NOV 1998

BeeCulture

INSIDE...Winter Ventilation. *All About Nectar.* The NHB Referendum. *Loan Program Back.* Recall the Bee Hunt. *Search the WWW.* Much More!

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

NOVEMBER 1998 VOLUME 126 NUMBER 11

FEATURES

COVER

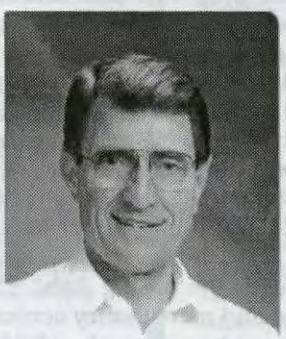
Yellow sweet clover, and its close cousin white sweet clover are the dominant sources of honey in the U.S., even exceeding the generic 'wildflower.'

This exceptional photo is by Charles Hofmann from Janesville, MN. A retired commercial beekeeper and amateur photographer, Mr. Hofmann knows the value of honey bees, and sweet clover. He and his son have produced a video of still photos on bees and beekeeping. All are of this quality.

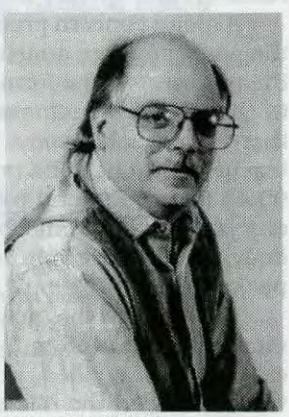
COLUMNS

The Wise Guy, Pg. 11

DEPARTMENTS



JOHN ROOT
Publisher



KIM FLOTTUM
Editor

Bee Culture is Printed on Recycled Paper

INNER COVER

Changing The National Honey Board; Resistant Mite Test; Loan Program Back!

When congress passed, and the president signed the act to modify, with industry approval, the makeup and function of the National Honey Board, more questions were left unanswered than answered. Four basic, though fundamental changes have been crafted, and are now offered to eligible industry members to implement, or not, as an order by their vote.

First, and probably most controversial is a change in the structure of the board itself. From the beginning, the board has consisted of 13 members: 1 public, 2 importer, 2 handlers (essentially packers), 1 cooperative, and 7 producers. From a purely numerical viewpoint the production side of the industry had a voting advantage. The proposed legislation will remove the public member, but 7 producers, 2 importers, 2 handlers (packers) and 1 cooperative member remain the same. New are 2 importers who also handle honey for a new total of 14. Producers still have half of the votes, and concerns that board activity would be dominated by non-producer activities still flourish. After all, there will be 4 packer and 4 import (2 packer and 2 importer) votes instead of only 4.

History does not support that concern however. I did a bit of research to see how contentious board meetings have been over the years. Yes, there have been disagreements, discussion, passion, even anger on occasion. But let's do the math. With about a dozen votes made at each meeting, and three meetings each year, over 1700 votes have been made since inception. That's 12 years producers have had the edge in numbers. But of all these votes, I found fewer than 20 decisions that were not unanimous — that's a hair over 1.0%. This tells me that for 12 years the board's activities have been debated, tossed around, discussed, cussed and worried about, changed, tweaked, fine tuned and refined, and voted on with consent and agreement reached by all involved. Producers have not dominated, and could have. Packers have not dominated, importers, exporters and cooperative members have not dominated. Rather, it seems, common sense and reason have held sway.

The second change that has raised controversy is the change in assessment. Presently producers pay a penny a pound to the board (producers that produce less than 6000 pounds a year can be exempt). The proposal reduces the assessment to three-quarters of a cent per pound, but begins a three-quarters of a cent per pound assessment on packers. Total to the board increases to a cent and a half per pound to fund the two new programs of bee research and quality assurance programs (see below).

A major concern producers have is that when selling to a packer, the packer's three quarters cent per pound will be charged back to the producer in the form of a lower price, rather than passing it on to the packer's customers. In spite of assurances to the contrary there is probably some merit to this. History is, after all a good teacher. Although the price per pound seems small, it amounts to $0.45 for a 60 pound pail, and nearly $5.00 for a barrel. A case of one pound jars would be affected by just under 20 cents. Somebody, somewhere has to eat that, however small it seems...and packers generally don't eat much the feeling goes.

So what will this new board and more money accomplish? First, money will be used to fund honey bee research, with a very strong emphasis on applied, rather than basic studies. Traditionally this work has been the role of University Extension, but funding agencies currently don't see benefit or glamour in paying for work that produces better beekeeping equipment, more productive queens or even making what's been done easily available to those who can use it. Glory is at the molecular level. This money will change that. Governed by the board, beekeepers and scientists, guidelines will be established, peer review oversight strengthened and end user input given first consideration. And eight percent of this new money goes there, which is about $250,000.00.

Second, a quality assurance program will be developed with these funds. This has been, and still is somewhat fuzzy. But let me explain what came out at the Honey board meeting the first part of October.

First, the mission of the QA program is that all honey sold in or exported from the U.S. is pure honey. But needed are much better field tests for screening purity (current tests are only good to about 15%). Research, funded by the money col-

Continued on Page 48

Reader Assistance

To subscribe to *Bee Culture* remove or copy the form below, fill it in and return it and your remittance to the address at the bottom. Please allow 3 - 5 weeks for your first copy to arrive. And Thank You!

☐ Please Renew ☐ New Subscription ☐ Send Sample

☐ **2 Years (24 issues) - $33.00** ☐ **1 Year (12 issues) - $17.00**

☐ **2 Years (Foreign) - $50.00** ☐ **1 Year (Foreign) -$27.00**

Airmail on Foreign Subscriptions Available on Request. Find my enclosed check, or charge to my Credit Card. Call for information on back-dated subscriptions.

Name _____

Address _____

City _____ State _____ Zip _____

Phone # _____

Please check one.

☐ Visa

☐ MasterCard

☐ Discover

Expiration Date

ADDRESS CHANGE

If you are moving, please fill in the form below so we can process the change without undue delay. Also, if you have 2 addresses during the year (i.e., winters in Florida and summers in Connecticut), let us know which months you spend where and we can pre-program your address change so you will find us waiting when you move – No Delays, No Fuss!

FOR PERMANENT CHANGE:

Name: _____

Old Address: Street _____

City _____ State _____ Zip _____

New Address: Street _____

City _____ State _____ Zip _____

FOR TEMPORARY CHANGE:

Name: _____

Address No. 1: Street _____

City _____ State _____ Zip _____

Circle Appropriate Months: J F M A M J J A S O N D

Address No. 2: Street _____

City _____ State _____ Zip _____

Circle Appropriate Months: J F M A M J J A S O N D

Send to: The A.I. Root Co., 623 W. Liberty St., Medina, OH 44256

Bee Culture is available on microfilm from: University Microfilms, Inc., 300 N. Zeeb Rd., Ann Arbor, MI 48103

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

Publisher ..... **John Root**

Associate Publisher ..... **Robert Stanners**

Editor ..... **Kim Flottum**

Production Coordinator ..... **Kathy Summers**

Circulation & Advertising ..... **Dawn Feagan**

Publications Assistant ..... **Mary Weigley**

Contributors ..... **Richard Bonney**
Roger Morse
Richard Taylor
Mark Winston
Clarence Collison
Ann Harman
B.A. Stringer
James E. Tew

Subscription Information

United States, one year, $17.00; two years, $33.00. Newsstand price: $2.50. All other countries, (U.S. Currency only), $9.50 per year additional for postage. Send remittance by money order, bank draft, express money order, or check or credit card. Bee Culture (ISSN 1071-3190), Volume 126, Issue 11, is published monthly by The A.I. Root Co., 623 W. Liberty Street, Medina, OH 44256. Periodicals Postage Paid at Medina, OH and additional mailing offices.

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

Published by The A.I. Root Co.

Advertising

For information on placing display advertisements, contact Dawn Feagan in our Advertising Dept. 1-800-289-7668. Ext. 3220

Circulation Figures reviewed monthly by Ernst & Young Accounting Firm, and are available on request.

MAILBOX

KEEP IN TOUCH

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

Best Ever Cover

Thanks for featuring the artistic talents of Jonathan Taylor and Lela Dowling on the cover of the September issue. Within the Sonoma County Beekeepers Association, we're quite familiar with their creative (as well as beekeeping) skills, and to see their talents shared with others gave us all a sense of pride.

Dan Archibald
Editor, Fruit Winemaking Quarterly
Sebastopol, CA

•

That picture on the cover of *Bee Culture* (September) was the funniest I've ever seen. I laughed til it hurt. It is things like that plus the very timely articles inside that make *Bee Culture* a great magazine. Keep up the good work.

C. Rogers

•

Great cover! It's perfect. I especially loved the (Mad Magazine type) handling of the mailing label . . . the little airplane was a scream! Please, please, run a couple of those a year. I've had people at my job pick it up and read it. They don't know a bee from a wasp. Past magazines barely got a glance . . . super job.

Ray Dixon

Better & Better

You are doing a great job. Your magazine keeps getting better and better. I realize what a big job it must be to get it out every month.

Tell Richard Taylor that I enjoy reading about his youth. He could be an example for many of our people today, no matter how young or old. You have to keep trying even if you are not successful the first time!

I have made some of the projects that you have had from time to time and they have all worked out very well.

Norm Adams

Resistant to AFB

The article by Dr. M. Winston, entitled *First Times*, September issue, page 17, deserves some comments. First of all I agree with him on the misuse of the drug Terramycin in our beehives. I myself in the past 30 years have used less than a pound of the drug in my numerous colonies when I was a senior scientist studying bees with the USDA in Tucson, AZ, operating my bee business in CA, operating my bees in France and now working my bees here in SC.

I have actively brought in AFB contaminated equipment to my bees during this 30 year period and will continue to do so. AFB is not a problem with me and my bees and I expect it never to be a problem.

During this period I have been breeding and selecting for bees that are resistant to AFB and requeening my colonies with this resistant stock. I object strenuously to the burning of beekeeping equipment for the started objective of AFB control.

Bees that are resistant to AFB will occasionally show symptoms of AFB by having a few cells occupied by AFB scales which they will clean up. I first observed this when I was a student at the University of Wisconsin in 1946, 47 and 48 when four AFB contaminated colonies headed by resistant queens were constantly observed as to their behavior. I have since then watched many other colonies clean up the disease without the use of any antibiotic.

Most beekeepers with 15 or more colonies can immediately start a breeding program of resistance to AFB by testing their colonies for hygienic behavior. This is done by inserting a freeze killed sample of sealed brood, approximately two to three square inches in the brood nest. If the dead brood is removed in 48 hours or less the bees are hygienic and resistant to AFB, if not they will succumb and be killed by the AFB bacterium. Beekeepers who buy queens from breeders should insist that the queens they buy are reared from mothers who tested hygienic. In my past experience covering about 30 years approximately one colony of seven will test hygienic.

For further information consult M. Spivak and Reuter. 1998 *American Bee Journal* 138 and Taber. 1982 *American Bee Journal* 122:422-425

Steve Taber
Elgin, SC

Once In 32 Years

That's how many colonies I've had that have developed American Foulbrood (AFB). Granted, I don't have a large quantity of bees, 20 colonies, but when you add up the years it gives a pretty fair idea that AFB is of little concern to me. I have never regularly treated with Terramycin (Terra) and don't intend to. My nine-year stint as a MD Apiary Inspector convinced me that regular use of Terra only masks the problem and once started beekeeper beware if you discontinue its use. The disease appears to be endemic in those colonies that are treated on a regular basis.

This past July I accompanied Dr. Keith Delaplane of the University of GA on a "People to People" trip to New Zealand and Australia. Both countries prohibit the regular use of Terra and burn infected equipment as a method of control. During the trip Keith and I had a continuing discussion on the merits of regular use of Terra and I must say that his strongest point seems to be that it "may" give the bees an edge when under stress. To me this sees to be a rather weak argument.

The discussion came up with some of the commercial beekeepers we met in both countries. Their viewpoints coincided with mine. For example, one young man in NZ recently took over his dad's 2,500 colony operation that for

Continued on Next Page

MAILBOX

some years had been rented to a poor beekeeper. The young man's first year he burned 200 colonies with AFB, a tough hit to take. His second year he burned 50 colonies and this year only two out of 3,000 colonies. Both countries have an AFB incidence of about 1%, similar to what we have here in MD where we use Ethylene Oxcide fumigation which is the equivalent of burning. In the September issue of *Bee Culture*, Mark Winston talks of the problem and wishes we could get away from the regular use of Terra. As a hobbyist beekeeper I urge all of you to *not* use Terra on a regular basis, particularly if you are a new beekeeper. Remember even the experts don't have all the answers when it comes to beekeeping.

