrance feeders. Entrance feeders require the bees to leave the cluster to feed, generally have a smallish syrup container, and encourage robbing behavior near the entrance. Use these only if you have a few colonies to feed.

In lean years past, I employed "open-feeding" procedures in which I cut a 55-gallon drum lengthwise and used each half as two large bulk-feeding tanks. The bees took an amazing amount of syrup in a short while, but classically, "the rich got richer." Strong colonies got the bulk of the syrup while the weak colonies got much less. I still had to move full combs about the apiary to equalize the Winter feed. This season, I felt that the syrup costs too much to feed to colonies that didn't really need it. I chose not to use this simple procedure.

A unique device that I have (for reasons I now can't remember) is a Kelley Comb Filler. This is a gasoline-powered device that was intended to spray sugar syrup into empty combs.[2] With no intended insult directed to the Kelley Company, I could never find much use for it. It was slow, messy, and noisy. I thought it to be too slow for commercial beekeepers and too expensive for hobby beekeepers, but it did spray syrup into empty combs; however, I felt that the gasoline-powered pump might have value in moving the corn syrup from drum to feeder.

I rolled the unit out of storage only to discover that the three hp engine – having hardly three hours of run time – had a thoroughly gummed up carburetor. Though I know how to rebuild the carburetor on a small engine, I felt that it would not be worth my time to get parts and do the task *(refer to the comment above about beekeeping being only part of my life).* In fact, the carburetor was so gummed, that the commercial repair company had to replace the carburetion device for a bit less that $150. Ouch. Yet more money had to be invested in this project.

This is a risky article that I am writing for you for I have not yet had the unit pump syrup. I went to the Beekeeping Department at my local home center and bought a hose adaptor (3/4" MH x ½" MIP) so I could attach a heavy-duty garden hose to the output port. I bought a universal rigid drain hose kit that (hopefully) will not collapse as the pump sucks syrup from the corn syrup drum. Presently, I don't know: (1) what will the pump do when I am not filling feeders and the engine is running (will I need a

Modified comb filler (syrup pump).

[1] The syrup provider was confident that the syrup would not crystallize so this would not be a problem.

[2] When this device was sold to me, corn syrup did not exist as a bee feed.

Goldenrod blooms, but no goldenrod honey.

shunt?) and (2) will the intake hose and the pump have to be primed before it will pump syrup from the drum. My goal is to pump the syrup directly from the drum on the bee truck to either top or division board feeders. I am putting you through all these plans because I am a one-man show. I will be the guy getting feeders out of storage and onto the colonies. I will be the only guy monitoring the feeder levels, and I will be the guy putting all this equipment away. I must use machinery as much as possible or this project has no hope of success.

Why am I in this predicament?

I'm the guy who writes the articles. Should I not have the answer? True, last Spring was really wet, but it didn't rain every day. Sweet clover stayed in bloom longer than I can ever remember – until mid-August. White clover was everywhere. Yet, no Spring honey crop – none. Autumn came and Goldenrod, and other autumnal plants came on strong. I awaited the autumn "stink" of the goldenrod crop in the bee yard, but it hardly came. There was rain, but the weather seemed to be good and without a horror story, yet no honey crop. It would be easy to become paranoid. This past year, there have been blooming plants during both Spring and Fall. The bees seemed to show copious flight from the colonies, but no honey crop – not a drop. Soil type, excessive moisture, not enough moisture, nighttime temperature, mite loads, herbicides – what was the reason. What should I do differently next year? I simply don't know and it is very frustrating.

Misery loves company. It is not just me. I have spoken with numerous beekeepers who report small to non-existent honey crops. Specifically, one Ohio beekeeper with 75 colonies, has decided to go the route I didn't choose – don't feed and don't treat and next Spring split from those that survive the Winter. If we all got bumper honey crops every year, honey would have no value. We would be awash in it. But I would have loved to have gotten enough to have the bees comfortably pass the Winter.

Goldenrod all looks the same to me. Are there different varieties – some better for bees than others? Without an obvious answer, I continue to ask, *"Just what makes a bad year a bad year?"*

And then there were mites

Honey crop or not, we can depend on the mite crop. I've got one. More labor. More costs. As are all of us, I am still learning how to reduce mite populations, but do it efficiently and economically. As I feed colonies, I can only appraise which need mite treatment and which does not. I don't have access to secret chemicals. I can only treat correctly and legally and do it for years to come.

Why are some stronger than others?

Splits, packages, swarms, and established colonies – apparent randomness abounds in my apiaries. In each category, some look okay while others look terrible. Most colonies had new queens from different sources. All were foraging in the same arena. Clearly some colonies were better at the foraging game than others. For me, it's just more unanswered questions. Some colonies make crops while others don't.

I'm whining

Last Spring, I took a chance and it simply didn't pay off. For the past two articles, I have been whining to you about my bee problems. Now, I must scramble to salvage my investment. It happens in agriculture all the time. Good crop years – bad crop years. Did I think it would never happen to me? All I can do is employ good beekeeping procedures, feed as much as is practical, and take my lumps. The best I can do is all I can do; after all, it's only a hobby – right? BC

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Make Your Own EXCELSIOR HIVE COVERS

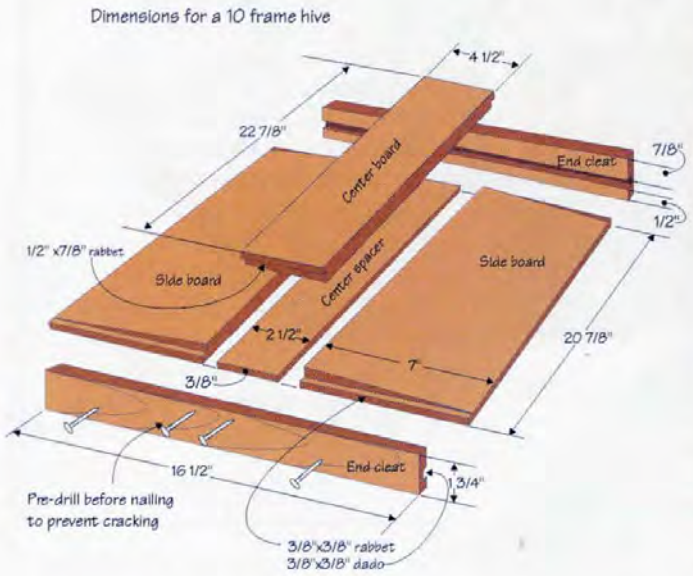
Peter Sieling

One hundred years ago, beekeepers commonly used Excelsior covers on their hives. The name must have originated with a zealous marketer, although the meaning, "higher" or "always upward", appropriately describes something that fits above a super. It was a big improvement over a single wide plank with cleats nailed across the ends. Made of narrow boards, the excelsior cover did not warp and crack. The side boards slide freely in grooves, allowing the wood to expand and contract with natural humidity fluctuations. The pitched and overlapped boards shed rain.

The original design required the use of specialized equipment. In those days no one would even try to make one in a home wood shop with hand tools and at best a treadle powered table saw. Today it's easy to make your own excelsior cover in a shop equipped with a planer and table saw.

Excelsior covers were used mostly on the narrower eight frame hives. The widest boards could be milled from

nominal 1" x 6" lumber. A 10 frame hive requires 7"-wide side boards, well within the capacity of small planers. Dimensions included here cover both sizes.



Milling the parts

1. One hundred years ago, most lumber was planed to 7/8". Today, dimensioned lumber is 3/4"-thick. 3/4" lumber will work if that is what you have, but properly sawn rough lumber will still yield 7/8". Thicker lumber allows a steeper pitch to the roof. Plane all parts to 7/8". Straighten

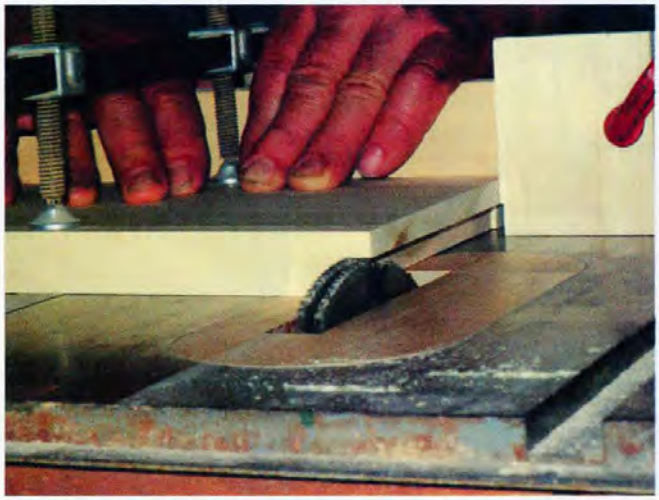
Suitable woods

Decay resistant woods may last longer than non-resistant species, but rot resistance isn't as critical to a painted top as it is to a bottom board. The sun damages covers more than rain. The excelsior cover accommodates normal wood movement – side boards expand and contract freely but stay flat by riding in the grooved end cleats. Any stable, easy to work wood will last many years with regular maintenance. Tulip poplar is widely available and inexpensive. While not considered a rot resistant wood, it will last many years. Other suitable woods include pine, cedar, cypress, and redwood. If possible, avoid knots and other defects.

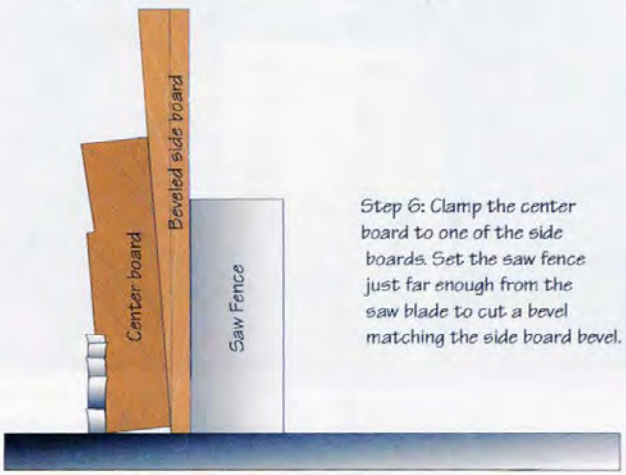
one edge on a shaper, jointer, or table saw and rip the different parts to width. Leave everything the same thickness for now. Crosscut the components to length except the center board. It's safer to leave it a little longer and trim it to fit after assembling the other parts.

2. Set the table saw rip fence 7/8" from the dado blade. Mill a 3/8" x 3/8" rabbet on the end cleats (photo step 2).

3. Finish planing the center spacer to 3/8" until it fits into the rabbet on the end cleat.



4. Mill a 3/8" x 3/8" tongue on the ends of the side boards. The tongue should fit easily into the end cleat groove. If you remove the waste wood with a dado cutter, take multiple passes, raising the blade a small amount each time until the tongue just slides into the groove. If you make several covers at once, you can increase accuracy and save time by clamping a stop block to the miter fence (photo step 4) to automatically align parts for identical cuts.



Step 6: Clamp the center board to one of the side boards. Set the saw fence just far enough from the saw blade to cut a bevel matching the side board bevel.

6. Mill the roof pitch on the side boards. Place the side boards on the piggyback board, aligned along one edge and mill in several passes until the thinner edge equals the thickness of the tongue (photo step 6).

5. Make a beveled piggyback board. A planer planes one face parallel to the face that slides along the table. To create a taper across the width of the board, the stock rides on top of a board already milled to the desired taper.

For either eight or 10 frame hives, cut a 2"x8" board to 20"-long. Rip to 7"-wide. If you are making 8 frame hives you can use a 2" x6" by 20" and leave it the full width. Cut a shim from scrap stock 3/4"-wide by 20" long. Rip or plane the shim to 1/2"-thick if your side board stock is 7/8"-thick or 3/8" if you are using 3/4" stock. Place the shim under one edge of the piggyback board and run both through the planer until the board is wedge shaped across its width (photo step 5). Friction between the two pieces will prevent slipping, but if you aren't comfortable, glue the shim to the board. Mill the board before the glue hardens and then peel off the shim.