Bob Cory
Dunkirk, MD

An Official Beekeeper

I really enjoy your magazine. The September cover was funny. My name is Jeffrey Connell, and I just became a beekeeper this year. It was really neat. Last year I did beekeeping for 4-H, but I didn't have a beehive then.

But this year the Ohio East Central Beekeepers Association sent Mr. Jon Cleary over and made me a real beekeeper. Here are some things I wrote about beekeeping. My project won at my county level and then I won at the Ohio State Fair.

Jeffrey Connell, 10 years old
Hide-Away-Hills, OH

A is for Apistan; **B** is for brood; **C** is for chalkbrood; **D** is for drone; **E** is for European foulbrood; **F** is for frames; **G** is for guard bees; **H** is for hive tool; **I** is for inner cover; **J** is for (royal) jelly; **K** is for keep your smoker lit; **L** is for larvae; **M** is for mating flight; **N** is for nectar; **O** is for opening the hive; **P** is for propolis; **Q** is for queen; **R** is for requeening; **S** is for swarming; **T** is for tracheal mites; **U** is for uncapping honey; **V** is for Varroa; **W** is for wax; **X** is for queen e**X**cluder; **Y** is for yowza, I got stung; **Z** is for bu**ZZZZZ**.

Tolerance

I have been a semi-fan of Richard Taylor ever since I started reading *Bee Talk*, until now that is. I am very glad that he is retiring soon. In fact, I hope it is very soon. I know this is not the place for a long, drawn out study of the Bible and God, but since Mr. Taylor attacked my God, and you gave him Print, I ask that you give me equal opportunity to respond. His statement "I decided that the Bible, or at least the New Testament was filled with crude absurdities, and my studies in early church history confirmed this in my mind," prove he should be put out to pasture. The mites have gotten him.

Frank Chamberlin
Asheboro, NC

Mr. Taylor's Reply: *Perhaps we should all remind ourselves from time to time that our nation is founded on a principle of religious toleration, enshrined in our Constitution. We should welcome diverse views, rather than insulting those who hold them. We do not all have to be Christians. Moslems, Buddhists, Jews, Humanists, Pagans, and even a few odd balls like me, who follow the wisdom of the Stoics, find a warm and friendly home in our beautiful country.*

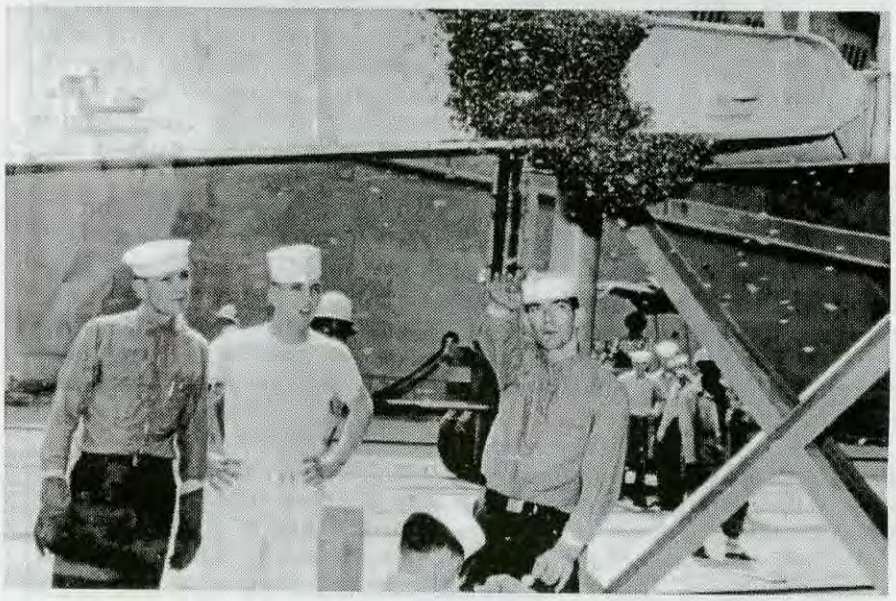
Sea-Bees

Mention honey bees and just about everyone has a story. Usually the story is about stings and usually it's hornets or wasps and the teller doesn't know the difference.

This spring we were visited by my wife's high school chum and her husband, a retired naval officer, Ruth and Ed DeLong of Va. Beach, VA. A tour around the yard to look at my wife's beautiful Spring flowers also revealed my six colonies of bees nestled behind some tall privet hedges. This brought forth the following story.

Ed's ship, the guided Missle Cruiser, USS Galveston was moored to a pier at the Philadelphia Naval Shipyard. The ship was in tip-top shape and everyone was ready for a formal inspection by one of the Navy's top admirals. Ed was the Officer Of The Deck and would be the first to greet the Admiral. Shortly before the Admiral's arrival a huge swarm of bees swirled through the air and landed on the ship's gangway! As resourceful as he was Ed was momentarily non-plussed but quickly got on the ship's phone and informed the captain. Quick thinker that he was, the captain told Ed to announce over the ship's intercom that any crewmen that had knowledge of honey bees lay up to the quarter deck and be prepared to capture a swarm of bees. Within moments two sailors arrived with a large cardboard box. They quickly capture the swarm, no one was stung and they saved the day. It's no telling where you will find a beekeeper!

Bob Cory
Dunkirk, MD



THE WISE GUY

Quality Assurance. That sounds good. Makes you feel safe. Also, it is the new buzz word in the honey business. But what is it? It seems everyone is talking about it, writing about it, and comparing it to what is happening in the industry today, but again, what is it?

The only thing that everyone knows is that the idea is going to cost you three-quarters of a cent per pound of honey. What are the written standards of this program? Will imported honey have the same standards as domestic? Who will oversee this program and will they be the enforcement arm of the program? Will this only be done at the producer level or will store shelf inspections be in order? Will bulk sales be monitored for adulteration? These are just a few of the questions being thrown around by members of the honey industry.

I believe that the three-quarters of a cent per pound is the start of a problem. This was done in the name of research and quality assurance. The street talk is this is just another packer program to keep the price of honey low or to control the price of honey. It seems that the packer factor was the largest contributor to the quality problem in the past. They have been very willing to import honey from any market where the price is right. Quality was never an issue, only price. How many times has a honey buyer only talked color or price? How many times did the buyer say "I can purchase imported honey for x, so why should I pay you more for domestic?"

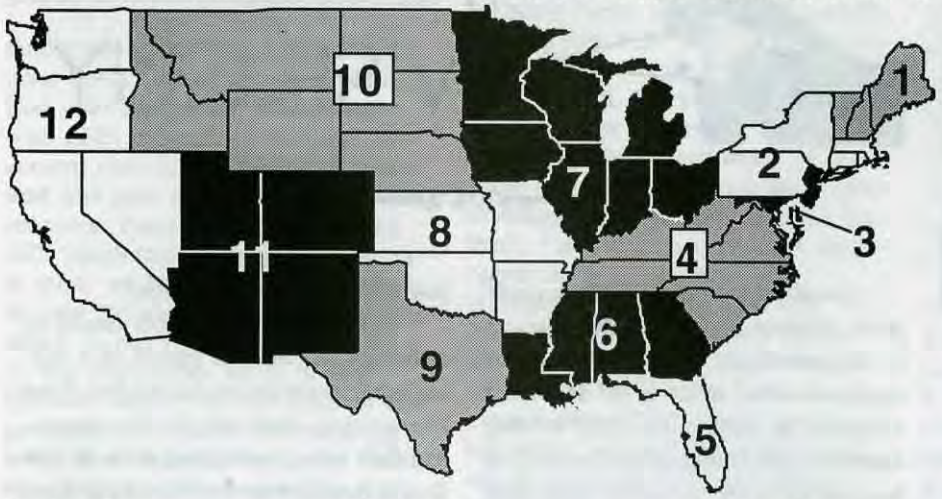
The only adulteration cases to either go to court or result in a ruling against some one have come from the packer side of the business. Another very interesting area in this line of thought is the "blending" that goes on in the bulk sales area. I hear honey buyers telling me that they blend honey for certain bulk buyers. Do you suppose the "blend" contains all honey?

I believe if we are to have a good quality assurance plan, we need the quality to be there when the customer buys our product. The main reason that shelf sales are low is that honey packers are putting crap on the shelves and the buying public is responding. The public is demanding quality assurance, but the bottler is not listening.

When the government loan program was in place, quality assurance was being done by maintaining moisture levels and by making sure the product was clean. I believe that producers will do what is required of them but need an outline of those requirements. My problem is, what will the honey buyers do with our product?

In closing, the best test I can use is to go to a local food market and compare the honey placed there by local producers vs. the national packers. The difference is truly amazing. Also, if you think the three-quarters of a cent per pound "tax" will not be paid by the producers, you are crazy. BC

NOVEMBER – REGIONAL HONEY PRICE REPORT



Region 1

Prices up a bit for pails and retail, and steady at wholesale and bulk. Goldenrod and Aster were above average this year, making up to half of the season's crop. Sellers predict no change in prices.

Region 2

Prices steady at all levels. Fall crop only average, but overall a strong season. Goldenrod, Aster, Bamboo biggest Fall crops. Prices will remain unchanged.

Region 3

Prices essentially unchanged since last month. Fall crop average at best due to dry weather. Goldenrod and Aster short crops. Prices expected to remain stagnant.

Region 4

Prices unchanged and few plan to raise this season. Fall crop hurt by dry weather so down in most places. Short season anyway this year. Goldenrod, Soybean, Bidens and Asters are the crop. Hive beetles causing concerns and colony losses.

Region 5

Prices up just a bit at bulk and retail since last month, but very little. Fall crop average, so not much of one. Season average to a bit up overall this year.

Region 6

Pail prices up, other prices steady this month. Fall crop average, wildflower and Goldenrod predominant. Predict prices will stay the same the rest of the season.

Region 7

Pail prices up just a little, others steady. A good Fall crop of Goldenrod and Aster, and a 90-100 lb. season overall have producers happy, but prices will remain only steady with no increases planned.

Region 8

Goldenrod, Aster and Smartweed produced a bumper Fall flow, and an 80 lb. or so season average helps. Prices steady at bulk and wholesale, but down a bit retail.

Region 9

An average to somewhat below average Fall crop (weird weather all season) and below average crop in many areas has, surprisingly, reduced prices at bulk, and even retail and buyers are resisting higher prices yet.

Region 10

Prices for pails up a bit, all others steady. A generally below average Fall crop, mostly Alfalfa, Clover and Sunflowers, helped produce an only average crop generally.

Region 11

Prices at bulk and wholesale steady, but retail bouncing around a bit. Primarily due to large stores dropping prices. Fall crop average, but spotty and no change in sellers prices seen.

Region 12

Price up for pails, down for barrels, but steady to down retail. Fall crop average to down a bit in the north and even more so south. Overall a good season though, with 85-100 average.