7. Mill the pitch on the center board. Clamp the board to a side board or the piggyback board (photo step 7). Adjust the fence to the exact thickness of the combined center board and side board. The blade height isn't critical as long as the center section is narrower than the center spacer.

8. With the dado blade, cut rabbets on the lower side of the center board ends to fit the top. Raise the blade a little at a time until the board sits firmly on the side boards with the lapped portion fitting snugly over the end cleats (photo step 8).

Parts List for 10 frame cover

Number	Part	Size	Notes
2	side boards	7/8" x 7" x 20-7/8"	
1	center board	7/8" x 4½" x 22-7/8"	Leave oversize for final fitting
1	center spacer	3/8" x 2½" x 20-7/8"	
2	end cleats	7/8" x 1¾" x 16½"	
8	nails	6d x 2"	

Parts List for 8 frame cover

Number	Part	Size	Notes
2	sideboards	7/8" x 5¾" x 20-7/8"	
1	center board	7/8" x 4½" x 22-7/8"	Leave over length for final fitting
1	center spacer	3/8" x 2½" x 20-7/8"	
2	end cleats	7/8" x 1¾" x 14"	
8	nails	6d x 2"	

9. Assemble the cover. Cross cut the center board to the exact length of the cover. That should be 21-7/8" but may vary a little.

Before nailing the cover, caulk the underside of the center board for extra protection. Use one nail through the approximate center of each side board to allow for wood movement. Use two nails in each end of the center board.

Finishing

Covers suffer the worst exposure to the elements and need a good weather resistant finish. The 1909 edition of *Langstroth on the Hive and the Honey Bee* recommends coating with roof-cement. I used an oil based self-priming aluminum paint, partly because of its light reflective quality, but mostly because I had it on hand.

The apicultural industry has had many fads throughout its history. Like the once "indispensable" dummy board and the straw mat, the Excelsior cover has disappeared, replaced by the telescoping cover. As time and conditions change, it's worth reevaluating old equipment styles. The excelsior cover is easier to make than a telescoping cover and doesn't require an inner cover. It gives your hives a quaint old-fashioned look. With periodic maintenance, they will last for many years. BC

Charles Martin Simon

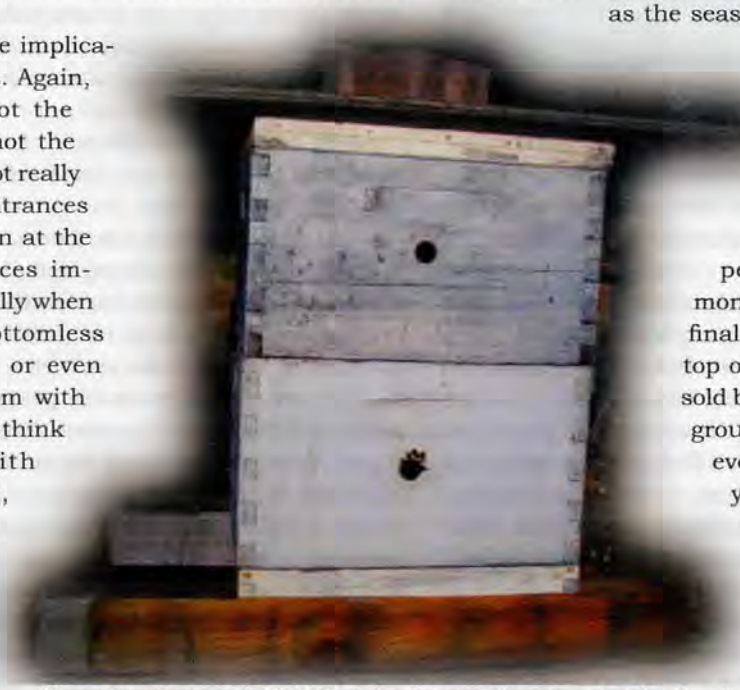
Going Topless!

In previous articles I discussed Beekeeping Backwards (Everything you know is wrong), Foundationless and Bottomless Beekeeping.

I am neither the first nor the best with these techniques. I am just one man who has, and still does these things; who gave them cute names; worked and still works them in the field; wrote and writes about them.

Bottomless is not always really bottomless. It is best, though, when it is. But often it needs to be modified: for top pollen trapping, moving hives, and preventing robbing (I'm not sure preventing robbing is a valid reason, as robbing might be a good thing in terms of the big picture, long-range gene pool enhancement), and possibly temperature control in cold climates (I'm not sure about this either. Indications are that moisture is more of a problem than cold.)

Now I discuss the implications of going topless. Again, I'm not the first, not the only, and certainly not the best. And topless is not really topless. It refers to entrances at the top rather than at the bottom. Top entrances improve air flow, especially when combined with a bottomless or modified bottom, or even a conventional bottom with entrance, although I think that for coping with current conditions, entrances should not be at the bottom period, and that the term "topless" can include any entrance, as long as it's not in the normal position at the bottom.



The only entrances ARE NOT on the bottom. They may be the classic one-inch hole, like here, a pollen trap on top, or just a top entrance.

When bees enter at the top, skunk predation is eliminated immediately, provided your stack is at least two deeps or one deep on a stand at least eight inches high. Skunks don't climb, and their reach is only up to 16 inches.

Trapping pollen at the top is a topless situation. There is never any debris whatsoever in top trapped pollen, not to mention enhanced circulation and ease of removing the trap. That the bees crawl down instead of up through the stripping screens does not influence the yield and is actually easier on them.

Neither dead bees nor anything else will clog a top entrance. Sound unimportant? But I am concerned about clogging entrances. Do you think maybe I'm being paranoid or overly prophylactic about something that might possibly but isn't likely to be a problem? Let me illustrate my concern . . .

Once upon a time, BV (before *Varroa*), I had a stand of fifteen hives among the farms of Watsonville, California. Watsonville is a dwindling farming community, and there were many more farms back then. It took some effort to find a location in the area, but I was motivated, and when I did, I thought I was in honey bee heaven. Indeed, as the season progressed, my hives were seven deeps high, really incredibly strong, absolutely loaded with honey. Back then, I still thought it was about honey. You know, we all know, the pernicious formula: honey is money. I was just waiting for the final capping before harvesting. On top of all that good stuff, it was all sold before I even got it into jars. Two groups in Los Angeles were buying everything I could deliver every year – retail. Things were going so well I wasn't paying enough attention.

I went to that yard to start pulling supers when I calculated they were ready, visions of the trip to LA and money and dancing girls dancing in my head, and found...no bees flying. Every single one of those fabulous hives was dead, totally, completely, absolutely dead. I couldn't get my mind around it. It was unthinkable that they could just die; they were doing too well. I had to believe there had to have been foul play involved, and it turned out there was.

Inspection revealed that all the hive entrances, conventional bottom board entrances at that time, were

Making several double screened bottoms from old equipment.

plugged with bees and that there was a layer of dead bees a couple of inches thick on the bottoms. Bee carcasses blocking the entrances had suffocated them. All the supers were silent.

Further investigation revealed that some mentally defective farmer had been spraying his cucumber fields with insecticide while they were in bloom. (Currently, another mentally defective farmer has been spraying his apple blossoms within striking distance of my hives. But it hardly bothered my bees at all this time, because the hives are bottomless and topless. There has been the poisoning of some bees, yes, and that is unfortunate, but the hives were basically not affected and recovery was quick and virtually seamless.)

But back then, what happened was the poisoned bees returning to the hives had died in sufficient numbers to block the entrances and cut off the air flow, causing more bees to die which even further blocked the entrances. The heat built up and a melt-down ensued with honey trickling from the bottoms like blood. I've smelled many dead things in my time, but I think dead honeybees have to be the worst. Maybe I could have salvaged some honey, but I was too despondent to even try. I opened the hives and let them get robbed out.

I had gone to Watsonville specifically thinking it would be good for the bees to get close to the farms. I was so stupid back then I didn't realize how stupid farmers could be. I thought farms were good just because they were farms. I had wanted to be a farmer myself. I had majored in agriculture in college. But I could not relate to what they were trying to teach me. I saw that conventional agriculture was not going to do it, so I dropped out and joined the organic farming movement. But due to some psychological flaw in my makeup, I held onto the notion that if they were farms, they were good.

Now I understand that farms are questionable. The best of them are best at doing the wrong things the right way, but they're still the wrong things. Unless they are organic. But even those might not be right. I recently visited an "organic" farm where I observed the strawberries growing under a tight blanket of black plastic covering the ground, the plants poking through little holes, just like conventional strawberries are grown, around here at least. Upon being questioned, the farmer said he had to do it or he couldn't make any money. We all know plastics give off toxic substances, such as PVCs and zeno-estrogens, especially when it's heated. Imagine vast fields of black plastic baking in the sun so the farmer can make money selling us contaminated produce labeled "organic".

I could go on about how the agri-industry dovetails into the food processing industry which dovetails into the drug industry, the specific Triangle of Evil that brings us the epidemic of unnecessary sickness and premature death that is so prevalent today. But I won't. This is not the place for sociological observations. This is about topless bee management – what it is, what it isn't, and why.

Had those hives back then been topless, that disaster would not have occurred. And it will never happen again, not to my bees, by God.

Whereas it is possible for a conventional screened bottom board to get covered and plugged with dead bees to such an extent that it could suffocate a hive, it is totally not possible with a truly bottomless setup or a modified bottomless setup combined with a topless variation.

Do you see where this is going? Do you see the importance? It's not about controlling the idiots out there. There's no way to control them. They're out of control. It's about controlling the idiots in here. For the past 150 years or so, techniques of bee management have been oriented to increased production. The side effects have been/are devastating. We need to focus on techniques that develop the survival skills of the hives themselves, or they won't survive. Without bees we won't survive, at least not in the manner to which we are accustomed. An acre of almonds produces 500 lbs of nuts without bees. With bees, it produces 3000 lbs. Get the picture?

A case could be made for keeping the entrance along the stack below the top, in order to maintain a nice tight cap in order to keep heat in. Might be better to run a propolis trap at the top and let the bees themselves decide how much air to let through, at least during the hot season. But then again, propolis traps are black plastic cooking in the sun, which makes me think about building some wooden ones. But whatever, I like to keep a nice piece of plywood on top of the top overhanging on all sides, to protect the equipment and keep water out of the opening, maybe not so critical if the opening is somewhere along the stack, but definitely when the opening is a slot directly at the top.

When the bees enter and exit at the top and crawl down instead of entering at the bottom and crawling up, they are influenced away from the bottom, and anything keeping them off the bottom, if or when there is any kind of bottom, is a good thing.

With a screened bottom, some *Varroa* might hang on

the screen and reattach to bees that might be crawling around. Also, screened bottoms can get propolized to greater or lesser extent and plugged with debris forming convenient platforms for the parasite, which is why screened bottom boards, although they help, do not by themselves get the job done.

When using screened bottoms, I often use two, one on top of the other with a space in between (the space between preventing bee communication through them, which can be a problem when using a single screen with entrance higher up, especially during the transition time before the bees have fully oriented to the upper entrance concept. I have a hive right now on which I switched the entrance from conventional bottom to the second super from the top. Those bees still land at the old entrance location at the top and then march up to the new entrance. They mostly all still do it and it's been changed over two weeks. So you have to accommodate them during training and transition time. During that time, if they can contact bees through the screen, they will get hung up there.).

An old medium-depth super with sheets of 1/8 in. screen stapled over the top and bottom works well; just turn them over when necessary. But you do get debris between the screens, and they will eventually get clogged. The solution is to cut the supers laterally, making up to four single-screened bottoms out of one medium-depth super. (See photos.) A full-depth will yield up to six screened bottoms. You could actually get more, but I'm comfortable with these numbers, and two fingers interlocking at each joint makes a good strong connection.

Worn-out supers are usually worn out on one edge. Just trim off that edge and you've still got plenty of good wood to work with.

Do I need to point out that you should take care to make your cuts between the nails?

These super-section screened bottoms are the bees knees.

You can use one or two depending on whether there is bee communication or not. They can be duct taped to the bottoms for moving bottomless hives. Very convenient, very versatile, very light weight, much simpler and sturdier than the commercial screened bottoms, with increased health benefits, and a good use for worn-out supers.