	Reporting Regions												Summary		History	
	1	2	3	4	5	6	7	8	9	10	11	12			Last	Last
Extracted honey sold bulk to Packers or Processors													**Range**	**Avg.**	**Month**	**Yr.**
Wholesale Bulk																
60# Light	58.76	55.50	60.00	70.00	58.77	58.77	46.53	58.77	54.00	58.77	62.67	58.50	36.60-78.00	61.70	54.98	69.01
60# Amber	55.07	45.75	65.00	60.00	54.19	54.19	46.00	59.39	54.00	54.19	60.33	66.00	30.00-75.00	57.57	55.27	64.84
55 gal. Light	0.68	0.67	0.67	0.66	0.77	0.67	0.62	0.67	0.70	0.60	0.67	0.65	0.60-1.50	0.70	0.78	0.92
55 gal. Amber	0.65	0.65	0.68	0.68	0.74	0.64	0.67	0.64	0.70	0.64	0.60	0.70	0.55-1.50	0.66	0.75	0.86
Wholesale - Case Lots																
1/2# 24's	30.23	30.58	32.66	32.20	32.66	26.00	30.96	32.66	30.00	32.66	29.25	36.60	24.48-42.00	31.50	30.14	30.79
1# 24's	43.35	42.79	43.20	45.77	45.49	45.49	43.89	39.00	48.00	44.00	44.20	49.47	32.00-60.00	44.47	43.74	43.10
2# 12's	39.28	38.09	42.60	45.87	40.85	40.85	38.85	40.10	42.00	41.00	34.80	42.00	29.40-52.58	40.56	40.25	40.23
12 oz. Plas. 24's	36.90	37.26	40.80	37.02	37.45	37.45	37.40	37.20	36.00	38.40	39.80	37.20	26.40-48.00	37.94	36.38	36.59
5# 6's	42.13	45.24	48.00	48.50	47.46	47.46	39.95	39.00	48.00	41.00	35.78	40.50	31.50-67.50	43.37	**41.56**	**40.59**
Retail Honey Prices																
1/2#	1.98	1.61	2.83	2.17	2.83	1.75	1.83	1.89	2.50	2.83	2.75	1.83	1.35-3.69	2.01	1.85	1.89
12 oz. Plastic	2.24	2.24	2.35	2.38	2.39	2.39	2.04	2.24	2.50	2.30	2.78	2.10	1.61-3.25	2.30	2.24	2.26
1 lb. Glass	2.80	2.45	2.60	3.07	3.17	2.53	2.54	2.73	4.00	2.41	3.61	3.05	2.09-4.59	2.84	2.82	2.71
2 lb. Glass	4.50	3.98	4.55	5.28	4.47	4.28	4.33	5.07	4.50	4.61	4.83	5.00	2.75-6.00	4.65	4.60	4.48
3 lb. Glass	6.45	6.87	6.75	6.91	6.87	6.36	6.16	6.59	6.00	5.69	7.00	5.99	4.94-9.00	6.66	6.47	6.19
4 lb. Glass	7.45	7.00	8.18	7.92	8.18	8.18	8.30	8.18	7.00	8.50	8.18	8.18	6.00-10.50	8.03	8.19	7.95
5 lb. Glass	9.27	10.42	9.80	9.35	10.50	10.50	8.66	10.99	9.00	8.46	9.51	9.29	7.00-15.00	9.49	9.53	9.20
1# Cream	3.25	3.23	3.63	3.25	3.63	2.75	3.11	3.27	5.50	3.00	3.83	2.05	2.05-5.50	3.35	3.40	3.30
1# Comb	4.00	4.56	3.50	3.95	4.04	4.04	3.40	3.99	6.00	4.04	5.25	4.25	1.95-6.00	4.17	4.25	4.31
Round Plastic	3.57	3.15	3.50	3.75	3.91	3.91	2.93	3.66	6.00	3.91	4.75	4.25	2.00-6.00	3.72	3.87	3.83
Wax (Light)	2.68	2.74	2.35	1.73	3.17	2.70	2.31	2.38	5.00	1.20	2.17	4.00	1.20-5.60	2.72	2.82	2.82
Wax (Dark)	2.40	2.17	2.13	1.49	2.93	2.65	1.82	1.85	4.00	1.10	2.05	3.75	0.95-5.40	2.44	2.47	2.41
Poll. Fee/Col.	36.32	38.00	31.50	37.94	39.13	30.00	36.60	40.00	20.00	39.13	55.00	36.50	20.00-60.00	37.39	35.81	36.35

Roger Morse

Research Review

"If you see drones in your colonies in the late Fall or Winter you can expect only the worst."

Drones are a luxury. They are grown and tolerated only in large, queenright colonies and then only during the active part of the year when they may be needed for mating. When drones emerge from their cells they engorge on pollen and honey as do newly emerged worker and queen bees. However, drones soon learn they can solicit food from workers and once they do so they do not feed themselves again. Thus, for the rest of their lives they are at the mercy of worker behavior.

Small colonies of honey bees do not grow drones and do not feed and keep them if they drift in by mistake. In the Fall, and sometimes during a drought, the worker bees stop feeding the drones in their colonies. When drones become weak because of a lack of food workers drag them outside where they fall onto the ground, die and are consumed by ants and other insects. The workers stop the feeding of older drones first but soon give the young drones the same treatment. Most colonies discharge their drones slowly over a period of a month or so.

The chief reason for writing about drones at this time of the year is that if they are present in your colonies in the late Fall, north or south, there is probably something wrong with the queen. It is most likely that she has died though she may also be old and not producing a sufficient quantity of the chemicals (pheromones) by which she is recognized. The biology of the drone has been investigated by several researchers but the paper by Free and Williams (1975) I cite below is one of the more reliable and informative.

There is nothing that can be done to save the queenless colony in the Fall but it can be combined with another and this should save some bees, give the combs protection and prevent robbing.

All honey bee colonies in the northern hemisphere start to rear brood in mid or late December, even in the coldest climates. Of course, bees in a cold climate do not rear as much brood as do those in a warm climate. However, the first brood reared is worker brood and the rearing of drones starts later. I have seen bees rear drones in Florida in February while in New York State drone brood does not appear until April.

Free and Williams, working in central England, confirmed some of the following facts in their studies. Smaller colonies either build no drone comb or build less than do large colonies. The greatest amount of drone comb is built in May through July. Colonies that already have a large proportion of drone comb built less than do those that do not. Removing drone brood from a colony encourages the bees to increase their production of drones. The final sentence in the summary of the Free and Williams paper reads "A colony could be caused to evict its drones by preventing it from foraging and in Autumn eviction was greatly delayed by providing forage or removing the queen."

Seeley (1985) points out that an examination of a number of nests in trees and houses reveals that 13 to 17 percent of the total comb area that bees build themselves is drone comb. However, colonies do not use all of the drone comb available to them to produce males. An under or over supply of drone brood appears to control how many drones are reared. There is an upper limit as regards the amount of drones a colony will rear.

Be careful in selecting the papers you read about drones. One honey bee biology text states that colonies with substantial stored honey may allow drones to remain during a Summer drought or even in the Winter. Two references are cited for this information but upon reading these I find the researchers only suggest this may be the case as regards the Fall discharge and both of these papers state that "drone destruction by workers was not observed in the Autumn."

I have talked to several commercial beekeepers about killing of the drones in the Fall and none of them has ever seen drones in the late Fall or Winter in colonies that have more than enough honey for Winter nor have I seen it myself. I repeat, if you see drones in your colonies in the late Fall or Winter you can expect only the worse and the colony will probably not survive the Winter.

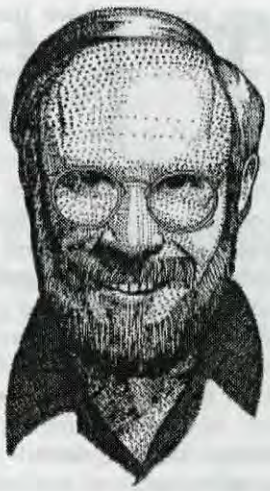
A most incorrect but fascinating. Romantic report to read on the Fall killing of the drones was written by the Belgian Nobel prize winner for literature, Maurice Maeterlinck. Subsequent to earning the prize he wrote a book entitled *The Life of the Bee* that appeared in the early part of this century. Maeterlinck claimed, in his first chapter, that he had been a beekeeper for 20 years and in this book he was only reporting facts. In his 7th chapter, entitled The Massacre of the Males, he wrote "One morning the long-expected word of command goes through the hive; and the peaceful workers turn into judges and executioners." This is not the truth, or the way in which bees behave. However, Maeterlinck wrote so well that many people came to believe what he wrote was true and that the killing of the drones takes place in a short period of time in the Fall. In fact, as is stated above, it is done over a period of a month or more under normal circumstances.

References:

Free, J.B. and I.H. Williams. *Factors determining the rearing and rejection of drones by the honey bee colony.* Animal Behavior 23: 650-675. 1975.

Maeterlinck, M. *The Life of the Bee.* Dodd, Mead & Company, NY 1901.

Seeley, T.D. *Honeybee Ecology.* Princeton Univ. Press. Princeton. 1985.



Mark Winston

So What Are You Doing To Help Us Out?

"My laboratory, and most bee research facilities in the world, are doing quite a bit of research to find some new control methods for *Varroa*."

I was at a beekeeping meeting the other day, and during the break a beekeeper came up to me concerned about the abundance of problems and lack of solutions he kept reading about in his beekeeping magazines. *Varroa*, of course, was the big one, and this fellow not only was having his own problems controlling mites but also was terrified by the impending arrival of resistant mites and a perceived potential for the loss of product sales due to pesticide residues in his honey and wax. He was in a bad mood, looking for someone to blame, and decided that I, as a visible representative of the research community, was a good target. "Why haven't you found something to control *Varroa*," he wanted to know, and "What are you doing to help us out?"

Fair questions, but like most fair questions, the answers are both simple and complex. The simple answer is that my laboratory, and most bee research facilities in the world, are doing quite a bit of research to find some new control methods for *Varroa*. Remember that the methods we have today in North America, Apistan and formic acid, were developed by researchers, and beekeepers using these tools properly should still be able to control the *Varroa* in their colonies. Nevertheless, there is a need for more diverse and effective chemicals and methods to control *Varroa*, and the search for new controls has become the Holy Grail of contemporary bee research. It is here, in the quest for the magical cure, that research runs up against the complex reality of controlling a pestiferous mite that lives inside the colony of a beneficial insect, in a world in which government regulation and the vagaries of industrial patent protection superimpose limits on what science can accomplish in developing new pest management techniques.

We currently are working on three distinct projects for *Varroa* control: essential oils, neem and an attractant trap, and in each of these projects we have run into some common and some distinct problems that highlight the difficulty of bringing a scientific idea from concept to product. These problems include everything from the more "political" component of funding through to the grungiest and most mundane aspects of pesticide research such as dose, delivery method and side effects. Taken together, our experiences have renewed my respect for my predecessors who were involved in developing the disease and pest management tools we use today in beekeeping. Their task was no different from ours today, and the fact that we have any control methods at all is a tribute to both their skill and their perseverance.

The first barrier on the Holy Grail quest is funding, and right out of the starting gate many researchers with good ideas falter and fall by the way. It is especially difficult today to find appropriate levels of funding, because governments have cut back severely in allocating research dollars, industry is reluctant to commit funds unless there is the possibility of patent protection for new findings, and beekeepers on their own have not contributed enough dollars to do the job. The patent problem is a serious one, because the research community insists on free and public disclosure of all new findings, and industry often wants secrecy. Faculty and government researchers depend on publications for promotion and tenure, and student success in finding jobs revolves around getting their accomplishments known, both of which are hindered by the privacy associated with patent filing and protection of industrial secrets.

We have more or less solved this first problem by my devoting a considerable amount of time schmoozing potential industrial sponsors, and developing agreements by which we can publish our results freely while still providing some patent protection to our collaborators. Not all companies are willing to enter into these types of agreements, which generally involve giving the company a "first look at results" and the "right of first refusal" for any new technology developed. Also, not all researchers are willing to put in the enormous amount of time and energy necessary to develop these relationships, which are only the first step. Once an industrial sponsor is on board, I still have had to convince my own university that these arrangements fit our industrial research guidelines, then move on to take the promise of industry money forward to government in order to obtain matching funds. For our three projects, I spent roughly half of my available work time over the last few years in developing these interactions with industry and then moving through the university and government stages. Today, we have about $35,000 (U.S.) in annual funding from three different companies, two Canadian and one American, which we have managed to increase to about $140,000 in various matching grants from federal and provin-

Continued on Next Page

"It is here, in the quest for the magical cure, that research runs up against the complex reality of controlling a pestiferous mite that lives inside the colony of a beneficial insect, in a world in which government regulation and the vagaries of industrial patent protection superimpose limits on what science can accomplish in developing new pest management techniques."

cial governments. It took about two years to put together this package, which gives us only about two more years of breathing room before I have to start again to raise money for whatever the next phases might be.

Raising money is only the first step; the research itself is challenging and fraught with roadblocks along the crusade trail. Our first problem has been developing rapid screening methods for potential compounds and control methods. For example, there are tens of potential essential oils, and innumerable dosages and combinations, that could be effective. Screening all the compounds and application methods inside bee colonies would be prohibitively time-consuming and expensive. We spent the first years of this research developing laboratory methods by which we could put a handful of adult bees infested with *Varroa* into dishes with test compounds, and determine which of the compounds had the most potential to kill mites without harming bees.

We've just begun to work on the attractant trap problem by developing methods to extract compounds from bee larvae and adults and present them to *Varroa* mites in order to elucidate the chemical component of *Varroa* attraction to hosts. There are a number of methods already in the literature, which should provide us with a short-cut, but remember that it's not enough to simply show that a mite is attracted to a compound. We have to do this tens of thousands of times in the course of our research, so that a useful method needs to be adaptable to mass-generate data. In addition, we have found some of the information in the literature is not repeatable, so that we basically have had to start from scratch in developing our bioassay.

Another problem we've encountered is finding a supply of *Varroa* mites. We sometimes go through thousands of mites a week, so that instead of killing mites we do anti-beekeeping to maintain colonies that are as mite-ridden as possible. We have an entire apiary devoted to mite rearing, in which we continually supply *Varroa*-infested colonies with clean bees to support the high *Varroa* populations we need for our research.