It's all about fresh air. We can live a couple of months without food, maybe a week or a little more without water, but just minutes without oxygen and we will be dead. The attempt to improve production by maintaining a tight hive is a contributor to degeneration in bees, as it is in humans.

The one-inch hole that used to be *de rigeur*, presented simply as a fact of life, its benefits never really stressed or explained enough, went out of favor and just about disappeared completely as a result of the compulsions of modernization, everything lined up, everything tight and tidy.

It's time to go back to the one-inch hole (more Beekeeping Backwards). But it's not just for ventilation anymore. I mean using it for a main entrance, combined with an entrance-less screened bottom. See photo of current hive model, with entranceless super-section screened bottom. But note there is a mistake with this setup. The lower upper hole is within skunk predation range, something I will correct by adding a few posts to the stand, when I get around to it, or I could simply close that hole.

There is no symmetry in Nature. Remember that. There are no straight lines. The attempt to actualize concepts of perfection is a completely human and generally futile pastime. Artificiality should be projected upon our beehives, if at all, only with extreme caution based on real awareness of what the goal really is. BC

Charles Simon goes topless, and bottomless, and chases yellowjackets in his spare time, in Soquel, California.

The Dance Language

Nest Scouts, and Shotgunning - Can It Be This Simple?

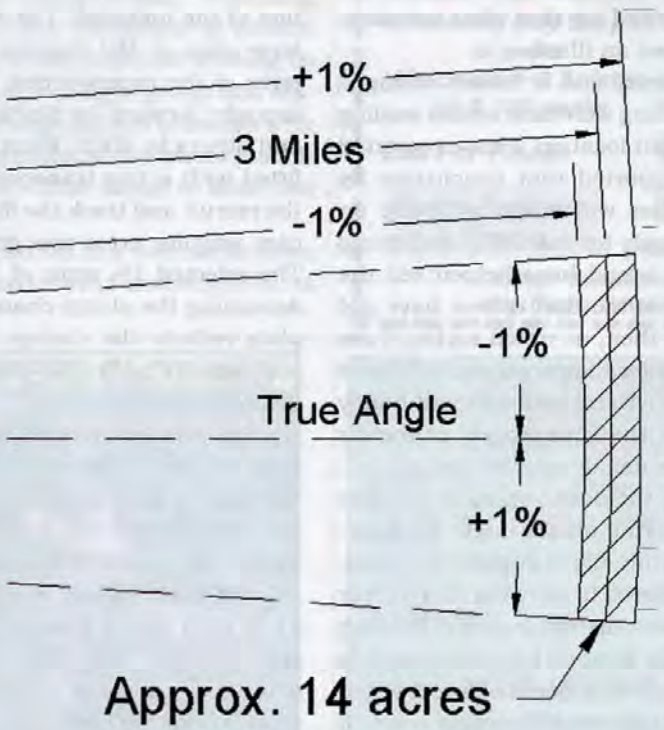
Walt Wright

In the last few years there has been a running battle between proponents and opponents of the effectiveness of the dance language of scouts or foragers to direct recruits to a forage source. The disagreement has oscillated since von Frisch learned to decipher the dance many years ago. At first, most agreed that his observations were a step forward in knowledge and a major contribution to the craft of beekeeping. As time wore on, and other investigators tested the concepts in different ways, doubt about the effectiveness of the dance crept in. A group of investigators emerged that set out to debunk the dance language as an effective way to induce recruited foragers to find the source of the dancers' enthusiasm. They contended that the forage source was located primarily by the equivalent of our sense of "smell." There is no doubt that the sense of smell of the honey bee is acute. We cannot even comprehend how acute.

After watching the flap unfold between the advocates and the naysayers for some time, I concluded that they both were probably correct. If we had just happened to come in during an evolutionary step forward in foraging skill, where the forager had learned to describe direction and distance, and the recruit had not learned to interpret that message, both sides would be correct. Should we come back in a couple eons, when recruits have learned to read the message, we would find them going directly to the forage source.

I'm glad that my erroneous conclusion was confined to my quarters. This year in ABJ (April) Emily Smith and Gard Otis updated us on some experiments published in more prestigious publications in recent years. It's like we dumb beekeepers didn't have a need to know. There's a lot of data generated that we don't see – even subscribing to both ABJ and this magazine. In the Smith/Otis article, not counting von Frisch's original work and a thesis, eight periodicals and two university press outlets were listed in the references, plus two entries in a German publication. Five separate references were published in Nature magazine alone. Several other periodicals had been referenced two or more times. Do you think we may be getting left in the academic dust?

The more recent experiments convinced me that the bees *do* use the information contained in the dance language to their advantage. But this submittal is relevant to a circumstance where the dance language is not good enough. The reproductive swarm is reported to travel in excess of five miles, sometimes, to a distant nest site selected by nest scouts. Assuming those distances to be correct, any error in the dance data is amplified the further away the nest site is from the parent colony. We'll come back to this later. This introduction is just to provide some background for a short observation yarn and a discussion of that observation.



A description of the observation follows: The truck was located to the side of a row of colonies such that the flight path of foragers could be seen. The reason for observing the flight path was just to determine the direction of most forager traffic. The colonies were backed up to some trees for afternoon shade at the top of a low ridge overlooking the river bottom less than a half mile down hill.

At that time, a hypothesis had been developed that early season colony decisions were based on forage availability. An active monitoring of field forage was an on-going interest to confirm or refute the hypothesis. Unfamiliar with forage sources across the river (eight miles by road with bridges), I wanted to know roughly what percentage of foragers were working over there. As feared, most were headed in that direction, and very few climbed up and over the trees behind them. Scratch this group of hives from evaluation of the hypothesis. This beekeeper was not going to scout the mix of forage sources across the river. But that is not what this submittal is about.

Lighting was very good for observing the "streaks" coming and going. Sun angle, glinting on the wings, made them quite conspicuous in flight. And there were many at any one time. The hives wintered well and were quite strong. The season timing was early in the swarm issue period. At any instant there might be a dozen or more streaks in my field of view.

Having the info I came for in just a few minutes, I was about to move on when an outgoing streak got my attention. Eyes are attracted to, and follow, motion naturally. That prominent streak branched into five or six individual bees about 20 yards out, and the group continued in tight formation out of sight. Whoa! Did I really see what I thought I saw? Decided to stay a little longer to see if it happened again. It didn't take long. A prominent streak came from the third hive down the row (watching closer in) and did the same thing. Staying long enough to see two more occurrences convinced me that what was seen the first time was real and not an illusion.

My conclusion at the time, and it hasn't changed since, was that what I was seeing were nest scouts leading recruits to a promising distant location. I have regretted many times not having supported that conclusion by spending a few more minutes watching the group on the landing board getting ready for take off. Confirming completion of swarm preps would have helped sell the concept. It is inconceivable to me that others have not seen this phenomenon. But then, as noted earlier, I see only a small fraction of the information published about honey bees. Have you seen anything written about honey bees flying in formation like the Blue Angels at the air show? I think not, but that's mostly speculation.

Having failed to support the observation at the time with more data, and considering others might be interested, we have resorted to arithmetic to support the need. The dance language is considered to have too much error to direct nest scout recruits to a distant location. Finding that distant potential nest site location by scent (smell) is out of the question. A tree hollow in acres of forest is not anything like a forest with dispersed blooming trees. If the recruit finds any one of the scattered trees in bloom the dance has accomplished its mission. She can home in on the fragrance once in the area. A potential cavity in a residence located in miles of subdivision houses is also low in scent value. Forget smell.

With smell ruled out, that leaves the dance language. We have not the foggiest notion of how accurate that is. It's only recently that its use has been confirmed(?). The skeptics are not convinced yet. The controversy persists. Perhaps some of the smell advocates would like to take a crack at the question we are addressing here.

Back to accuracy of the dance language: I try not to guess much and report only what I see. If what I see has an obvious conclusion, I might report that as a conclusion, rather than a fact. You have the option to draw your own conclusion from the observation and ignore mine. In this case, data from another source will be used as a basis for the conclusion that will be supported with some arithmetic. We have for purposes of this discussion arbitrarily selected ±1%. We need a number to work with for the arithmetic. Two bees are involved – the dancer and the recruit. Each can add error in the message. The dancer can be a little off, and the recruit a little off in both her reading of the message and the flight application of the message. The ±1% error selected looks like a large slice of 360 degrees (360°), but is well within the error of the experimental data. One of the experiments brought forward by Smith/Otis was the work of Riley, and others in 2005. Recruits were collected on exit and fitted with a tiny transponder. They could then release the recruit and track the flight path with radar. The worst case angular error was greater than 10° on both sides. The selected 1% error of 3.6° is therefore conservative. Assuming the sharp change of direction on most of the plots reflects the change from dance directions to the odor search mode, the distance error is well outside our discussion error of 1%.

The shaded area of the sketch reflects the area to be searched by the recruit, if the nest site is three miles from the parent colony. Remembering the pi factor of circle area calculations has a 3.14 multiplier, further distances build area numbers at a rapid rate.

Without walking you through the calculations, the ±1 % error yields almost 14 acres of trees. Using a tree spacing of 20 feet between medium to large trees per acre (also arbitrary) yields about 1,500 trees that need examination by the scout armed only with dance directions. The scout looking for a nest cavity must check the whole tree trunk, all the way from the ground up, and all the way around. She is looking for a dark spot that may be an opening. She will check dark spots more closely that do not turn out to be openings. The search is a time-consuming effort.

That is not a practical way to go about it. Honey bees are efficiency experts. I remember reading somewhere that conservation of resources is a cornerstone of their survival format. That concept has applicability here. To send a nest scout to a forested area to look for the tree hollow that has already been found by a nest mate makes no sense at all. What better way to get a review of the site by others than to have the original finder lead them there? That group then, in turn, can lead others to the site.

Another factor to be considered is the urgency of nest site scouting. The swarm that left the parent colony, without having selected a place to go, is in a hurry. They

Tip Of The Month

If you still have swarming, you might have an opportunity to see it yourself. Look for it on the settled swarm cluster that didn't move to a pre-selected nest site the same day. That cluster has increased motivation to get the vote finalized. And leave the swarm box at that location – at least until dark to collect nest scouts returning for nourishment. Those senior foragers will be an asset during the establishment phase.

"They contended that the forage source was located primarily by the equivalent of our sense of "smell." There is no doubt that the sense of smell of the honey bee is acute. We cannot even comprehend how acute."

left the parent colony with limited resources, and do not have much time for the "voting" process. Multiple potential nest sites must be examined by many bees in a short time to arrive at a consensus. There is not much time to cycle bees to multiple potential sites for comparison. Taking them there in groups by a guide that knows the way should definitely speed up the voting process.

I call this phenomenon "shotgunning." Watching the streak get larger until it was comprised of several individual bees reminded me of the dispersal of shotgun pellets. The pellets exit the gun in a tight group and disperse with distance to make a large pattern to insure a hit on the target game. If a description of the phenomenon exists under some other name, I'll be happy to make the adjustment.

Shotgunning was only seen on this one occurrence about 10 years ago. That same year investigation of checkerboarding started with a strong outyard in a different location. In the intervening 10 years, only two colonies swarmed. Both of those swarms were the result of failing to follow my own recommendations. Other priorities caused me to get a little sloppy in maintaining empty space at the top. This paragraph is not intended to brag but to point out that I may never see shotgunning again. BC

Walt Wright measures angles, and counts bees near his home in Elkton, Tennessee.

Honey Bees KEEP OUT!

Larry Connor

Structural, temporal, familiar, and engineering isolation keeps honey bees away from these flowers.

Most beekeepers ponder the reasons one species of plant produces flowers that prove to be highly attractive to honey bees while another species – one that appears very attractive – does not attract any honey bees at all. The second species may be covered with other bees, wasps, moths, beetles and an entire range of potential pollinators. With some effort it is possible to decode these differences, and find out why the first species is worked by honey bees and the second is not.