Our project that is the farthest along is examining the use of extracts from seeds of the neem tree as a miticide, and this project has moved into the next phase of colony-level tests. Here we have been faced with innumerable other obstacles to overcome, including determining which dose will be effective at killing mites in colonies, figuring out how to apply neem (spray it, feed it in sugar, feed it in a pollen supplement patty, put it in a paste, impregnate it into an Apistan-like strip, micro-encapsulate it . . .), working on formulations (oils, extracts, synthetic components; there are endless possibilities), and examining when and how often to apply it (Spring, Fall, once, twice, six times). Put together, there are endless product development questions that could bring the project to a grinding halt at any time, and we have to hope that our intuition about what's going to work can narrow down the possibilities to a testable level.

We're about a year away with neem and essential oils to be able to say the potential products we're working on will or won't be effective, and probably two to three years away from demonstrating the feasibility of an attractant trap. If we do get to that point with any of our research, the fun would only just begin. Then we have to determine commercial feasibility: Is it cost-effective; are there residue issues; does it work over the wide range of beekeeping conditions found in North America and around the world; will the material have lethal or sub-lethal effects in colonies; can it move through the labyrinth of government regulations to become a licensed and regulated product?

So yes, I and many other bee researchers are doing our best to help you out, but it's not easy. The miticides you have available today were the product of intuitively astute research, but also a tremendous amount of work to overcome the innumerable obstacles associated with moving from concept to product. The beekeeping community could be better integrated into this process by developing its own funding sources and the associated methods of deciding which research has the most potential for success and should be funded. If nothing else, the increased beekeeper involvement that would come from your own funding would require you to better understand what research can or can't do. Private industry makes these decisions all the time, and there's no reason the beekeeping organizations can't join the quest for the miticidal Holy Grail. BC

Mark Winston is a professor and researcher at Simon Fraser University, Burnaby, B.C. Canada.

NITIDULIDS

Beetles belonging to the family Nitidulidae are primarily scavengers, which appears to be the role of the small hive beetle.

Roger Morse

The finding of the small hive beetle, *Aethina tumida*, in Florida and subsequently in other states, was a surprise. It is a native of Africa and is widespread there. Curiosity caused me to review the literature to ask about the origin of this insect. What do its relatives do? What are the Nitidulidae, the family of beetles to which it belongs?

The beetles are the largest group of animals among the insects. They are different from other insects in that their front wings are thick and hard. These forewings are called elytra. They serve to protect the whole body and especially the second pair of wings that the beetles use in flight. Like the bees, ants and wasps, the beetles have four life stages: egg, larva, pupa and adult. Feeding takes place only in the larval and adult stages, and so it is at this time that they are pests.

Some people call the nitidulids sap beetles because many of them feed on plant sap, while others call them pollen beetles because several species appear to live almost exclusively on pollen. The Nitidulidae that feed on pollen are not pollinators but are destructive and can sometimes cause economic damage to the flowers that in turn damages the fruits, nuts or seeds that may be produced. In truth, beetles in this group of insects have highly variable habits and biologies. The larvae of some species live in seed capsules while the adults feed on pollen and other parts of the same or other plant species.

Some species of these beetles feed only on rotting and fermenting fruit while others have close association with certain fungi. There is an article in the August 1998 issue of the *Journal of Economic Entomology* that researches the role of sap beetles that feed on corn in Mexico. It states that they feed on fruits and plant parts that are ripening or decomposing. They are quick to invade bird- or caterpillar-damaged corn or that which has poor husk coverage. They are apparently not primary invaders. More important, the bodies of these beetles may be covered with harmful fungi that they carry from corn ear to corn ear and that can be even more destructive than the beetles themselves.

Several species of the Nitidulidae have a close association with social insects other than honey bees, but again apparently only as scavengers in their nests. There is a species in Australia that feeds "in a wild bee's nest." It is not clear, but this probably refers to a nest of one of the stingless bees that live in that country. One species breeds in bumblebee nests and another in ant nests, but it is not known if these nests are their only homes. In all cases, including the small hive beetle, it appears that the mature larvae move into soil where they pupate before emerging as adults. I am not aware that the small hive beetles have any pests or predators and apparently their numbers are limited by the amount of food available to them.

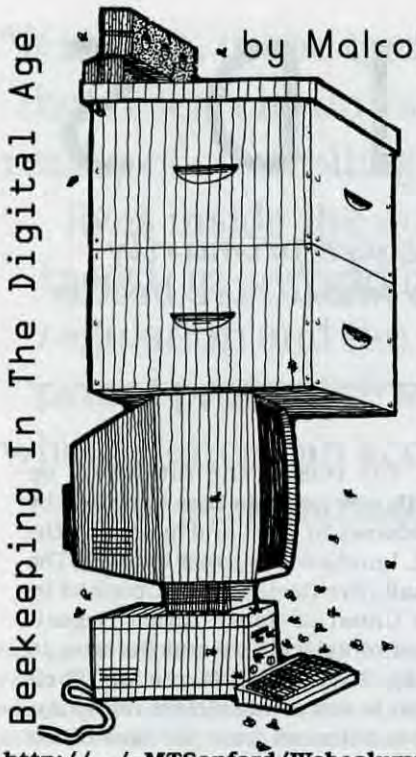
The role of the nitidulids on earth was perhaps best captured by A. Murray in 1864 and quoted by Dr. A.E. Lundie in his paper entitled "The Small Hive Beetle" and published by the Union of South Africa Department of Agriculture and Forestry in 1940. The quotation reads, "Their main business is to clear off decaying substances from the face of the earth, especially those minute and neglected portions which have escaped the attention of other scavengers . . ."after the beast of prey has satisfied his hunger on the animal he has slain, after the hyena and the vulture have gorged themselves on its carrion, after the fly with its army of maggots has consumed the soft parts . . .and when naught but the bones remain, then come the nitidulids." However, it is also pointed out that some live in flowers where they "feed upon fresh victuals." In other words, beetles belonging to the family Nitidulidae are primarily scavengers, which appears to be the role of the small hive beetle. BC

"Some people call the nitidulids sap beetles because many of them feed on plant sap while others call them pollen beetles because several species appear to live almost exclusively on pollen."

Roger Morse is a professor at Cornell University in New York and is one of our regular contributors with his Research Review column.

Beekeeping In The Digital Age

by Malcolm T. Sanford



In my last column, I discussed the advantages of accessing information on the World Wide Web. Again, it is possible to directly access that previous column on the World Wide Web by pointing to and selecting or clicking with a computer mouse the following URL:

http://.../~MTSanford/Webcolumns/Column2.htm

Also notice that anything in **bold** typeface will be directly selectable using the computer. The sheer volume of information that exists on the World Wide Web is daunting. Thus, one of the first questions asked is how to begin to find some that might be of interest. Fortunately, assistance is available through specialized programs that search for key words. These are programs called "search engines." There are a number of these and more are implemented each year. One of the most popular is **AltaVista®**. Its URL is **http://www.altavista.digital.com**. The .com suffix refers to a commercial site. Other broadly defined suffixes (called domaines) are .edu (education), .net (network operations), and .org (nonprofit organizations).

Entering the Altavista URL in your browser or clicking on the URL above will access the site. When I entered the word "beekeeping" in the form provided on the Altavista site to search the World Wide Web, the following listing came up as a response: 4072 documents match your query.

Searching The World Wide Web

1. **Beekeeping Practicum**
   BK 200. BEEKEEPING PRACTICUM. 7 credits. Students will be placed with commercial honey producers throughout Western Canada for the entire season for ... **http://www.fairviewc.ab.ca/~fairviewc/calendar/AGfolder/CDBeeTec/BK200.html** - size 860 bytes - 17-Sep-97 - English - Translate

2. **Directory of /Docs/www/Subject/Beekeeping/099-149**
   Directory of /Docs/www/Subject/Beekeeping/099-149. Updir. 149_Bees_mites_Apistan_and_alte. 148_Worlds_Beeswax_Contaminati. 147_Worlds_Beeswax_Contaminati.. **http://ekolserv.vo.slu.se/(en)/Docs/www/Subject/Beekeeping/099-149/** - size 6K – 15-Jun-97

3. **New Zealand Beekeeping: Environmental Indicators**
   Back to New Zealand Beekeeping. Back to Bibliographies Contents. Bees as Environmental Indicators. Anderson, J.F. and M.A. Wojtas. 1986. Honey bees ... **http://www.beekeeping.co.nz/biblio5.htm** - size 4K - 7-Aug-97 - English - Translate

4. **Bees and Beekeeping [Entomol. 20]**
   Netscape Enhanced. Bees and Beekeeping Entomology 20 Fall 1996 Kirk Visscher. A good brood pattern is one in which the brood area of the combs have a ... **http://entmuseum9.ucr.edu/ent020/sq6_4.html** - size 857 bytes - 16-Oct-96 - English - Translate

5. **Beekeeping Building**
   Great shots, but it might take a minute or two! The following exhibits will be featured: 1997 American Honey Queen - Miss Emily Anderson. Honey Show ... **http://www.topsfieldfair.org/bee.html** - size 1K - 7-Oct-97 - English - Translate

6. **Beekeeping Tools**
   Member of the Internet Link Exchange. Coventree Grove Meadery. Beekeeping Tools. Coventree Grove Meadery is always on the lookout for new and interesting ... **http://www.grovenet.com/Coventree/Beekeeping/beetools.htm** - size 8K - 15-Jun-97 - English - Translate

7. **sci.agriculture.beekeeping FAQ**
   sci.agriculture.beekeeping FAQ. From: adamf@vtaix.cc.vt.edu (Adam Finkelstein) Newsgroups: ... **http://www.faqs.org/faqs/beekeeping-faq/** - size 20K - 6-May-95 - English - Translate

8. **Amateur Beekeeping**
   Text-Only. Amateur Beekeeping by E. L. Sechrist. List: $4.95 Our Price: $4.95 + $2.35 special surcharge. Availability: This title usually ships within 4-6. **http://www.amazon.com/exec/obidos/ISBN=0815950012/allabouthoneybeeA** - size 5K - 20-Dec-97 - English - Translate

9. **Bees and Beekeeping [Entomol. 20]**
   Netscape Enhanced. Bees and Beekeeping Entomology 20 Fall 1996 Kirk Visscher. It provides protein food to support brood rearing (as does pollen), and ... **http://entmuseum9.ucr.edu/ent020/sq6_2.html** - size 706 bytes - 16-Oct-96 - English - Translate

10. **Beekeeping Free Classified Ads Page**
    Beekeeping Free Classified Ads Page. **http://www.internode.net/HoneyBee/BeeAds/class.htm** - size 507 bytes - 17-Jul-97 - English - Translate

This first page provides the first 10 of over 4,000 items that contain the key word "beekeeping." Because there is a good deal of turnover in sites, search results may differ for every query entered, even if the same word or words are used.

The small subsample above indicates the range of resources available on the World Wide Web at that time. Thus, if you are interested in beekeeping educational programs, you can look at the practicum or internship provided by Fairview College in Canada (#1) or glance at a class syllabus in apiculture by Dr. Kirk Visscher at the University of California at Riverside (#4 and 9). You might also like to scan a directory of documents concerning bee mites and beeswax contamination (#2), learn about New Zealand Beekeeping (#3), or read or enter a free classified ad selling beekeeping equipment (#10). Other resources include an ad for a book on amateur beekeeping (#8), description of beekeeping tools (#6), and a document showing frequently asked questions (FAQ) about beekeeping (#7).

The parts of each entry include the subject/title, full URL, the size of the file and date created. A final entry shows not only the original language of the document, but also the fact that some translation into others is available. Simply pointing and selecting with a mouse either the main title or URL (notice they are in **bold** face) will bring the document to your computer screen.

The first three columns have provided some background on the World Wide Web and how it operates. Here, I described the results of a simple search using the Altavista® search engine for beekeeping resources on the World Wide Web. Subsequently, I will examine some of these sites in depth and provide other details on how the digital age information revolution continues to affect beekeepers. BC

Thanks again to Rich Petke, WorldCom Advanced Networks (rpetke@wcom.net) for reviewing this article prior to publication for accuracy and readability.

VENTILATION

Brad Kurtz

Since temperature is relatively noncritical, interior air quality should be considered the Winter priority.

My attention was drawn to the topic of hive ventilation during a lecture on Winter preparation and management given by Dr. Jim Tew, Ohio State Extension Service honey bee specialist and president of the Tri-County Beekeepers Association. That Winter ventilation was a topic for debate in beekeeping circles has escaped my attention for the eight years or so that my wife Janet and I have been beekeepers. Why is anyone's guess. It isn't often that Janet and I are able to offer information of value during the course of any beekeeping discussion. As I sat listening to Dr. Tew that night, I realized that I know a little about ventilation and heat transfer. I will here attempt to lend credence to some old advice, and maybe in the process cast doubt on some other old advice. The basis of this informational offering will be solid engineering mixed with a bit of professional opinion.

The typical beehive consists of the familiar bottomboard, hive bodies containing frames, wax and honey, the inner cover, and cover. This assembly, taken as a whole, is in physical and engineering terminology a system. For the purposes of this discussion, it is a system which transfers heat energy and water vapor both internally and from a system with a high content to a system with a low content. The outside walls of the hive bodies, as well as the bottomboard and covers, separate the internal hive environment from the outside conditions. This separation offers resistance to heat transfer, again outside to in, or inside to out. The heat in, or around a beehive outdoors will always be in a state of movement to achieve equilibrium, a state of temperature equality, one system to another. An empty wooden box will always be at, or very near, the temperature of its surroundings. But a beehive contains living animals, wax and honey. The animals transform the honey into usable energy and ultimately radiate that energy in the form of heat. The honey and wax absorb, and contain heat as it becomes available from the bees, and outside. The honey and wax then act as an internal temperature stabilization mechanism. As a temperature drop occurs, the wax and honey will continue to conduct heat to the hive environment, slowing the rate of the temperature drop inside the hive system.

To Wrap or Not To Wrap

The hive insulation issue seems to be at the forefront of all discussion concerning the winterization of bee colonies. The beekeeper understands that if his or her bees are stressed during the Winter, they use an increased amount of their reserves, lessening the chance that the colonies survive. Insulating the hives in some way is the logical thing to do. The idea, decrease the energy requirements of the colony by increasing the temperature inside the hive, is well-founded in fact. But ventilation problems are usually complex, involving several related sets of mechanics. Temperature and the logical act of insulating will be discussed. We will see that solving one problem may give rise to other, more serious problems, that the bees do not have the ability to contend with themselves.

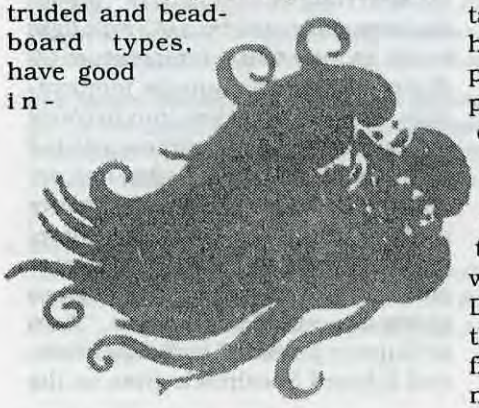
Applying insulation to any structure is done with the intention of maintaining a temperature difference between the inside of that structure and it's surroundings. A typical Winter beehive with two hive bodies requires 200 Btu/hr* (about the heat generated by a 60-watt light bulb), to maintain a temperature 20 degrees above the outside temperature. This figure takes into account an estimated outside airflow into the hive of about 0.5 cfm (cubic feet per minute) through the hive entrance without entrance reducer. Somewhat less than 100 Btu/hr maintains an inside temperature 10 degrees above the outside and so on. "Bees as Superorganisms" by Robin Moritz and Edward Southwick gives us the

Continued on Next Page

VENTILATION ... Cont. From Pg. 19

statement, "The total heat conductance of the cluster shows similar values to that of homoeothermic mammals of the same mass . . ." This is to say that when the bee cluster is considered as a whole (superorganism), its physical characteristics are such that it transfers body heat in amounts similar to a small, warm-blooded animal. Using the above statement we can take known animal heat values and estimate the heat output of a bee cluster to be 2 Btu/hr/lb at 35°F. The heat generation (transfer) mathematics should be strictly considered an estimate. The mechanics of a bee cluster are such that it could be 50 percent larger in weight without a like increase in surface area. Surface area is one of the components of any heat transfer calculation. The heat generated and transferred also changes with the temperature around the cluster. The estimate is close enough, though, to remove any doubt that the internal heat generated by the bee cluster will have almost no measurable effect on internal hive system temperature. But the insulating and energy efficiency qualities of the cluster are so good, so well-adapted, that honey bees can survive extremely low temperatures. The beekeeper must take this Winter hardiness into account when investing time and money into any sort of hive wrapping system.

A wide variety of building materials, "suitable" for hive wrapping, are available at any home center. Installation advice can usually be had at no extra cost. Tar paper has an insulating value roughly one-ninth that of the wood out of which the hive bodies are constructed. Polyethylene has an insulating value described as negligible. Styrofoam, extruded and beadboard types, have good insulating values, ranging from R-2 to R-5 and higher. Fibrous insulating materials can be found with higher resistance (R) values yet. However, all of these building materials share a major drawback. They all inhibit the free movement of moisture out of the hive.



Moisture is contained inside the hive. A strong bee colony enters the Winter season with many pounds of liquid honey reserves, about 15 percent of which is water. Though it is capped with wax, the water slowly evaporates out of the honey. Intermittent, incidental moisture is introduced through the hive entrance. The water is absorbed by the air inside the hive system, eventually moving to the outside through normal transfer and ventilation. This movement is difficult to stop entirely, and it is never desirable to do so. It is extremely easy, though, to cause water vapor to condense and collect in liquid form. Honey bee experts agree that high Winter moisture levels invite all manner of problems. An inspection of the interior surface of the hive body reveals a varnishlike finish. This finish, primarily propolis, serves as a vapor barrier. It does not entirely stop the transfer of moisture, but slows it down on its way to the wood constructing the hive body. Once in the wood, it is quickly transferred to the outside air. If a layer of wrapping is applied to the outside of the hive body, this moisture can, and will condense on the inside surface of the wrapping and contact the outside surface of the hive. The moisture eventually saturates the wood of the hive body. The water-soaked hive body wall will begin to transfer moisture back to the interior of the hive, resulting in an elevated moisture level inside the hive. The condition will persist until measures are taken by the beekeeper to allow the hive system to dry out. The drying process cannot be easily accomplished without an extended period of very mild weather. Fibrous wrapping, such as mineral wool or fiberglass, greatly magnifies this condition because it can hold moisture, the condensation taking place within the structure of the material. Dr. Tew pointed out in his lecture that insulating a hive can keep bees from taking advantage of our common mild Winter days for cleansing flights, by decreasing the rate of heat transfer from the mild outside to the cooler interior of the hive. This is a bit of very sound advice. Because heat always transfers from a system of higher content to a system of lower content, insulating to impede this transfer works in both directions. On 50-degree days in January, it is desirable for the bees to be able to respond quickly to the opportunity to get out. The bees have instinctive mechanisms that adequately provide the hive system with Winter weather protection. The functional gain of adding an exterior wrap to the hive system is very questionable.

Entrance Reducer and Inner Cover

The hive entrance reducer and inner cover play a traditional part in the winterization of a beehive. The entrance reducer is added, and the inner cover's position is reversed to lessen the infiltration of cold air. By virtue of their position, they become physical parts of the hive ventilation system. The infiltration of outside air through the hive entrance, and other ventilation openings, serves to control the water vapor levels inside the hive. As dry outside air enters the hive it forces out some of the moister interior air. A mixing of outside air and interior air occurs in conjunction with this ventilation. The resulting interior air is slightly dryer. The heat expended to this entering outside air is roughly six and one-half percent of the total heat, at the 20 degrees temperature difference, in the example heat calculation. Installation of an entrance reducer will cut this ventilation rate by an estimated 90 percent. However, the problem this device can present is related to the dynamics of outside airflow. Because surface wind is so unpredictable when contacting obstructions, no assurance can be given that ventilation rates are consistently high enough with the entrance reducer in place. Honey bees, being oxygen-breathing animals, are as affected by an oxygen-depleted environment as any other form of livestock housed in intensive conditions. In fact Moritz and Southwick point out that heat production (metabolic energy consumption) by a bee cluster is measured by environmental oxygen reduction. In the case of chickens and pigs,

both traditionally housed indoors and in close quarters, high moisture levels and low oxygen levels promote poor efficiency, disease and high mortality.

The position of the inner cover has a minimal effect on outside air infiltration given its relationship to the cover. The heat transfer through the material of the inner cover and cover, and the air space between, is unchanged by the position of the inner cover. Since the movement of heat and air inside the hive in the form of convection currents is a certainty, and since this moving air also has insulating value, nothing should be done to interrupt this circulation. The typical Summer position of the inner cover is less likely to impede this circulation because of the slightly increased space between the inner surface of the inner cover, and the top bars of the frames. The ventilation scoop in the frame of the inner cover is of limited value when used in conjunction with a hive cover constructed with a four-side rim. The potential space for ventilation is governed by the space between the cover rim and the hive body side. A three-side hive cover brings this ventilation opening into effective operation. If an entrance reducer is used, the inner cover, and the use or disuse of the hive reducer, can have an impact on the Winter health of the bee colony. Since temperature is relatively noncritical, interior air quality should be considered the Winter priority.

The topic of outdoor air currents, and their effect on hive ventilation, was addressed very briefly in a previous section. This subject, related to hive orientation, is important enough to generate questions during the course of any discussion on hive ventilation and winterization. The "answer" is usually made up of sidestepping and evasion that would gain the admiration of a U.S. Senator. There is a reason for this. As stated earlier, outside air movement is very unpredictable. The assignment of a favorable, ventilation-related orientation, for a flat-sided structure such as a beehive, in a highly variable moving air mass, is far outside the scope of this, or any other beekeeping discussion. The information required to make the calculation is so complex that the final recommendation would be nothing more than a guess. The normal Summer facing of the hives is best because it saves the labor of repositioning them for Winter.

Hive Color

The subject of hive color may seem out of place in a discussion on hive ventilation. But the outer color of the hive can have an enormous effect on the inside temperature of the hive system. Temperature cannot be separated from the subject of ventilation. Beekeeping experts (usually) agree that a beehive can be painted any color as long as it is white. This is based on an aspect of heat transfer called absorbtivity, and how it relates to the transfer of radiant heat energy. Dark objects absorb more radiant heat than light-colored objects. A dark-painted hive is subject to wildly fluctuating Winter interior temperatures due to this rapid, short-term warming. Because our coldest weather is usually accompanied by snow cover and bright sunshine, a dark-painted hive's interior can warm up very quickly to temperatures at which the bees become very active. Because the actual air temperature may be near zero, the temperature inside the hive can plummet in a matter of a very few minutes to just a few degrees above zero when it is no longer subject to the radiant heat (cloud cover, sunset). The heating and cooling of a dark-painted hive occurs so rapidly that no net gain in heat content in the hive interior should be expected. Colony stress due to internal temperature fluctuation is the only probable outcome. White-painted hives are very temperature-stable because the color reflects a good percentage of the radiant heat. White is not perfectly reflective, so some heat is transferred to the interior of the hive system. The color white also does not slow interior warming on mild days since it has no effect on the normal transfer of heat through the hive system structure.

Conclusion

All ventilation projects have a set of given inside condition requirements. Temperature, humidity level, air quality and air quantity, all combine to set the standard. Our very short look at bee colony's inside Winter needs leaves us with the following recommendations that should maintain the hive system within a reasonable range of those needs. Honey bees are very temperature-resistant as long as they have sufficient energy reserves, good air quality and moderate to low moisture levels. The recommendations are very simple. The bee cluster generates insignificant amounts of heat, so insulating the exterior of the hive is without purpose. Wrapping the hive in any other way invites high moisture levels and disease potential. The bees seal the interior very well. In addition, since the bees require oxygen to maintain the mechanics of the superorganism during the Winter season, reducing the flow of outside air into the hive should be done with extreme caution. In other words, the normal beehive structure is very well-adapted to operate in Winter conditions without further modification.

We beekeepers exert our influence on the beehive system in an ongoing effort to provide for our charges' survival. Thrust into an environment of our making, the bees always respond to our ministrations. The choices we make as beekeepers determine whether or not the bees' response to our husbandry is favorable. BC

**British thermal unit per hour. One British thermal unit is approximately equal to the heat generated by one wooden kitchen match.*

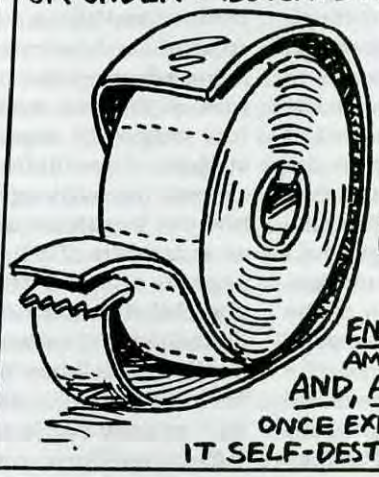
Brad Kurtz is a commercial ventilation specialist working in the heating, ventilating, and air conditioning industry. He and his wife, Janet are owners of Fox Head Farm nursery, specializing in old roses, and bee plants located in Wooster, Ohio. Questions and comments can be directed to e-mail address: foxhead@bright.net

---

THE HOLIDAYS ARE FAST APPROACHING ~ HERE ARE SOME IDEAS FOR THE BEEKEEPER ON YOUR GIFT LIST!