As an undergraduate entomology student at Michigan State in the mid-60s, I learned from one of my professors the following lesson: a good entomologist is also a good botanist. While it makes sense, it's not easy. Bees can discriminate between varieties or cultivars of the same species of agricultural crop or selected horticultural cultivar. So to paraphrase my professor: a good beekeeper is also a good bee botanist.

The coevolution of flowering plants and animal pollinators began over 100 million years ago. There were plenty of insects around at the time, and the selection pressure to associate specific pollinators to flowering plant species was high. Some plants only have one insect pollinator, and if the pollinator is destroyed by human or natural efforts, the flower species dies. This is abundantly clear in the orchid bees, where a rapid proliferation of new species – both floral and bee – developed as new habitats were forming in South America due to the movement of the earth's geological plates. There are an estimated 4,000 bee species in North America, and one explanation for so many species is the movement of the earth's plates and the uplifting of mountains. The repeated Ice Ages clearly had isolating effects that increased the number of species. The vast majority of the world's bees are solitary species – single bees living alone to build, provision and lay an egg one cell at a time.

This may seem somewhat abstract until you look at common plants that grow in your bee territory every year and yet the bees never or only rarely touch them. If we take some time, and dissect a few flowers, we can learn more about the role of floral structure and how it affects bee visits.

Flowers Honey Bee Rarely Visit

Most of us are familiar with common **Evening Primrose** (*Oenothera biennis* in the eastern part of the country, *O. rydbergii* in western regions), a tall woody herb that often grows as either single stems or sometimes has stems branched like a candelabra. It is found in open areas, along roadsides open fields and disturbed areas. A biennial (blooming in the second year), the flowers are bright yellow and cup shaped, 1.25 to 1.5 inches (3-4 cm) across. In Connecticut the evening primrose starts to bloom in June and continues until either drought or frost shuts it down, usually in September. It has indeterminate flowering, meaning it will continue to produce new flowers as long as the plant is healthy and has the nutrients and water to support growth. Once the plants have finished blooming the flower stems persist into the Winter, shaking seeds out of the very distinctive seed capsules. This is a variable genus, and other species can be found throughout the country, differing in flower size and color of

Stem end of a four-foot common evening primrose in Connecticut. The western and eastern species are very similar, and the genus is quite large. Most share the same flower structure. These are moth-pollinated flowers, with a long calyx ending in the ovary that develops into a seed capsule. Bees cannot collect nectar from these flowers, but they can collect pollen.

Close up of the floral structure of the common evening primrose. There are four yellow petals, a single stamen terminating in five pistils, and eight anthers, that appear to have given up their pollen.

Stemless white evening primrose in Idaho. A close relative to the common evening primrose species. There is no stem; the leaves and flowers arise from a woody carrot like root.

the petals. In years of looking, I have yet to see a honey bee on the flowers of this plant. It didn't make sense to me, since the flowers appear to be very attractive and open during the evening and into the morning hours, and remain open on cloudy days, when the bees could gather pollen and nectar.

A relative of the Evening Primrose is the perennial **Moon-Rose or Stemless White Evening-Primrose** (*Onenothera cepitosa*) that grows between 3000-7500 ft., and can bloom anytime between April and September in open, dry spaces, often clay flats and roadways in the Rocky Mountains. It is also called the tufted evening primrose or sometimes sandlily; there are related species in different habits and parts of the country. It is unique because it lacks a stem. The leaves and flowers all come out of the ground from a well established, thick woody, carrot-like, root system. The flowers are white when they appear in the evening and turn pink the next day (I have found no explanation for the color change). The flower is cup shaped, about 1.5 to 2.0 inches across (4-6 cm), with four petals and what appears at first glance to be a flower stem. It is not a stem; this plant is stemless. On inspection, the structure is actually part of the floral tube or calyx, and the ovary is located two to four inches (5-10 cm) from the stigma and style. The pollen must be placed on the stigma of the flower and germinate, growing down the flower this considerable distance.

When you see a floral structure like this, you should know that bees are unable to obtain nectar from the nectary located at the bottom of the calyx because their tongues are not long enough to reach. Instead the flowers are visited and pollinated by night-flying creatures with very, very long tongues, primarily moths. The most likely culprits are sphinx moths, whose larvae feed on the leaves of the plant. It is a very tight system for insects and plants living in very dry, steppe-like conditions with an annual rainfall of three to four inches. I saw the plants growing on a gravel roadbed going into the mountains near the tallest peak in the state, Mt. Borah, 12,662 feet (3,861 meters). (We had gone to this area because it was the site of the October 28, 1983 magnitude 7.3 earthquake that lifted Borah Peak seven feet from 12,655 feet to its current elevation of 12,662. My brother and I ended up sitting in the middle of the road taking photos of these fascinating flowers).

Bees do visit these flowers for pollen. A small bee, probably a ground nesting *Halictus* spp., remained on the flower as I took photos; systematically working the anthers to harvest the pollen. The bee also worked the mouth of the long corolla tube to collect pollen that had been placed there by some moth pollinator. Indeed, when I cut the floral tube to reveal the long pistil, I found pollen along the outside of the tube where it is doing neither bee nor plant any good at all, since most moths feed only on nectar. The *Halictus* bee also removed pollen from the multipart pistils, collecting pollen for her brood provisioning while robbing the flower of pollen that may or may not have already germinated. This does not concern the bee in the short term.

Flowers from which bees collect only pollen

There are many flowers with calyx's that are too long for bees to collect nectar from but provide pollen for visiting bees. Recently I noticed honey bees visiting the flowers of **Hosta** growing in a garden. These are large bell shaped flowers, but I have not observed honey bees visiting them for nectar. On this particular day, worker honey bees were actively collecting pollen from the anthers of the flowers, using a biting behavior very similar to the *Halictus* I observed on the moon-rose, mentioned above.

Honey bees collect pollen from a wide range of floral sources. While the **Hosta** was in bloom there was abundant pollen in the many fall composites, the smartweed/knotweed complex of flowers, as well as abundant goldenrod in the neighborhood. Honey bee colonies almost always collect a wide range of pollens, even if it seems logical that the bees

Stemless white evening primrose showing the newly opened flower stamens and pistils. As flowers age overnight they turn pink and sometimes red before they close (background flowers).

Field dissected primrose flower on the author's jeans. The long green structure is the stigma ending in the five-part pistil where pollen is deposited by night flying moths. The pinkish calyx protects the stigma and is often mistaken for a stem.

Close up view into the base of the stemless white evening primrose, showing the long pistil extending into the length of the Calyx (orange area in photo). The nectaries are located at the end of the calyx, two to four inches away from the anthers.

Ground nesting Halictus bee using her mandibles to remove pollen from the pistil of the stemless white evening primrose flower. While much smaller than a honey bee, the Halictid is still able to collect pollen for provisioning its nest. This bee also collected pollen in the opening of the calyx, apparently moved there by night flying pollinators, probably moths.

Honey bee approaching a common Hosta flower with the protruding white tipped pistil and the yellow, pollen laden anthers. Note the pollen basket on this pollen forager. This bee is unable to collect nectar from this flower.

A common Hosta in the garden has a flower corolla and calyx that is too long for the bee's tongue. That does not prohibit the forager to collect pollen from the anthers, using behaviors similar to the Halictus bee working the primrose flowers.

Male carpenter bee (Xylocopia) uses its strong mouthparts to separate the flower structure this Wisteria. Male carpenter bees have a yellow mark on their "face."

Tiger swallowtail butterfly shows the long tongue it uses to probe flowers like this zinnia. Night flying moths have similar mouthparts; often longer. They visit night-blooming flowers with extremely long calyxes that often produce a perfumed odor.

concentrate on abundant sources. This probably reflects a nutritional balance the bees have to achieve to be successful as a colony over time; it is better to have 20 to 200 different pollens stored in a hive than just one or two. Some of those minor pollen sources may help balance the colony's nutritional needs. In the pollen collection studies I have reviewed, the times when bees collect primarily one or two pollen sources is when there is little else available. Two examples: in Michigan after the main pollen/nectar flow was done in agricultural areas, the bees collected a very large percentage of pollen from *corn* tassels (a potential hazard if insect controls are applied). And in October, when most other flowers have finished blooming, an abundant supply of **Aster** pollen was stored, undoubtedly because it was the only thing still available.

Wisteria and Carpenter Bees

Living in an older part of New Haven in an area of homes built on average a century ago, there are well established flower gardens. A large **Wisteria** (*Wisteria* spp.) vine is on the side of the house, and the dominant bee species on this flower are the carpenter bees (*Xylocopia* spp). There are both native and Asian Wisteria vines growing in the country, and I do not know which species this is, although is seems identical to most I see in established locations, parks and in the wild.

A member of the Pea family, the beautiful wisteria flower has a simple mechanism for nectar presentation. There is no long floral tube. Instead, the flower offers nectar near the surface of the flower, but the petals must be moved slightly to reach that nectar. This not a problem for robust carpenter bees, because they are larger in size and have short mouthparts. I have not found heavy pollen foraging on Wisteria and do not know how much is produced; and the seed set is always light in spite of heavy floral visits from dozens of foragers.

The carpenter bees are some of the largest we have in North America. They may be confused with bumble bees (*Bombus* spp.), but are often more metallic and less hairy in appearance. The mouthparts are the best way to determine species if you have any doubt; the carpenter bees have extensive jaw like mandibles for chewing holes and tunnels in wood for their nest site. There are two common species in the eastern part of the United States: *Xylocopa virginica* and *Xylocopa micans*.

Why don't honey bees visit these flowers? I suspect that while it may be due to a limited nectar production, flower size and strength are more of an issue. But the carpenter bees are very aggressive foragers, and may keep other bee species away from the flowers. The carpenter bee and the wisteria flower have been a team for thousands of years, if not much longer. Honey bees visit some members of the Pea family, but not all; this may be one of those plants the honey bees will forage when nothing else is bloom, but when the Wisteria blooms in May and June, the bees are given a wide range of flowers to visit, perhaps another Pea family member, the black locust trees.

Conclusion

These flowers show us a few key ways flowers work to keep unwanted pollinators from visiting them. The evening primroses have **structural isolation mechanisms** that restrict pollinators to long tongued pollinators. They also have **temporal isolation** by blooming from late afternoon to early morning, so the pollinators must fly at night, like the moths. This may be an adaptation to the harsh environment in which some of the species live, but certainly not all. Other plants, like Wisteria, have evolved close relationships with a dominant pollinator species, the Xylocopids. Finally, some bee species are restricted to pollen foraging; something that benefits both the bee and the flower, even if the bee was not "engineered" as the primary pollinator. BC

To learn about the first Southern New England Beekeeping Assembly November 18 cosponsored by Dr. Connor and Wicwas Press, contact www.sneba.com. Contact Dr. Connor, email ebeebooks@aol.com.

FEEDING PROTEIN

Pollen, or a substitute is easy to feed to your bees.

Tim Arheit

Pollen Patties

Bees need more than just the carbohydrates from honey, sugar syrup or corn syrup to survive. They also need protein that usually comes from pollen, especially when raising brood.

Many beekeepers may never need to feed pollen or pollen substitute. The bees typically will store enough for their use and when supplies run short they will stop raising drones and eventually will stop raising brood entirely until pollen again is available. Thus the bees tend to manage their supplies fairly well and this is enough for many beekeepers. However, there are many reasons why you may want to feed pollen or pollen substitute:

- Early Spring buildup so you can make early splits.
- Buildup in preparation for pollination (especially almond pollination).
- To force building in preparation for a strong nectar flow.
- To encourage early drone rearing for preparation for raising early queens.
- To maintain drone and brood rearing though a strong dearth (again important for rearing queens in some areas)

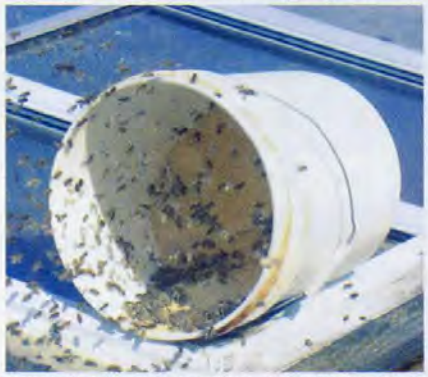
Open feeding pollen substitute

In fact, a protein source (pollen or pollen substitute) is critical for raising drones which is very important for rearing queens. When there is a shortage of protein drone brood is the first to go, and in severe dearth even adult drones may be removed from the hive. (Steve Taber covers this in his book *Breeding Super Bees*)

In warm weather when bees can fly open feeding dry pollen substitute is a good easy method of feeding and I use this method myself when possible. It is as simple as putting out a bucket on it's side with pollen substitute in it. It creates quite a feeding frenzy but doesn't seem to cause any fighting. Of course when the weather isn't warm and dry this obviously won't work. Feeding pollen patties which are placed right in the hive is the solution. You can buy pre-made patties or you can mix your own.