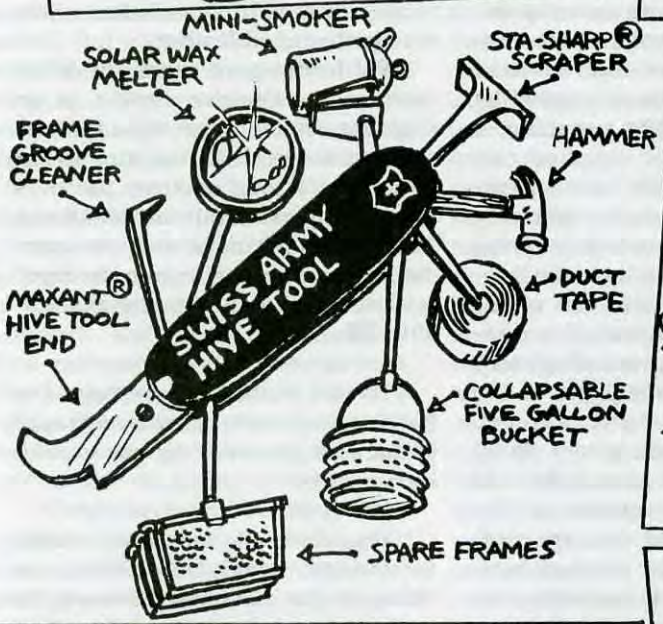
NEVER BE EMBARRASSED BY YOUR SMOKER GOING OUT AGAIN!

DIRECTIONS SAY ONE STRIP FOR EACH FIVE FRAMES OF BROOD. BUT WHAT IF YOU HAVE EIGHT FRAMES OF BROOD? DON'T OVER- OR UNDER-MEDICATE...

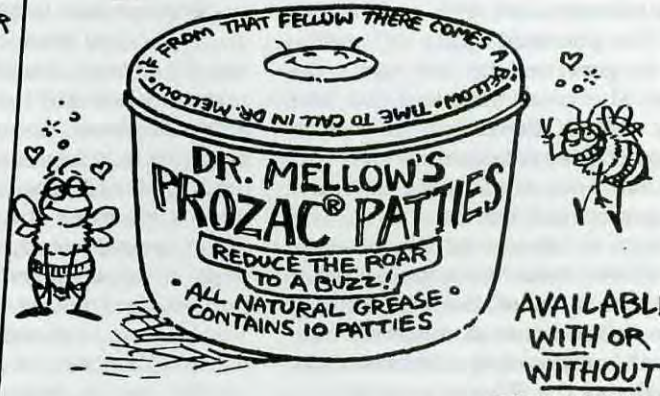


USE 'APISTAN®' BY THE INCH™

ENSURES THE CORRECT AMOUNT OF MITICIDE AND, AS AN EXTRA BONUS- ONCE EXPOSED TO PROPOLIS- IT SELF-DESTRUCTS IN 45-60 DAYS!



CRANKY BEES? NO TIME TO REQUEEN? NOW IT DOESN'T MATTER!



AVAILABLE WITH OR WITHOUT TERRAMYACIN!

YOU'VE SEEN THEM — NOW OWN THEM!
CHECK OUT THE BEEKEEPER IN THE FULL PAGE AD ON THE BACK COVER, HOLDING A FRAME,... WITH NO THUMB!

"IT GRIPS WITH NO GRASP!"

WE NOW SELL — THE WELLMARK GLOVE!

LIKE MAGIC!

ALSO AVAILABLE — THE WELLMARK FRAME, DEEP FRAMES THAT FIT IN SHALLOW SUPERS! SAVES TIME AND SPACE!

NEVER LOSE A SWARM AGAIN — USE "MARC'S MAGIC™ SWARM STOPPER"

TWO INFRARED BEAMS COUNT THE NUMBER OF BEES GOING IN AND OUT OF ENTRANCE. AT THE FIRST SIGN OF SWARMING QUEEN EXCLUDER DROPS OVER ENTRANCE —

—AND AUTO ALERT ALARM PAGES @BEEKEEPER!

From Nectar To Honey

Richard Bonney

Nectar is essential to the life of the colony, but what is it, really

Although nectar is essential to the life of a colony, and in turn to our success as beekeepers, most of us probably don't think about it a lot. We are usually aware of those times when the bees are working hard and bringing nectar in, and we usually are aware of a dearth. Then, when goldenrod is being worked, we certainly are aware of it because of the strong odor around the beeyard as the nectar is evaporated. For the most part though, our concern is primarily for honey, not nectar. Some would say we don't need to know any details about nectar, but, as with so much of beekeeping, if we do know more perhaps we can do a little better job of hive management. But first, what is nectar?

Nectar is a sugary product of plants, secreted through a part of the plant called the nectaries, which are normally located in or near the flowers. Nectar is an excretory product of the plant, originally a waste product resulting from the overproduction of food by the plant. Over the millennia it has evolved into an attractant for insects, birds, and other creatures, to aid in the pollination process for these plants. The bees, of course, convert nectar into honey.

We tend to think of nectar as something that is always present if a plant is in bloom. This is not necessarily true, In fact, it is probably less often true than not. It takes specific combinations of weather, moisture availability, and plant maturity for a plant to be actually secreting nectar. Then, once it does start, it is not necessarily a continuous process. With most flowers the amount of nectar available at any given time is probably less than an individual bee can carry. A bee finds a flower with available nectar, sucks it up, and moves to the next flower. A period of time must elapse while the plant replenishes the nectar in that particular flower. Once nectar secretion begins, though, the product is of a consistent makeup within a specific range for a given floral species.

Overall, the sugar content of nectar ranges from 3 to 70 percent. The average is around 25 to 30 percent. Given a choice, the bees are not likely to collect nectar in the lower end of the range. The economic return, that is, the nutritive value of the resulting honey, would be too low considering the energy they expend in collecting and then processing the nectar.

Nectar contains about 30 different sugars. Only three of them are important to us here. The primary sugar is sucrose (also known as saccharose.) The two secondary sugars are glucose (levulose) and fructose (dextrose). Nectars from different plant species have different proportions of the three, but there are three basic patterns.

- Dominantly sucrose
- Dominantly fructose and glucose
- A balance of all three

No matter what the pattern, nectar is converted to honey with a balance of approximately 70% glucose and fructose, and less than 10% sucrose and other sugars. Depending on the specific flower source, the proportions of glucose and fructose will vary within the 70 percent range.

The conversion of nectar into honey is a simple process. At the same time, it is complex. The process has two parts, carried on more or less simultaneously. One part is chemical, where the sugars of the nectar are converted into the sugars of honey. The other part is physical, where the moisture content is reduced. The moisture content of most nectar ranges from 20 to 50 percent, whereas the moisture content of honey is less than 19 percent.

First, let's look at the chemical change. It is brought about by enzymes that are added to the nectar by the bees. The process starts at the flower as the nectar is collected and continues in the hive. An enzyme is a chemical substance produced by an organism, in this instance by the bees, which catalyzes or brings about specific reactions or chemical changes when added to another substance, in this case the nectar. In making honey, three specific enzymes are involved:

- Invertase - which inverts (changes the chemical structure) of most of the sucrose of nectar to become glucose and fructose. These latter two sugars can be stored in more concentrated solutions than

Continued On Next Page

NECTAR ... Cont. From Pg. 23

honey more efficient than storage of nectar.

• Diastase - which becomes a constituent part of the honey and helps break down starch. Its function is not fully understood but it probably helps in the digestion of pollen.

• Glucose oxidase - which works to produce gluconic acid and hydrogen peroxide, which in turn protect unripe honey against bacterial contamination and help to protect against fermentation. Hydrogen peroxide is an unstable compound chemically, and glucose oxidase activity in some honeys is destroyed by light. It is dark in the hive but when we take the honey, we bring it into a different environment. This is one of the reasons that it behooves us to extract honey quickly and protect it once it has been removed from the hive.

Back to the conversion process. As our bee flies from bloom to bloom the process is already starting. As nectar passes through the bee's mouth parts, the three enzymes, which are produced in the hypopharyngeal glands in the bee's head, are added to the nectar. The nectar moves to the honey stomach and the enzymes begin their work.

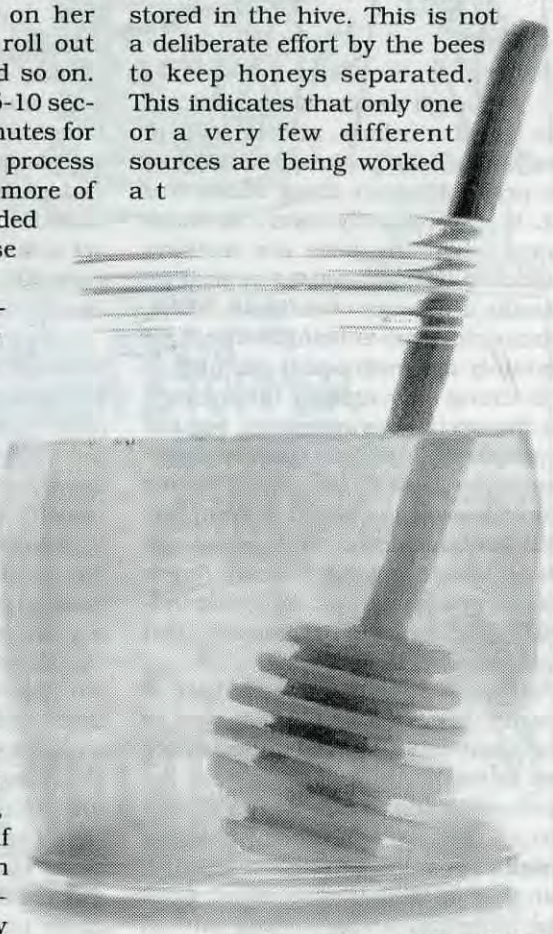
Our bee completes her load and returns to the hive. There she will go to the nectar processing area and search out one or more receptive house bees. Nectar processing normally takes place adjacent to the brood area to take advantage of the warmth there. Our bee may give the entire load to one house bee, but more likely it will be split among two or three.

The normal procedure is for the house bee to seek out a quiet spot, if such can be found in a crowded and busy hive, where she will stand, roll out a drop of nectar on her tongue, hold it, roll it in, roll out another drop, roll it in, and so on. Each drop is held for about 5-10 seconds, taking perhaps 20 minutes for the whole load. During this process moisture evaporates, and more of the enzymes are probably added to the nectar by the house bee.

After the moisture content is initially reduced by this action, the load is deposited in the hive wherever possible. This processing will have reduced the moisture by about 15 percent, usually within one hour of arrival, and this green honey will have its full complement of enzymes. Initially this green honey is placed in temporary storage and the individual cells are not filled. If there is room this temporary storage will be in the normal honey storage areas, but if the hive is crowded, if space is limited, the green honey may be stored anywhere. If you see green honey in the brood area, it may be a signal to you that more supers are needed, especially in the early season when such congestion could lead to swarming.

In this temporary storage the ripening process continues as the enzymes do their work and as the moisture content is further reduced by the particular environment of the hive. The total conversion process from nectar to honey takes 2-3 days on the average, although it can take as little as one day or as many as five. Once the honey has totally ripened, the bees will consolidate it, filling and capping the cells, and the process is complete.

Meanwhile, back in the field, we know that an individual bee collects from a single floral species per trip, sometimes per day, and perhaps for her entire life. Collectively, however, the hive may be gathering nectar from many sources. Once the nectar from these sources enters the hive and goes into the conversion process, it loses its identity and becomes part of a blended whole. Sometimes, because of the difference in colors, you can see where honeys from different sources are stored in the hive. This is not a deliberate effort by the bees to keep honeys separated. This indicates that only one or a very few different sources are being worked a t



National Honey Board photo

Why Granulation?

In some years honey seems to granulate sooner than in other years, once taken from the hive. Some honeys, that is, honey from specific floral sources, have a reputation for rapid granulation. Dandelion honey, for instance, is quick to granulate; milkweed honey is not known for granulation. One of the factors which encourages granulation is a high glucose content. Honeys containing less than 30% glucose rarely granulate. Another factor is the moisture content. Honeys with a moisture content of less than 17% are more likely to granulate than those with a content closer to 18%.

Unfortunately, sugar content is not something easily determined outside of the laboratory, and little information seems to be available as to which honeys are quick or slow to granulate. We are left to conjecture. Why did honey seem to granulate faster in a particular year? A simple answer could be that the proportion of different nectar sources was different in that year, with more nectar being available than usual from plants which yield a high glucose content, or conversely, with less nectar being available from plants yielding a low glucose content.

the same time. The origin of the honey does not matter to the bees or to the process.