Making Pollen Patties

Mixing pollen patties is fairly straight forward though the first time I mixed them up I made quite a sticky mess. Plus when mixing up more than just enough for a couple patties at a time it can take a long time if mixing by hand or with a small kitchen mixer. Hopefully the instructions here give you a few ideas to make it easier for you. When mixing up small batches of pollen patties it probably isn't worth buying the raw ingredients for the dry substitute and mixing it yourself.



Open feeding dry pollen substitute. Bees love this when it is warm and no other sources are yet available.

My daughter helping to mix pollen substitute in a five-gallon bucket.

Using a creaming screw to mix pollen substitute. The mix pictured here is still too thin.

Pollen substitute mixed and ready for forming patties.

Scooping the pollen dough into the 'envelope.'

Rolling the patty flat with a rolling pin.

Sealing the 'envelope' with the impulse sealer.

Cut a V and peel back the paper.

A smoker may be needed to drive the bees down before placing the patty.

The patty placed on the hive. The patty was cut in half to avoid interference with the syrup feeder placed on the inner cover.

Even before the cover of the hive was replaced the bees started consuming the pollen patty.

Complete pollen substitutes are available from many beekeeping suppliers. However, If you wish to mix them yourself links to *pollen substitute recipes* are listed at www.honeyrunapiaries.com/16.231.0.0.1.0.phtml

I use Bee-Pro from Mann Lake myself, though other substitutes are available. None of them are a perfect replacement for pollen and you can add about 10% real pollen to the mix to improve both acceptance and nutrition. However, be aware that bee pollen can carry both American Foul Brood spores, chalkbrood spores and can spread these diseases. If you use pollen in the mix either collect your own pollen from hives you know are disease free or buy irradiated pollen.

In a five gallon bucket I mix half a bucket of pollen substitute to approximately 1/3 a bucket of sugar syrup (2:1 sugar syrup or corn syrup). The syrup should be added gradually until the mixture is reasonably stiff and not runny. The mixture will stiffen up after you mix it as the substitute absorbs the liquid so don't mix it too stiff. A creaming screw normally sold for making creamed honey works well for mixing bucket quantities. A good 1/2" drill with a relatively low RPM should be used. The typical inexpensive variable speed 3/8" drills tend to be higher RPM and don't have enough power at low RPM. The drill I used is a 1/2"7.5Amp 500 RPM drill. Smaller quantities can be mixed by hand or a mixer with attachments for mixing bread dough.

I find it easier to form the patties themselves right after mixing up the substitute and syrup as it does get stiffer if you wait till the next day. If you intend to use the patties the next day then putting the pollen dough between pieces of wax paper works well. However, the wax paper will become soggy over time making them hard to handle. And wax paper isn't a great moisture barrier, letting the patties dry out if not sealed in a container.

The solution I've found to this is to use freezer paper. It has a thin plastic coating the bees have no trouble chewing though yet it makes a good seal with an impulse sealer. I start by cutting the freezer paper into strips about eight to 10 inches wide, folding it over with the shiny side *in* and sealing the two sides using the impulse sealer. This makes a pocket or envelope that the pollen dough can be scooped into. I typically put about 1.25 pounds of dough in each then roll them flat using a rolling pin. This step is much easier if the dough is not too thick and is rolled right after mixing up the substitute before it has thickened up. Then the last side is sealed with the impulse sealer. This makes a patty much like the pre-made patties available from several venders that can be stored for quite some time before use.

Feeding the Bees

Your pollen patties can be placed on the hive even when it is relatively cool because it is a quick operation that doesn't need to break up the

cluster and doesn't involve removing frames exposing brood to the cold. Still, I prefer to wait till a warm day when at least some bees are flying though that is not always possible.

The patties are installed just like the pre-made patties. First, cut a V in the paper and peel it back exposing the pollen dough. Then open the hive exposing the top of the cluster. If the cluster is in a lower box you may have to remove or lift up the top box because the patty should be placed just above the cluster. You may have to smoke the hive and possibly use a bee brush to make the bees move down between the frames so you don't squish the bees when placing the patties on. When feeding the bees sugar syrup at the same time with a top feeder as I do, I will cut the patty in half, still using both halves, but placed so that the feeder that is placed over the hole in inner cover is not blocked. BC

Tim Arheit feeds bees when necessary and is involved in other beekeeping activities from his home in Delphos, Ohio.

The Honey Garden

Combining honey bee pollinated garden crops with honey recipes. The best of two worlds.

Connie Krochmal

Apples are by far the most popular tree fruit. No fruit planting would be complete without them. To a large extent, the size and quality of the fruits are determined by the growing conditions and weather.

Growing Conditions

Because these trees have a chill requirement, zone nine is usually the southern limit. They do better where the growing season is at least 135 days.

Choose an open, sunny spot. In areas prone to late spring frosts, elevated sites allow the cold to drift below without harming apple buds and blossoms.

So far as soil is concerned, loams are best. But, apple trees grow well enough on any well-drained spot so long as their needs for water and nutrients are met.

Space-Saving Apple Trees

For most home gardens, space-saving apple trees, such as dwarfs, mini-dwarfs, and columnars, are the best options. Gardeners can buy most any cultivar they want on dwarf rootstocks. By choosing small trees, you'll find harvesting and caring for the plants is easier. They also begin bearing at a younger age, and yield larger crops of better quality fruits.

With a few exceptions, true dwarfs are usually six to eight feet tall, while mini-dwarfs or miniatures only reach four to six feet.

For small gardens, columnar apple trees are by far the best choice. These can even be grown in pots. In addition, three-on-one or four-on-one trees would be suitable for they feature multiple cultivars grafted onto a single trunk.

Choosing a Cultivar

With over 6500 cultivars available, there is an apple to suit every taste and need. To make selection easier, focus on the most important factors, such as chill requirements, winter hardiness, desired fruit characteristics, and intended use (i.e. cooking, fresh, juice, cider). Sample fruits from the kinds you are considering if you aren't familiar with them.

To minimize the need for spraying, select disease resistant apples. Any number of these is now available, including newer ones, such as Easygro, Jonafree, Jonamac, and Macfree. In addition, some heirlooms show some disease resistance. Among these are Tompkins County King and Yellow Transparent.

Of the newer ones that resist diseases, the following apples are outstanding. These grow best in zones four through eight.

Freedom

Very productive, Freedom is a vigorous tree that is resistant to fire blight, cedar rust, mildew, and scab. The ➢

RECIPES

Ann Harman

Apples and honey just belong together. No, I am not talking about pollination, although that is an important part of the relationship. I am talking about cooking – using apples and honey. I trust that you are using honey as the sweetening in apple pie and applesauce. Slices of apple dipped in honey make a super snack. Now is the time of year to take advantage of the apple harvest. Many varieties of apples are on the market. About the only common one not recommended for cooking is the Red Delicious. Use that one dipped in honey for your snack.

Rome apples make excellent baked apples. Now most people put some honey and cinnamon, perhaps a few nuts, in the hollow. However, you really should try other stuffings for that baked apple. Try some of these but just one at a time: peanut butter (crunchy is best), chocolate chips, grated cheese, cinnamon candies, butterscotch chips, cream cheese, cooked sausage or ham or bacon. You can use the microwave to make baked apples. Place the stuffed apples in individual bowls. Cover with waxed paper and microwave on HIGH: one apple = two to four minutes, two apples = four to 5½ minutes, three apples = six to eight minutes, four apples = nine to 10 minutes.

Apples are so versatile that recipes seem to fit into all the items on our menu. And don't forget apple cider and apple juice. Any recipe book will have enough apple recipes to keep you busy as long as you can find apples on the market, which now is all year around.

PAN-FRIED APPLE FRITTERS WITH APPLE-HONEY DIPPING SAUCE

These are so good you'll probably want to make a double batch. Great with bacon and eggs for breakfast or served alongside pork chops for dinner.

2/3 cup all-purpose flour
2 teaspoons baking powder
1/2 teaspoon ground cinnamon
1/2 teaspoon ground ginger
1/4 teaspoon salt
1/2 cup plain yogurt
2 eggs, separated

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crisp, juicy, all-purpose apples store well. They ripen mid-season.

Gold Rush

Bearing at an early age, Gold Rush resists scab, and fire blight. Maturing late in the season, the apples are good keepers. This tree has a tendency toward biennial bearing.

Liberty

Immune to scab and cedar rust, Liberty bears heavy crops. Noted for their excellent flavor, the all-purpose apples are excellent fresh, but are also good for cooking. These have a good storage life.

Planting Apple Trees

Planting is done mostly in late Winter and early Spring since the trees are readily available then. For container plants, the planting hole should be twice as wide and the same depth as the root ball. Place bareroot trees with the graft union several inches above the soil surface. Backfill with the soil you removed from the hole. Soil amendments, such as manure or top soil, are unnecessary.

Spacing is determined by the variety and the ultimate size of the tree. Columnar ones can be planted two feet apart. For dwarfs, allow about six to nine feet between trees in rows that are 10 to 12 feet apart. However, vigorous types, such as Liberty and Sweet Sixteen, will need a little more room.

After planting dwarf trees, erect posts or trellises. Otherwise, these plants can't adequately support the heavy crops of apples.

Caring for Apple Trees

Like all fruit trees, apples produce better crops when they receive good care. When the trees are young, weeding is especially important. An organic mulch helps to suppress weed seedlings. For large home orchards, grass or ground covers can be grown between the rows.

Apple trees need watering during dry periods. Regard-

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1 TBL. unsalted butter, melted
2 tablespoons sugar
2 cups apples, such as Granny Smith or Gala, peeled, cored and grated
vegetable oil for frying
1/2 cup honey

Preheat oven to lowest possible setting (no more than 250°F) and line a baking sheet with paper towels.

Mix together the flour, baking powder, cinnamon, ginger and salt. In a separate bowl whisk together the yogurt, egg yolks, melted butter and sugar. Add the flour mixture and stir well. Let sit for at least 30 minutes or up to one hour. Squeeze the grated apples completely dry, reserving the juice. Whip the egg whites until they form soft, moist peaks. Add the apples to the yogurt and flour mixture. Fold in the whipped egg whites very slowly and gently. In a heavy skillet, heat about 1/8" of oil over medium heat. Drop the batter by heaping tablespoons into the oil, spreading the batter gently into an oval shape about 2½ to 3" long. Avoid pressing or flattening the fritter with a fork. Cook for 2½ to three minutes on the first side. Turn and cook for two minutes on the other side. The fritters should be quite dark. Place them on the baking sheet and keep warm in the oven. Heat any additional oil used for each batch before frying.

While the fritters are frying, reduce the reserved apple juice by cooking in a small heavy saucepan over high heat until one-quarter of the liquid remains. Skim off any foam. Add the honey and bring to a boil for three minutes.

Serve the fritters with the apple-honey dipping sauce on the side. Makes 15 fritters.

Covered In Honey
Mani Niall

This next recipe can be used as a breakfast or as a dessert.

GIANT APPLE PANCAKE

3 tablespoons butter or margarine
4 eggs
1 cup milk
1 cup all-purpose flour
1 tablespoon sugar
1/2 teaspoon salt
3 tablespoons butter
3 apples, peeled, cored, sliced
3 tablespoons light-brown sugar
1 tablespoon lemon juice
1 tablespoon brandy or 1 teaspoon vanilla
1 cup sour cream
1 tablespoon sugar
1/4 teaspoon cinnamon
1/8 teaspoon nutmeg

Preheat oven to 425°F. Place three tablespoons butter in a heavy oven-proof 10-inch or 12-inch skillet. Melt butter in oven. Place eggs and milk in blender and blend until combined. Add flour, sugar and salt and blend on high for one minute. Pour into hot skillet over melted butter. Bake for 20 minutes. Pancake will be very puffy.

While pancake cooks, melt three tablespoons butter in a saucepan and sauté apple slices and brown sugar until apples are translucent. Add lemon juice and brandy or vanilla and boil to reduce liquid. Keep warm. Beat together sour cream, sugar, cin-

ing fertilizer, most soils will likely need some nitrogen. For best results, run a soil test before you plant. Then, follow the specific recommendations provided with your test results.

Training, Thinning, and Pruning Apple Trees

Proper training is needed to create a strong vertical trunk with sturdy side branches, which are held at 30 to 45 degree angles from the horizontal. This should begin when the apple trees are young.

For best results, prune lightly each year. Limit pruning to the removal of weak, diseased, or dead wood and those branches that are shaded by other growth.

An apple tree sets more fruits than it can sustain. Much of the excess will naturally fall during the "June drop." Despite that, hand thinning is often needed. When you thin, leave one fruit per spur or cluster. Thinning results in larger, premium-quality fruits, and encourages the tree to bear annually rather than biennially.

Problems of Apple Trees

A number of insects and diseases affect apple trees. Among the most common insects are the apple maggot, leaf roller moth, plum curculio weevil, and the codling moth – responsible for the worms you find in apples. For maggots, hang several apple colored and sized plastic balls in each tree during late June or early July. Coat these with Tanglefoot. The balls can be removed once the insects quit laying eggs on them.

Regarding diseases, the most serious ones are the dreaded apple scab, fire blight, powdery mildew, and cedar rust. Natural sprays, such as light summer oils or Surround (a kaolin-based product) can minimize both insect and disease occurrence.

There are other good ways to prevent some of these problems. First, select disease resistant apple trees. Prune so the sun reaches all the branches. Proper sanitation also helps. So, remove and destroy fallen apples, diseased plant tissue, and apple debris from around the plants during the fall clean-up. By doing this, you help prevent pests and disease spores from overwintering on the site.

Pollination and Status as a Bee Plant

Even when an apple cultivar is partially self-fruitful, production will be better with cross-pollination. Crabapples can serve as pollenizers. The intended pollen source should be within 85 to 100 feet of the one needing pollination. Many mail-order catalogs have helpful charts listing compatible apple cultivars.

Assuming the Spring weather is warm and dry when the trees are flowering, honey bees collect lots of nectar and pollen during the one to two-week bloom period. Apple blossoms fill a valuable role by stimulating brood rearing. ➢

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namon and nutmeg. To serve, spread apple mixture over hot pancake and cut in wedges. Garnish with sour cream mixture.

The Farmer's Cookbook
Mitzi Perdue

Have you ever thought of combining apples and onions? Give this next recipe a try since it is an excellent dish to accompany ham, sausage or pork chops.

BAKED APPLES AND ONIONS

8 tart apples, pared, cored and sliced into rings
2 large sweet onions, peeled and sliced into thin rings
2 tablespoons butter or margarine
salt and freshly ground pepper to taste
2 tablespoons sugar or honey
1/2 cup cracker crumbs tossed in 2 tablespoons butter or margarine
1/2 cup hot water

Grease a deep two-quart baking dish. Arrange half the apple slices in bottom of dish. Cover with half the onions. Dot with 1 tablespoon butter and sprinkle with half the seasonings (salt, pepper and sugar). Repeat layers. Sprinkle crumbs over top and pour in hot water. Cover and bake at 350°F for one to 1½ hours, until tender. Makes six servings.

Treasured Recipes From Early New England Kitchens
Marjorie Blanchard

Apples seem to enhance ham and pork. This recipe is delicious and quickly made.

BOURBON-APPLE PORK CHOPS

4 (6-oz.) lean pork chops (½" thick)
1/2 teaspoon garlic powder
1/4 teaspoon pepper
1/4 teaspoon allspice
1/4 cup unsweetened apple juice
1/4 cup bourbon
1 teaspoon Worcestershire sauce
2 tablespoons water
1 teaspoon cornstarch
1 medium Granny Smith apple, cored and cut into rings

Trim fat from chops. Coat a large non-stick skillet with cooking spray. Place over medium-high heat until hot. Add pork chops and brown on each side. Sprinkle garlic powder, pepper and allspice evenly over pork chops. Add apple juice, bourbon and Worcestershire sauce. Bring to a boil. Cover, reduce heat and simmer 10 minutes or until pork chops are tender. Transfer chops to serving platter and keep warm. Combine water and cornstarch, stirring until smooth. Stir into skillet and cook until mixture thickens, stirring constantly. Add apple rings to skillet and cook until thoroughly heated. Remove from heat and spoon over pork chops. Serve immediately. Makes four servings.

Cooking Light Cookbook
OXMOOR HOUSE

Enjoy apples. They are beautiful to look at and delicious to eat. So use them in many ways, but don't forget to make apple pie sweetened with honey. I think Eugene Field said it best in a poem: "The best of all physicians is apple pie and cheese!"

The premium-quality, aromatic honey varies from very light amber to pale yellow. As it ages, the flavor becomes milder. Granulation occurs irregularly over a lengthy period. Under good conditions, the honey surplus can range from 45 to 80 pounds per colony per year.

Harvesting Apples

For long-term storage, pick apples before they're fully ripe. For eating fresh, let them ripen on the tree. Ripe fruits are well-colored, firm, and crisp with a good flavor. Most easily separate from the plant when they're ripe if you gently twist or pull on the apples. The exceptions are both kinds of Delicious.

Due to weather conditions, the harvest period can vary slightly from one year to the next. Generally, most ripen between late August and November. However, this does depend upon the cultivar.

The fruits on a particular tree will ripen over a period of several weeks. Therefore, several harvests are needed. Pick very carefully to avoid bruising the fruits as this reduces the storage life.

Apple tree yields can vary based on the tree's age and growing conditions. Dwarf trees yield from 30 to 60 pounds per year.

Storing Apples

For long-term storage, cool conditions are needed. Examples would include root cellars and well-insulated or refrigerated facilities. Place the fruits on trays with the stems up, setting them far enough apart so they don't touch. BC

? DO YOU KNOW ?

Basic Colony Management

Clarence **Collison**
Mississippi State University

For many beekeepers, another season is finished, the honey crop has been harvested and colonies have been prepared for Winter. Now it is time to begin planning for next year as well as developing management strategies for producing strong productive colonies. The distribution and negative impact of the small hive beetle continues to increase. *Varroa* mites, tracheal mites and American foulbrood remain a concern. Factors that affect queen and drone quality are also foremost in beekeepers' minds. To be effective managers, it is important to understand basic bee biology and learn to recognize a few subtle cues that describe the condition of the colony. Fall and Winter is also an important time to catch up on your reading and review of recent beekeeping research.

Please take a few minutes and answer the following questions to determine how familiar you are with these important topics.

Level 1 Beekeeping

1. In the north please indicate how small hive beetle adults survive the Winter. (1 point).
2. ____ Italian honey bees are more susceptible to small hive beetle infestation than Russian honey bees. (True or False)
3. ____ Feed Bee® is a new pollen supplement on the market that is formulated to emulate the natural diet of the honey bee. (True or False)
4. ____ Within sandy soils the majority of small hive beetles were found to pupate at a depth of 1-10 cm and within 30 cm of the hive entrance. (True or False)
5. ____ Worker honey bees cap worker, drone and queen cells and are also involved in removing the cappings prior to the emergence of the adult bees. (True or False)
6. ____ Hypopharyngeal glands (brood-food glands) are found only in the worker caste of honey bees. (True or False)
7. Caste determination in the female honey bee is dependent on the diet received during the first ____ larval instars.
   A. three
   B. six
   C. two
   D. four
   E. five
8. ____ Older worker honey bees are more aggressive toward newly introduced virgin queens than young workers. (True or False)
9. ____ Saliva that is used by honey bees to moisten materials that they chew is produced by the mandibular glands. (True or False)
10. ____ In mead production, generally dark honeys are more difficult to ferment than light colored honeys. (True or False)
11. In natural bee nests about ____ of the total comb area is drone comb.
    A. 8-12%
    B. 1-5%
    C. 17-21%
    D. 13-17%
    E. 4-8%
12. ____ In both American and European foulbrood, the vegetative stage (rod-shaped bacterial cells) is the infective stage. (True or False)
13. ____ Adult female *Varroa* mites can survive on dead adult worker and drone honey bees for at least two days. (True or False)

Advanced Beekeeping

14. ____ Oxalic acid is effective in controlling both *Varroa* and tracheal mites. (True or False)
15. ____ Oxalic acid is found naturally in honey. (True or False)
16. ____ Oxalic acid treatments are most effective in the Fall when a colony is broodless. (True or False)
17. ____ Chronic bee paralysis virus kills larvae, pupae and adults only in association with *Varroa* mites, otherwise bees seem healthy. (True or False)
18. ____ The use of queen mandibular pheromone increases queen acceptance during the introduction of a new queen during the requeening process. (True or False)
19. Name three different application techniques that can be used in treating colonies with oxalic acid. (3 points)
20. Name two functions of the hypopharyngeal gland. (2 points)
21. Compare the differences in the hypopharyngeal gland found in summer and winter worker honey bees. (2 points)
22. ____ The corpus allatum is the only well developed endocrine organ in the early larval stages of the honey bee. (True or False)

ANSWERS ON NEXT PAGE

?Do You Know? Answers

1. Small hive beetles become incorporated into the bee's Winter cluster.
2. **True** Comparison of Italian and Russian honey bee colonies indicated that Italian honey bees are more susceptible to small hive beetle infestations, having significantly higher colony mortality. Observations suggested heightened aggressiveness toward small hive beetle adults by Russian bees. This behavior may have played an important role in survival of field colonies.
3. **False** Feed Bee® is a new pollen substitute made from 100% natural vegetable ingredients. Feed Bee contains no chemicals, soy products, animal products, pollen or hive products. It has been closely formulated to emulate the natural diet of the honey bee. It can be either fed dry, or mixed with syrup, or mixed with water to make patties.
4. **True** The majority of small hive beetles were found to pupate in sandy soil at 1-10 cm depth and within 30 cm of the hive entrance. More than 75% of all beetles were found in the first 10 cm of soil and about 83% within 30 cm of the hive entrance in south central Florida.
5. **False** Worker bees construct and cap all three types of brood cells found in the honey bee colony. No subsequent work is done on worker and drone cells until the bees in them have emerged. Worker bees, however, remove the tip of a capped queen cell at some time before the emergence of the queen. Thus the queen only needs to chew through her cocoon.
6. **True** Only the worker caste of the honey bee has hypopharyngeal or brood food glands.
7. A) Three
8. **True** The age of the workers influenced their behavior towards a virgin queen introduced to them. Young workers seven days old accepted an introduced virgin queen, whereas older workers (14 and 21 days) usually rejected her.
9. **False** The source of saliva honey bees use to moisten materials they chew with their mandibles comes from the labial (post-cerebral and thoracic) glands and not from the mandibular glands. The mandibular glands have no mechanical connection with chewing, and their outlets are not on the mandibules.
10. **False** In general, light honeys are more difficult to ferment than dark honeys in the production of mead. Light honeys consist principally of sugars and water; lacking in nitrogen, phosphate and vitamins that stimulate yeast growth and fermentation. As a result, light honeys require more additives in the form of vitamins, minerals and nitrogen than dark honeys to enhance the fermentation process.
11. D) 13-17%
12. **False** The pathogen that causes European foulbrood is a non-sporing forming bacterium, therefore, it only occurs in the vegetative stage and is the infective stage. American foulbrood has both a spore and vegetative stage and the spore stage is the infective stage.
13. **True** Female *Varroa* mites can survive on both dead worker and drone honey bees; significantly longer on workers compared to drones at similar temperatures. Longest average survival (71± 1.1 hours) was recorded on dead workers compared to 56 ± 1.4 hours on dead drones at room temperature.
14. **False** Oxalic acid is a good tool for reducing Varroa mite populations but not honey bee tracheal mites.
15. **True** Oxalic acid is a natural ingredient in honey and its concentration depends largely on the botanical origin. The natural content levels in plants are much higher than are found in honey.
16. **True** Oxalic acid treatments are most effective in broodless colonies, so late Autumn or early Winter treatements are recommended when temperatures are between 32-55° F.
17. **False** Acute bee paralysis virus, not chronic bee paralysis virus, kills larvae, pupae and adults only in association with *Varroa* mites. Otherwise the bees seem healthy. Bees infested with chronic bee paralysis virus become listless crawlers with trembling to dislocated wings and are often hairless and greasy in appearance. "Hairless, black syndrome."
18. **False** Tests have shown that the use of queen mandibular pheromone during the requeening process does not provide any increases in requeening success. Queen mandibular pheromone was added to colonies prior to or during new queen introduction.
19. Trickling, Evaporation, Spraying
20. The hypopharyngeal glands of the honey bee secretes invertase or sucrase that is used in the ripening of honey from nectar and supplies the protein in the food that workers give to developing larvae.
21. Summer Bees- The hypopharyngeal glands following nursing activities shrink in size and increase in invertase content as the bee ages.
    Winter Bees- The hypopharyngeal glands of bees of all ages are large and rich in invertase.
22. **True** The corpus allatum is the only well developed endocrine organ in the early larval stages of the honey bee and has been shown to have control over the later phases of metamorphosis in the honey bee.