The foregoing, of course, is only a general outline of the honey production process. Variations occur based on individual hive conditions, on the nectar flow, and on the weather. One of these variations involves cell capping. Generally, once a cell of honey is ripe, it is capped. However, being uncapped does not necessarily mean that it is unripe. In the late season especially, some of the ripe honey may be left uncapped. At other times the bees may simply be too busy dealing with a bumper crop and will get to the capping later. If you have some honey that you suspect may be green, give it a simple test. Hold the frame horizontal to the ground, open cells facing down. Give the frame a firm downward shake. If the cell contents fall out, you can assume the contents are green. If the honey stays in place you can assume it is ripe. If in doubt, and if the amount of questionable honey is small, leave it with the bees a little longer if you have that option. Otherwise, a small amount of unripe honey mixed with a relatively larger amount of ripe honey is usually not harmful.

As stated, a bee works a single source on a given foraging trip. It is less commonly realized that an individual bee has a very restricted life. She may spend her entire foraging life in one patch of bloom, or in one tree or shrub. Because of this, individual bees may have a very restricted knowledge of the geography around their hive. The colony as a whole, of course, knows much more about its surroundings, but because of the potentially restricted knowledge held by individuals we often hear confusing and conflicting reports about the results of moving a hive over short or long distances within its own foraging range. Often this confusion can be reduced if we are able to work out the probable foraging sources in the period just before the move. Such knowledge won't necessarily help the bees, but at least we will better understand what is happening. BC

Richard Bonney is the retired Extension Educator for the State of Massachusetts, and a regular contributor to these pages.

DISEASE & PEST CONTROL CHECKLIST

Randy Oliver

MIDWINTER (By February 1; when colonies are rearing brood in earnest)

1. Check all colonies for queenrightness, brood rearing, strength, disease and adequate stores (strong colonies may starve between now and April – check hive weight during poor weather). Suspect that any weak colony may be diseased, has mites, or has a poor queen.
2. *Varroa*: You may want to treat with Apistan now – especially if you're going to be exposed to mites in the almonds or other early crops. Collapsing colonies spread mites. If you're going to treat twice this year, this is a "window" before the honey flows start. See LATE SUMMER: *Varroa* below.
3. American foulbrood (AFB): Feed healthy colonies one or two TM extender patties (Note "B"). This will also help to control tracheal mites. Inspect colonies for AFB symptoms (salt and pepper brood, foulbrood odor, perforated cappings, roping of dead larvae, scale). Destroy and burn diseased colonies – don't let "deadouts" get robbed out by your healthy colonies!
4. European foulbrood: Feed a TM extender patty; consider requeening.
5. Nosema: If indicated (dissect bees), feed one or two gallons of light Fumidil syrup (Note "C").
6. Chalkbrood, sacbrood or bee paralysis: If bad, requeen with resistant stock.

SPRING (Late March or early April)

1. *Varroa* mites: You can easily spot Springtime infestation by seeing mites on broken drone cells when you split the brood boxes. If you see any mites at this time, I'd treat the colony immediately; allow enough Apistan duration before the honey flow starts in May (Note "A").
2. AFB: If you suspect robbing, give every colony a TM extender patty (Note "B").
3. Tracheal mites: Colony buildup will usually outpace the mites at this time of year. Use biologically resistant bee stock. (Optional: Test sample of bees for mites; if over 20% infestation, treat with 50 gr. of menthol in a bag when weather is over 70°F.)
4. Wax moths: Once weather gets over 70°F, store supers in a cool, well-ventilated place (promote air flow through supers) with lighted moth traps; separate white combs from dark. For longer storage, use Paradichlorobenzene crystals to fumigate honey-free combs.
5. Skunks: (Any time of year) Sprinkle 1/4 teaspoon lye crystals onto skunk-scratched dirt in front of hive. Skunks will quickly leave hives alone, but you may need to repeat after rains.

LATE SUMMER (August/September, after star thistle, as soon as honey surplus is removed)

1. *Varroa* mites: Put in Apistan now, to protect the bees that will form the Winter cluster (Note "A"); Dr. Eric Mussen (Univ. of CA, Davis) suggests that this may be the only treatment you'll need for the year.
2. Robbing: Reduce entrances in weak colonies; don't spill honey in beeyards; see Note "B."
3. Tracheal Mites (optional): Have a sample of bees tested for mites in late August. If infestation is over 20 to 30%, treat with 50g menthol while weather is between 70° and 85°F.

FALL (Late September or early October – prepare strong, healthy colonies for Winter)

1. *Varroa*: Remove the August-installed Apistan strips after 50 days. Otherwise, treat now!
2. American foulbrood (AFB): Inspect for symptoms. Destroy and burn diseased colonies. Feed healthy colonies one or two TM extender patties (see Note "B"). This will also help to control tracheal mites if colonies are fed while the last rounds of brood are emerging.
3. Build stores: Give honey-filled combs or feed heavy syrup for 40 to 60 pounds of stores.
4. Check brood nest for pollen: If scant, feed pollen substitute now to "fatten" emerging bees.
5. Nosema (optional): Feed two gallons heavy Fumidil syrup before weather cools (Note "C").
6. Wax moths: Not a problem in cool weather. Protect stored combs from mice.

NOVEMBER: Most queens stop laying about now.

1. *Varroa*: Remove Apistan strips. If you procrastinated, treat now and pull 'em about January 1.
2. General health: Winter only strong, heavy colonies full of pollen stores and young bees. Reduce entrances; use mouse guards; winter in sunny, dry, well-drained location.
3. It's generally too cold to feed or manipulate colonies from now until mid-January.

NOTES AND FORMULAS

A. Apistan: Distribute two to four Apistan strips throughout the cluster (one strip for every five bee-covered frames); leave in for 42 to 56 days. Strips must be placed so that the maximum number of bees will rub over them. Can be used right up until placement of honey supers. Don't try to reuse Apistan strips—the Fluvalinate's gone! Don't forget to remove them.

B. TM extender patty: To make 20 6-oz scoops (500mg OTC each), thoroughly mix one 6.4-oz packet Terramycin soluble powder with 5 lbs granulated sugar, then mix in 2½ lbs. Crisco. Place patties on the top bars of the brood nest, in contact with the cluster of bees; if patty is consumed in fewer than 12 days, add another. Terramycin treatment must be discontinued 45 days prior to supering for honey. I'd use a patty whenever there is robbing.

C. Fumidil: First, completely dis-

solve 1 rounded teaspoon of Fumidil powder in a cup of warm water. Then stir solution into 1 gallon of cooled heavy or light syrup as indicated.

D. Sugar syrup: Place syrup feeder immediately above the cluster and reduce hive entrance to avoid robbing. Or sprinkle syrup into empty combs. Avoid Boardman entrance feeders.
   1. Heavy syrup (for stores): 20 lbs. granulated sugar, 4½ qts boiling water (makes ~2½ gallons).
   2. Light syrup (for stimulation): 10 lbs. sugar, 5 qts hot tap water (roughly equal volumes).

E. Pollen patty or pollen supplement:.
   1. Trapped pollen moistened with heavy syrup to doughy consistency, or . . .
   2. 1 lb brewer's yeast, 1 lb sugar, mix in approximately 1 cup hot water, a little at a time, or . . .
   3. Commercial yeast/soy flour formulation per directions; add pollen if you have it.

   Mix with plaster paddle in ½-inch drill. Press, roll, or slice into 3/8-inch patties (grease your hands with Crisco). I carry them with waxed paper on one side, a layer of sugar on the other. Feeds best between brood boxes, paper side up, in contact with the cluster. Caution: Contaminated pollen can spread chalkbrood! BC

Randy Oliver runs about 250 colonies in northern California, and has been keeping bees for over 30 years. Randy holds an M.S. in biological science, is head instructor at the Nevada County Science Center, and teaches beginning beekeeping classes each Spring.

Notes: Terramycin teatment must now be stopped six weeks before a honeyflow. New *Varroa* treatments are being developed, but don't give up Apistan yet. Mites are a constant stress factor. Minimize stress by keeping your colonies well fed and in pollen, with queens from disease- resistant stock, absolutely prevent robbing of deadouts, and keep a constant eye on *Varroa*.

Honeybee Problems and Diseases – Randy Oliver 1998

Problem or Disease	Effect	Cause	Age of Bees Affected	Diagnostic Characteristics	Control
Livestock	Knock over hives	Cattle scratching			Fencing
Bears	Tear open hives			Boxes torn open	Electric fence, rooftop, horse trailer
Skunk	Eat bees		Adult	Scratched soil, hot bees	Chicken Wire or lye on ground
Mice	Nest in combs			Hive trash at entrance	Entrance reducer, poison
Birds	Eat bees in flight		Adult		
Hornets, Yellowjackets	Eat bees		Adult		Trapping, poison (don't poison bees!)
Ants	Bother or kill bees; steal honey			Ants entering colony, bees fighting ants	Poison (don't poison bees!); oil, teflon or sticky on legs of hive stand; usu. bees O.K.
Robbing	Steal honey, disease transmission	Honey bees		Bees probing at hive cracks; fighting with guards; clouds of bees	Prevention, reduce entrance, protect weak colonies, don't expose honey combs or drop scraps
Wax Moth	Damage combs	Wax "worms"		Silken tunnels	Strong colony, cold storage, paradichlorobenzene
Moldy Combs	Looks ugly	Fungi		On damp combs	Bees will clean up
Nosema	Poor buildup	Protozoan	Adults	K-wings, dissect out gut	Fumidil in syrup; Spring weather
Chalkbrood	Kills brood	Fungus	Older larvae	"Mummies"	Genetic breeding
Bee Paralysis Virus	Kills adults	Viral	Adult	Shiny bees with K-wings	None
Varroa Mite	Damaged pupae, colony death	External mite	Pupae & adults	Test for, or visual on bees and pupae; deadout has no bees, lots of honey, dead emerging brood, tobacco smell, white mite feces	Apistan strips; removal of drone combs; genetic breeding?
Tracheal Mite	Winter loss, general stress	Internal mite	Adult	Dissection under 'scope; colony dies in winter with a cluster of dead bees & dead bees on bottom	Menthol, Crisco patty, genetic breeding
American Foulbrood	Kills brood	Bacterial	Older larvae & pupae	Peppered pattern; sunken, perforated cappings; odor; "roping" of brown, melted larvae; black scale in cells.	Burn Diseased frames; prevent with Terramycin & genetic breeding. The only disease that equipment can't be reused.
Starvation	Colony death	No honey	All	Dead bees are headfirst in combs	Feed honey, syrup, or sugar before danger in March and April.
Sacbrood	Kills brood	Viral	Older larva	Grayish propupa with raised head	None
Laying Worker		No queen	Brood	Scattered eggs, drone brood in worker cells	Combine with queenright colony
Failing Queen		Queen out of stored semen	Brood	Poor pattern, drone brood in worker cells	Requeen
Pollen Dearth	Colony stress	No pollen	All	No pollen stored	Feed pollen or substitute

The Ritual Of The Bee Hunt

Earl Hutchison

"The battle of Waterloo was won on the playing fields of Eton."
– Duke of Wellington

Wellington may have been right, of course. But I believe that grit and backbone are ingrained in children much earlier than "Eton." I know that was true on the playing fields of my childhood on the Illinois prairie. To substantiate this, I need only tell you what took place during the rites of the bee hunt, the most thrilling and scary of all childhood pursuits.

The bee hunt served as a rite of passage into young adulthood – the seventh or eighth grade. During a bee hunt, for example, Jimmy Cox established himself as the leader of our troop by rallying us from a dispirited chaotic retreat to defeat the enemy.

Our bee-fighting ritual was practiced in only three villages in central Illinois – in Tovey, Virden and Auburn. Wherever I went in the Army – Europe and Japan, in three different infantry divisions – and wherever my brother Bill went in the Navy – the Atlantic and Pacific oceans and a myriad of naval bases – no one had ever heard of our fighting ritual.

We hunted the largest of the prey – the big black and yellow bumble bee, from the order Hy-

Continued on Next Page

BEE HUNT ... Cont. From Pg. 29

menoptera, genus *Bombus*. Sometimes it's mistaken for the carpenter bee. The *Bombus* bee is a bomber of a bee. It's ferocious-looking. It's fast – but not so fast that a well-swung paddle can't hit it. You've seen this huge black and yellow bee hovering above flowers, clover and honeysuckle. Nobody messes with it. It's the size of a small goober – the ideal combatant size. (Brown honey bees, like wasps and hornets, are too small and fast to fight.) The bomber bees also have just enough honeycombs and drones in their nests to lure even the weak-hearted into battling for them.