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

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

GLEANINGS

NOVEMBER, 2006 • ALL THE NEWS THAT FITS

GRANTS AVAILABLE

The Northeast Sustainable Agriculture Research and Education (SARE) program offers three different grant programs to explore innovative approaches to sustainable agriculture, all with application deadlines in the late Fall and early Winter.

Farmer Grants are for commercial farmers who would like to test a sustainable new practice, often by conducting an experiment, trial, or on-farm demonstration. Projects can explore a wide range of topics such as pest management, soil health, renewable energy, adding value, marketing, or new production techniques, and funds can be used for materials and to pay farmers for their time. The application is straightforward and comes with a how-to guide that gives examples from past applications. Awards are capped at $10,000 and the deadline is December 22.

Partnership Grants are for Cooperative Extension, NRCS, and other service providers who work directly with farmers. Partnership Grants support on-farm research and demonstration projects in sustainable agriculture, and funds can be used to pay for personnel, materials, sampling, supplies, testing, and to compensate cooperating farmers for their time. Awards are capped at $10,000 and the deadline is December 5.

Sustainable Community Grants are for projects that connect farming and economic development. Awards are capped at $10,000, and the application deadline is November 28.

To learn more about SARE, its different grant programs, and its educational offerings, go to www.uvm.edu/~nesare or call 802/656-0471. The Northeast SARE region is made up of Connecticut, Delaware, Massachusetts, Maryland, Maine, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, West Virginia, and Washington, D.C.

HONEY PRODUCERS PARTICIPATE IN VOLUNTARY QUALITY ASSURANCE PLANT AUDIT TRAINING

The first training sessions for a proposed honey industry Voluntary Quality Assurance plant audit program were successfully conducted in August in North Dakota. Additional training sessions will be conducted at various sites through the end of September.

The training sessions were conducted by honey industry representatives with inspectors from the U.S. Department of Agriculture's (USDA) Processed Products Branch. Inspectors are using an audit developed by U.S. beekeepers and other honey industry representatives. The USDA inspectors have indicated their willingness to provide an inspection program tailored to the needs and wants of the honey industry.

Participation in the training sessions is providing honey producers an excellent opportunity to obtain free feedback on their facility and have input in the development of the audit program.

Representatives from five honey industry groups participating in the 2006 honey industry roundtable in late June endorsed their support for the proposed voluntary plant audit program. The groups are American Beekeeping Federation, American Honey Producers Association, National Honey Packers & Dealers Association, Western States Honey Packers & Dealers Association and Sioux Honey Association.

NHB conducts research, advertising and promotion programs to help maintain and expand domestic and foreign markets for honey. These programs are funded by an assessment of one cent per pound on domestic and imported honey.

EL NIÑO ON THE WAY

The National Oceanic and Atmospheric Administration (NOAA) announced in September that the ocean warming that is El Niño has returned to the tropical Pacific Ocean. In August, both human forecasters and computer models had some inkling of the worldwide weathermaker's return, but a sudden warming ushering in El Niño caught them by surprise. Experts predict that the warming could bring some good news: a reduction in hurricane activity in the Atlantic Ocean.

El Niños occur every three to seven years, bringing patches of unusual warmth, dryness, coolness, wetness, and combinations thereof to various parts of the world. The last such event happened in 2003. In its monthly "discussion" issued 10 August, NOAA's Climate Prediction Center (CPC) in Camp Springs, Maryland, had noted that winds and ocean warming had in recent months begun to favor a weak El Niño by the end of the year and that the forecast models were leaning that way too. Within just a week or two, however, the surface waters of the tropical Pacific Ocean began warming faster, a hefty 1°C by early September. That was enough to convince forecasters as well as their models that "we have got the beginnings of an El Niño, and it's going to continue," says CPC's Vernon Kousky. Some of the models are calling for the weak beginnings to strengthen into a moderate El Niño.

USDA NEWS

FARM BILL ANALYSIS PAPER – Agriculture Secretary Mike Johanns released (September 13) a comprehensive analysis of key factors that will affect future growth in U.S. agriculture: international trade, research and development, protection of agriculture from pests and diseases, and challenges in preparing the next generation of farmers. "This paper looks at the evolution of the agricultural marketplace and the strategies that farmers have used to meet emerging challenges," Johanns said. "As we discuss a new farm bill, we must consider how best to support future growth in agriculture." The analysis paper is available at www.usda.gov/farmbill.

$4.5 MILLION FOR ORGANIC RESEARCH – The USDA is awarding more than $4.5 million in research grants to address organic agricultural issues, priorities, and global competitiveness. "To succeed in organic agriculture, producers must be creative and willing to take certain risks, attributes that American farmers have exhibited since the early days of farming," Agriculture Secretary Mike Johanns said. "This research will help organic producers to manage their risks by providing information that will help to increase production while decreasing costs." Contact: Jennifer Martin (202) 720-8188.

PROMOTING FARMERS MARKETS – Grants totaling $900,000 to establish, expand, or promote local farmers markets, roadside stands, and similar agricultural ventures under the new Farmers Market Promotion Program (FMPP) was announced (September 8) by Agriculture Secretary Mike Johanns. "Farmers markets are popular throughout the country and beneficial for both farmers and consumers," said Johanns. "It gives farmers an outlet to sell their products, and consumers access to fresh, locally grown food." For a list of recipients visit: www.ams.usda.gov/news/newsrel.htm. Contact: Becky Unkenholz (202) 720-8998.

EASIER SWEETENER

Genetically engineered bacteria that eat hemicellulose in corn fiber and other sources could set the stage for a new, biobased method of making xylitol, a mint-flavored sweetener used in chewing gum, toothpaste, mouthwash and other products.

Xylitol is produced naturally by many fruits and vegetables, and even to some degree by the human body. It is used as a sugar substitute because it has one-third fewer calories, imparts a cool mint flavor, helps fight cavity-causing bacteria and can pass through the human gut without involving insulin.

In studies at the center's Fermentation Biotechnology Research Unit, Saha and colleagues used an approach called metabolic pathway engineering to retool the enzyme-making machinery of E. coli bacteria so that they could convert two hemicellulose sugars--xylose and arabinose--into xylitol. At the laboratory scale, the bacteria were kept inside special biofermentors and fed a "broth" of corn fibers or other hemicellulose sources. The xylitol they excreted was later purified from the broth as a white, crystalline powder.

Under the cooperative agreement, Saha is helping zuChem develop a commercial-scale process that could cut xylitol's production costs and open the door to its manufacture in the Unites States from corn and other homegrown crops.

ARS is the U.S. Department of Agriculture's chief scientific research agency.

EPA BENDS

Unions representing thousands of staff scientists at the Environmental protection Agency say the agency is bending to political pressure and ignoring sound science in allowing a group of toxic chemicals to be used in agricultural pesticides.

Leaders of several federal employee unions say the chemicals pose serious risks for fetuses, pregnant women, young children and the elderly through food and exposure and should not be approved in November, the Congressional deadline for completing an agency review of thousands of substances in pesticides.

"We are concerned that the agency has not, consistent with its principles of scientific integrity and sound science, adequately summarized or drawn conclusions" about the chemicals, union leaders told the agency administrator, Stephen L. Johnson, in a newly disclosed letter sent May 25.

The leaders also wrote that they believed that under priorities of EPA management, "The concerns of agriculture and the pesticide industry come before our responsibility to protect the health of our nation's citizens."

Nine union leaders representing 9,000 agency scientists and other personnel around the country signed the letter. It was given to The New York Times in August by environmental advocacy organizations working on their behalf in the hope that it would arouse public outcry and increase pressure on the agency to withdraw the chemicals from use.

The chemicals at issue are organophosphates and carbamates, long a matter of controversy over their environmental and health risks. They are in such pesticides as chlorpyrifos, methyl parathion and diazinon.

The complaints from agency employees are the latest to come from within federal agencies that accuse the Bush administration of allowing politics or industry pressure to trump science on issues like climate change and stem cell research.

MILLIONS FOR EU AG PROMOTION

The European Commission, the executive arm of the European Union (EU) approved 31 programs in 19 member states to promote agricultural products in the 25-nation bloc.

The total budget of the programs running between one and three years is 55.3 million euros (about 71 million U.S. dollars), of which the EU will contribute half.

The selected programs cover organic products, agricultural quality products, dairy products, meat, wine, fruit and vegetables, plants, honey and potatoes.

"EU farm products are unique in their quality and diversity," said Mariann Fischer Boel, Commissioner for Agriculture and Rural Development.

"It is not enough to produce excellent food and drink, we also need to get smart when it comes to marketing. EU programs of this sort can really help our producers in an increasingly competitive world."

OBITUARIES

Warren Guy Wilbanks, 85, died Saturday, September 16. He was born January 28, 1921 in Banks County. Warren attended Banks County schools and North Georgia College. He was a veteran of WWII serving in the Philippines and Japan. Warren built a beekeeping business with his father and his sons to become one of the nations leading suppliers and a worldwide shipper of package bees and queens.

He was past-president of Wilbanks Apiaries, Inc., past-president of the American Bee Breeders Association, past-president of the Georgia Beekeepers Association, and past-president of the Southern States Beekeeping Federation.

Warren was a member of the First United Methodist Church in Claxton where he had served as chairman of the official board. He was a member of the Service Sunday School Class.

Surviving are his wife of 60 years, Vernelle Gailey Wilbanks; two sons and daughters-in-law, Tommy and Janice Wilbanks of Statesboro and Reg and Alva Wilbanks of Bellville; one sister, Emily Betts of Brunswick; one granddaughter, Jessica Wilbanks of Macon; two grandsons, Patrick and Natalie Wilbanks of Statesboro and Tim and Sarah Wilbanks of Washington, Iowa; one great-grandson, Ben Wilbanks; and one great-granddaughter, Ansley Wilbanks.

Remembrances may be sent to American Diabetes Association, 5105 Paulsen St., Savannah, Ga., First United Methodist Church, 401 W. Main St., Claxton, Ga. 30417 and American Heart Association.

Millard Coggshall died Tuesday, August 29. He was 91.

One might say Millard Vernet Coggshall was a family man – past, present and future.

Coggshall did extensive research into his family tree, tracing it back to the 11th century, and traveled to England to find his roots. For future generations, he put together a family-history book explaining the past in his own words.

"The most important thing to Father was his family," said his daughter Carol Coggshall of Ocala. "In family picture after family picture, he was always smiling."

Coggshall was born in Groton, NY. His father and grandfather were beekeepers, a career choice he would follow.

In high school, he lettered as a center in basketball and a first baseman on the baseball team. He was president of the high school senior class and responsible for organizing the five-year alumni reunions.

In 1937, he graduated from Cornell University in Ithaca, NY with a bachelor's degree in agriculture.

He married Genevieve Predmore in 1938.

Coggshall worked as a professional beekeeper in New York with his father.

In the early 1940s, he moved to Minneola – to the heart of orange country to produce orange-blossom honey.

Though he was a successful beekeeper, his son David Coggshall, principal of Clermont Middle School, said the hours were long, but the family enjoyed fishing or boating whenever they could.

Millard Coggshall was a member of and served as president of the Florida State Beekeepers Association and the Central Florida State Beekeepers Association. He received the Florida State Beekeepers Pioneer Award in 2002.

Coggshall was a charter member of the Groton, NY Rotary Club and joined the South Lake Rotary Club shortly after it was founded in 1955. He served as president and received the Paul Harris Fellow Award.

He was a member of the Minneola City Council. In the early 1960s, he served a term as mayor.

He served on the south Lake Hospital board for 25 years.

Michael Eugene Gardner II passed away September 8. He was 19 years old. Michael is the son of Michael Gardner, Sr. of Gardner Apiaries (Spell Bee).

Michael was a 2005 graduate of Zeeland High School and an avid outdoorsmen. His knowledge and love for the honey bees will be sure missed at Gardner's Apiaries, Spell Bee Company and The Holland Area Beekeepers Association.

Michael is survived by his parents, Mike and Pat; sisters, Rebecca, Jennifer, Deven and Amanda; many relatives and friends.

VARROA ERADICATED?

Beekeepers in New Zealand's South Island now are waiting to see if the attempt to eradicate *Varroa* has succeeded.

The last 300 hives of some 900 from the *Varroa* infested area near Nelson have been shipped to the North Island where *Varroa* is already endemic.

Varroa was first found in the Nelson area of the South Island in June. The government refused to attempt a formal eradication program but a coalition of beekeepers and farmers then went ahead with their own attempt with private and government funding.

If successful, it will be the first time *Varroa* has been eradicated from a region.

With the last of the bees shipped, Biosecurity New Zealand staff and volunteers began baiting all feral hives in the infested zones in an attempt to kill any mite-infected bees.

Biosecurity New Zealand policy adviser Paul Bolger told reporters the baiting program would be repeated after the coming southern Summer.

EVANSTON OKS BEEKEEPING LAW

The Evanston, Illinois City Council on October 9, in a 5-4 vote approved a beekeeping ordinance that does not ban the practice but places restrictions on hives and sets limits on the number of hives that residents can keep.

The regulations stem from a debate that began earlier this year when Gabriel Jacobs, 14, built a hive in his south Evanston backyard and bought 12,000 honey bees.

Jacobs and his mother, Susan Dickman, attended the meeting and voiced their concern about parts of the ordinance.

"Approving this ordinance as it stands sets a dangerous precedent. It's an example of democracy run amok," Dickman told the City Council.

"In the five or six months the hive has been there, nobody's been bothered or stung," she said.

But some residents in the area have said the hive would increase the risk of residents being stung and endanger people who have severe allergic reactions to bee stings. They also have voiced concerns over property rights because unwanted bees would be flying into their yards.

"This hive has been a nuisance," John Black, who lives four houses from Dickman, told the council. "I don't want my neighbor's bees on my property. Unfortunately, my neighbor can't control the bees."

Evanston officials had been meeting for months to decide whether the city should regulate beekeeping.

Under the ordinance that passed, a $25 city license fee was created, and approved a $500 fine for violating ordinance provisions.

There are also restrictions on the number of hives in each city ward.

The Illinois State Beekeepers Association showed a great deal of support by attending meetings and making presentations.

Illinois beekeepers – and others – wrote city officials in support of beekeeping. They even made appearances on Chicago radio shows. It seemed that the committee that was drafting the ordinance had a significant change in attitude after they had a chance to listen.

An email from Dickman "– The upshot was only a reasonable ordinance passed! I can't remember every piece of it, but it does not involve the 25 foot setback, it does not require a six-foot high solid fence, and it does not mandate an eight-foot high platform … it also does not grandfather in current beekeepers, adds a registration/licensing fee, and includes a stiff fine for beekeepers who do not comply with the regulations. So, in effect, it places responsibility on the beekeeper instead of trying to control the bees."

I am proud of Evanston for not going the way of Oak Park and Berwyn – for staying true to its progressive stance and pledge to be a gree city. A resource for others in this situation is the ISBA website www.isba.us. Support is available there.

submitted by Larry Krengel
President ISBA

APIMONDIA 2007 – AUSTRALIA

On behalf of the Australian Beekeeping Community and the Australian Honey Bee Industry Council I have great pleasure in inviting Beekeepers worldwide and their companions to Melbourne, Australia in September for Apimondia 2007.

All involved in the Australian honey industry are enthusiastic to host Apimondia. This will be the second time the Congress has been held in Australia, the first being in Adelaide in 1977 and we are eager to offer our colleagues hospitality and exhibit the beauty of our natural resources and some of the local Beekeeping sites of interest. Melbourne is regarded as one of the top conference destinations in the world and we hope that you will come to agree.

Melbourne has convenient access to a major international airport, where you can reach your home on the same or next day. In addition you can easily visit other spectacular parts of Australia through the convenience of many daily flights to the far north, the west, the red centre, or island state of Tasmania to the south.

We are very much looking forward to you joining us and to the scientific exchanges and social opportunities that the Apimondia Congresses provide. We are assembling a scientific and social program that will offer a memorable Melbourne and Australian experience for you and your companion(s).

We will keep you updated on what is on offer though our website. I suggest you mark this in your diaries as a "must do" conference in 2007.

All members of the beekeeping fraternity whether involved in research, honey production, pollination, recreational or professional beekeeping and their friends/relatives can be assured of a real welcome. Looking forward to seeing you in Melbourne in 2007.

Terry Ryan
Chair of the Organizing Committee

SHOPPERS CHANGE

Consumers are consolidating their shopping and placing more relative importance on speed and convenience, according to observations gleaned from "American ShopperScape 2006," a consumer shopping database managed by Retail Forward, a global consulting and market research firm based here. The firm's latest findings suggest that retailers that aren't among the top players in their respective channels are increasingly vulnerable to losing their share of shoppers as consumers narrow their store choice sets.

"Consumers' continuous shopping behavior changes are often driven by factors outside retailers' control -- their lifestyles change, they move, their tastes change -- but also factors within retailers' control," said Mandy Putnam, Retail Forward v.p. and author of "American ShopperScape 2006." "Change in shopping behavior is shifting the retail landscape gradually but indelibly. Retailers and their suppliers need to track change in order to remain relevant and participate in shaping the retail landscape."

According to American ShopperScape, increasing supercenter competition and rising gasoline prices have decreased the average numbers of discount stores and conventional supermarket retailers shopped by consumers in a four-week period.

American ShopperScape 2006 also reports:

-- Nearly 60 percent of consumers changed their shopping behavior to some extent this year.

-- More consumers are shopping and spending online.

-- Pricing changes affect consumers' shopping habits more than any other factor.

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THE SCOTTISH BEEKEEPER. Magazine of The Scottish Beekeepers' Assoc. Rates from Enid Brown, Milton House, Main Street, Scotlandwell, Kinross-Shire KY13 9JA, Scotland, U.K. Sample $1.

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THE AMERICAN BEEKEEPING FEDERATION has many benefits to offer its members. Send for a membership packet of information today! Contact the American Beekeeping Federation, P.O. Box 1038, Jesup, GA 31598, ph. 912.427.4233, fax 912.427.8447 or email info@abfnet.org.

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HIVELIGHTS, published by The Canadian Honey Council. Write Suite 236, 239-5149 Country Hills Blvd. NW, Calgary, AB T3A 5K8

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Display Advertisers

Everything breaks at once, and bad luck always kicks you while you're down. First it was the pickup, then the flatbed, now the ditch.

The pickup quit coming down from the Colorado Flat Tops, where I keep two honey bee yards at 9,000 feet. I'd just gotten down from the high country, when I passed one of Paul's Grass Valley yards. I was musing about how those hives could have so many supers on them, when my 1986 Ford F-150 pickup quit pumping gas.

My 1983 one-ton flatbed Ford was in the orchard, where neighbors would be less likely to complain. I figured I'd use it to haul the pickup to the shop, because my insurance company will no longer sell me towing coverage.

When the flatbed didn't start, I disconnected the fuel line at the carburetor. It wouldn't pump gas either.

When you drive beaters, you need a fleet. At least my '87 Toyota Tercel wagon never breaks down. When it got rear-ended and totaled, I bought it back from the insurance company for salvage. I put a bumper on it. Some of the doors work, and it gets 32 mpg. It hauls 27 medium supers without using the front seat.

I arranged to have the pickup towed to the garage. I wasn't too worried about the flatbed in the orchard yet, because I only use it to haul bees and honey, and it was early August, so what was the rush?

Paul extracts for me. When I talked to him later in the week, he said, "I've got a pretty good mite load. I'm going to take off honey starting the middle of August so I can treat. Can you get your Flat Tops honey to me by September 1st?"

Now that put things in perspective. I realized I'd better pull honey when I could, because I work four days a week for wages. That leaves three days for the bees, but we've finally gotten some rain, and the road to my Flat Tops yards is a no-go after a downpour. Not only that, it can get cold at 9,000 feet, even in August, and I prefer to take off honey in hot weather when the Bee-Go works.

The pickup problem turned out to be a fuel relay switch. When I collected the pickup at the garage, I said to Jim, "I've also got this other truck problem, and I've got this honey problem. I really need to get my flatbed on the road again. I can hear the fuel-pump hum, but it won't pump gas."

Jim said, "Maybe you're out of gas."

"No way," I said, but he planted this nagging little doubt.

Jim said, "Where is it?"

I said, "In the orchard."

He rolled his eyes, but he was a good sport and agreed to take a look.

While he was crawling under the frame, I got a gas can from the shed. "Let's rule out an empty tank, even though it's impossible," I said.

I put in a couple of gallons and said, "Go ahead and give it a try."

The truck started right up. I said, "There has to be a fuel leak," but when I looked there wasn't one.

Jim looked at me and said, "You said you tried to start it on both tanks, didn't you?"

"Yup," I said without hesitation, as he switched tanks. That 460 motor continued to purr, or as close to purr as it ever does. The gauge on both tanks read about an eighth full.

Jim said, "You know, it could be that one tank was empty, the gauge doesn't work, and the tank switch is out. It looked like you had gas, but you didn't, and you couldn't switch tanks." That was so diplomatic, and I felt so stupid. Before I was sure, but now I wondered if I'd tried both tanks. And I couldn't buy my way out of this. Jim wouldn't take a nickel.

I tried to make it up to him later with a jar of honey and a slice of humble pie, but I still had this leaking ditch problem.

My barn sits below the ditch, which runs along the side of the hogback. The ditch cuts its way through and under the rock on a steep hillside where you wouldn't think anyone could build a ditch -- mute testament to the settlers' thirst to water this land.

It had never leaked at our place before, and in the dim light inside the barn I only noticed when I nearly slipped in some mud moving honey supers on a hand truck. I opened the doors to dry the place out and to let in yellow jackets, wax moths and the odd wandering bear.

Two days later the wet spot had grown like a cancer, but I found a dead cottonwood stump in the water that looked like it might be a water conduit. When I plugged around it with bentonite, the leak only got worse. The barn floor was a lake when I called the ditch walker. I said, "Dave, I'm working overtime in Aspen, my bees are demanding my full attention, and now my barn's flooding. I don't have time to deal with this."

He laughed and said, "Are you telling me you need some help? Let me see what I can do."

Yesterday Dave turned off the ditch for a week to de-moss it and give me a break. I found some more cottonwood stumps that might be the source of my leak, and I patched around them with bentonite. All I have to do now is wait until they turn on the water to find out if I've fixed the problem.

Both trucks are back on the road. Tuesday looks good for pulling honey. Everything looks good, but I still have this sinking feeling. Bad luck always kicks you when you're down.

Ed Colby

Bad Luck

BOTTOM BOARD