On at least one Saturday afternoon every month in the Spring and Summer, our band swaggered barefoot through village streets and on hot, dusty roads to the bees' nests – a shirtless squad in Huckleberry Finn bib overalls, marching as to war. We talked big. We aimed tentative strokes and swings with wooden paddles at imaginary black and yellow monsters – blissfully unaware that death can come with a bee sting to an allergic boy or when a blood vessel on a temple is pierced.

A sequence of events heralded the bee hunt. A bee's nest might be reported by a villager who disturbed the bees while spading a garden. Or a farmer might mark a nest for us in one of the meadows surrounding the village. If nest sightings were slow, we ourselves might "track" a bee from its pollen stamping grounds to its underground nest.

The Saturday that Jimmy Cox established his leadership credentials was the first hunt of the Spring. Wood whittlings from orange crate slats flew in the morning as we carved paddles for the coming battle. We fashioned them the width of pingpong paddles and twice as long. We drilled quarter-inch holes, an inch and a half apart, with the small blades of our pocket knives – trying not to break the blades in the process. The holes kept the bees from being diverted by slipstreams over the sides of the paddles when we swatted them. (Major-league baseball bats are now being dimpled to curb those slipstreams.)

We meet at Jimmy Cox's house after lunch: Bobby Whalen, John Jumbock, Colin Boyd, Fred Pratt, Steve Dubosh, Bob Nicolson and the Quinn brothers, Leroy and Junior. We march east through alleys and on village streets, crossing the trolley tracks from Springfield and passing under the Virden North Mine steeple, where we merge with Joe and Eddie Lass and Howard Murphy. We tightrope walk on two sets of railroad tracks next to the mine yards before climbing the web fence with two strands of barbed wire atop it and jumping into the pasture bordering the North Woods. There, Mr. Fairfield, owner of Fairfield's Dairy, awaits us. He escorts us to the nest, a small hole in the ground in the southwest corner of the pasture, and quickly leaves, mentioning chores needing to be taken care of back at the barn.

We quietly form a wary ring around the nest. We check the surrounding grassy terrain behind us – mentally registering the best avenue of retreat from the beehive. A huge oak stump 30 yards away is the only in-flight obstacle on the landscape.

A solitary bee returning to the hive from gathering pollen is caught unawares as he circles for a landing and is summarily dispatched by Bobby Whalen with a swat of his paddle. The last arc in our 20-foot circle steps into place. We are primed for battle.

Joey Lass volunteers to tap on the ground by the spiderlike hole. Six taps with the butt of his paddle creates a minor quake in the hive. The bees are summoned to arms. The bees flex their wings, warming up underground like planes revving their engines. In the cherubic face of John Jumbock, the eyes widen. Jimmy Cox's lips part slightly. Bobby Whalen's tanned face pales.

Warrior bees scramble up from the hole, some tumbling out end over end. They circle around the hole in echelons three and four feet above the ground. Joey Lass, the hive "tapper," had tried to strike the ground with just enough force to call up two or three bees. Instead, eight bees of the 40 or 50 in the hive respond. They swirl above the hive entrance in 10 to 12-foot circles.

We pay great respect to these protective flight echelons until a fairly consistent flight pattern is established and the bees grow less wary. Then we close in until only four feet separate us from the bees circling on the outermost periphery. Now, in the hands of the most eager and brave, the two paddles come into play.

Jimmy Cox flicks his left paddle at a bee flying solo in the outermost circle. The bee reacts much as a bull does to a red flag. The bee charges. Jimmy gauges its speed and, at the proper moment, swings his right paddle. His calculations are correct. The bee, stunned by the blow, drops to the ground at Bobby Whalen's feet. A blow from the edge of Bobby's paddle dispatches it.

I am convinced things can go quite smoothly in a bee fight involving experienced bee hunters. If the proper concentration is maintained, bees can be eliminated efficiently and without incident. However, if concentration wavers, a wide variety of things can go wrong. On this Saturday afternoon, with this particular group of uncoordinated youth, variety was the spice of the battle.

Howard Murphy carelessly lures a bee with a paddle, not noticing another bee cruising beside it no more than a foot away. Both bees wing to the attack.

"Hey!" Howard cries, furiously swinging both paddles at one of the bees. Steve Dubosh moves to his side and takes care of one bee. Howard eventually clouts the other with a backswing.

Bobby Whalen flutters a paddle at one bee and attracts three. He steps backward swinging. He manages to kill two of the bees. The third bee perseveres and triumphs. But as he stings Bobby's forearm, a paddle flattens him. Bobby retires to the oak stump to extract the stinger from his arm.

The stinger of the *Bombus* bee thrust into the skin of a young boy

produces an enduring needlelike pain which instantly radiates out to a two-inch diameter creating a mound about a half-inch high. (I speak, of course, from experience.) Unless they're swatted in the process of stinging, the bees keep their stingers and live to sting another day.

Depending upon the stoicism of the individual, a sting produces grimaces and/or shrieks. Tears are nonnegotiable. They flow no matter how hard a boy tries to quench them. Whether they're silent tears or not depends upon the boy's macho rearing and the amount of pain-killing endorphins released in his body at the onslaught of pain. Near the eyes, a sting puffs up, closing the eye. All bee fighters, having been stung at least once, cultivate a finely honed wariness.

At the battle scene, the circle sags – gaps materialize. Colin Boyd whacks a bee onto Junior Quinn's thigh. The half-stunned bee clings and stings him through the overalls. Junior yowls and swats his thigh with his paddle, killing the bee. He joins Bobby at the oak stump.

Fred Pratt, meanwhile, is performing an Indian war dance trying to discourage a bee from crawling farther up his leg inside his pants. He's successful, shaking the bee to the ground where he stomps it with a bare foot.

Finally, and without enthusiasm, I wave my left paddle at a lone circling bee. As it dives to the attack, I carefully note its trajectory and velocity and viciously swing my right paddle. And miss!

On the surface, it would seem that a near miss of a paddle would intimidate a bee. After all, the paddle itself is a hundred times larger than the bee. And the wielder of the paddle thousands of times larger. But those statistics do not daunt the *Bombus* black and yellow bee. Rather, the whiffed paddle, like a toreador-waved flag, infuriates the bee. However, now aware of the danger, the bee flies in more cautiously, and the attacker's role is reversed. I, for example, have now become the defender. I walk backward, swinging my paddles.

Sometimes in a skirmish like this, the line of flight of the bee is direct and the situation is resolved immediately: The bee is destroyed or the boy is stung. At other times, the warrior bee bides his time waiting for an opening, suspending himself, as this one does, face high, just outside the range of my flaying paddles. I accelerate my back-pedaling. The bee hangs on tenaciously. Some bees have been known to follow their tormentors as far as a city block. In this pursuit, if the arms of the bee fighter tire and the fanning of the paddle slows, the bee closes in to attack, bringing renewed flurries of paddles.

When a bee fighter is engaged in such a retreat, all bee-fighting action stops as the fighters observe the spectacle. I heard cries of merriment mingled with shouts of encouragement from my friends. I may even have received in-flight instructions on how to combat the bee. Most of these exhortations, however, are lost on me because of the immediacy of the dark, Darth Vader-like eyes of the black and yellow fuselage body hovering just beyond the range of my flailing paddles.

At this point of the retreat, various scenarios are possible: Sometimes the bee becomes impatient and attacks at the wrong time and is killed. Sometimes the bee zooms in at a propitious moment and scores. Sometimes the bee fighter in his hasty retreat trips on a tuft of grass and is stung as he rolls and writhes on the ground to escape the bee's wrath. Sometimes the fighter turns in headlong flight swinging his paddles at the back of his head and neck in an effort to ward off or hit the bee. (The tactic I followed.) The fighter in this instance may or may not escape unharmed. Sometimes the ordeal becomes too nerve-racking for the fighter and he throws all caution – and his paddles – to the wind and flees ignominiously in fright – to the hoots and derision of his fellow bee fighters. These fleeing fighters may escape unscathed. That depends upon the determination of the bee involved. Most bees, however, as I have suggested, are relentless in pursuit.

What happened to the bee chasing me? I don't know. Perhaps I hit him with one of my paddles, crushing him against the back of my head. Maybe he gave up. In any event, when my arms were too weary to swing the paddles, I stopped running and turned to confront the bee. He was not there.

On beyond my sweeping eyes, however, are other bees, perhaps as many as 25. All in the vicinity of the ring – inside and out of it. As I walk slowly back to the arena of combat, Eddie Lass' casual swing of a paddle knocks a half-conscious bee onto Colin Boyd. He is stung on the wrist. His frantic paddle swats at the bee do not go unnoticed. Colin finds himself besieged by a half-dozen black and yellow angry bees. He runs around and behind the ring of fighters toward the oak stump. Two of the bees continue pursuing Colin. The rest hone in on other bee fighters. Meanwhile, several bees, returning from pollen harvesting, are outraged to see their hive beleaguered.

Now there must be 30 bees thronging through the melee of fighters and their gyrating paddles. All semblance of bee fighting discipline disintegrates into windmills of rackets, endangering not only the bees but fellow bee fighters. Instantaneously, as if on signal, the ring disintegrates and fighters sprint wildly in different directions. The only thing they have in common is the goal of distancing themselves from the hive.

When the buzzing fades from each fighter's ears, he stops and surveys the terrain. When the field is clear, he heads to the oak stump to rendezvous with the others.

A cursory assessment reveals that casualties for the action now include John Jumbock (on the back) and Jimmy Cox (on the left shoulder).

We wait for the bees to settle down into their underground nest – a sound tactical decision for occasions such as this. A heated discussion turns on whether to continue

Continued on Next Page

BEE HUNT ... Cont. From Pg. 31

the battle (the casualty rate being exceedingly high) or to retire. A vote is taken. The overwhelming sentiment is to return to fight another day – next Saturday. Only Jimmy Cox and Joey Lass are initially against that decision. We think we're home free when Joey swings over to the majority.

However, Jimmy says, "You can go home if you want to. But I'm not going to."

He picks up his paddles and walks to the nest.

No enthusiasm is generated by his words and action. Howard Murphy and Bob Nicolson rise to their feet to go home. The rest of us watch as Jimmy taps on the ground three times and swats one of the bees that has been summoned and hovers over the hive.

When Bobby Whalen decides to join Jimmy Cox at the nest, even though with his sting he has earned the right to nurse his arm and observe the rest of the battle, there is nothing left for me but to follow him. Both are my best buddies. With our return to the battle, the rest of the bee fighters are shamed into combat.

Surprisingly enough, the remainder of the warrior bees are destroyed without casualty. We dig up the nest, six inches below the ground, with our paddle handles. We capture the queen bee and four nonstinging drones and place them in Ball jars with holes in the lids.

Sometimes, distinguishing drones from the warrior bees can be a problem. Drones have primarily yellow-ringed posteriors, while warrior bees have solid black bottoms. Leroy Quinn committed this fatal mistake, much to our glee. Grabbing a warrior bee, he paid the price with a swollen hand.

The 40 or 50 honey cones in the nest are divided among us. We squeeze their honey onto the paddles, and lick it up with our tongues. I also got one of the drones. Another spoil of battle.

A gamut of emotions runs through the ring of bee fighters during the battle: There is the anxious waiting and tension as a bee is chosen to be destroyed. The sudden striking fear as the bee wings in to the attack. The exhilaration of the victory over a worthy foe. The comic relief of witnessing a fellow companion's battle. The wash of sympathy evoked by the tears or facial contortions of a fellow hunter who is stung. The empathy aroused by the fear in the face of a companion anticipating a sting. The gallantry experienced by joining a comrade embattled by more than one bee. The emotional strain of an hour-long battle sends a young fighter to bed that night bone-tired. He will be laced with feelings of satisfaction if he has given a good account of himself in battle. If he's not been particularly effective with the paddles, traces of remorse settle in along with a determination to do better on the next hunt.

My drone, with a three-foot length of black thread tied around a back leg, accompanied me to school Monday morning. I let it fly about my head briefly in Miss Reeves' geography class when she was writing on the blackboard. (Did I see a flash of admiration cross Shirley Griffith's face? Another spoil of battle?) When Miss Reeves again turned to the blackboard I freed the bee. It created momentary pandemonium by circling the classroom trailing the black thread— which somehow escaped the sharp eyes of Miss Reeves – before it flew out an open window.

I used to worry that my son and other children didn't engage in bee hunts. They displayed not one whit of interest in doing so! Then an uneasiness engulfed me. Is it because they now have more *divertissements*? Or are they smarter than I at their age? Another thing bothers me still: I used to think hunting bees singled me out as a courageous kid. But now, I, a grown man, cannot summon the grit to grab with my bare hand a drone gathering pollen from a flower – even though I know because of its predominantly yellow-ringed posterior it is incapable of stinging me. What does that say about me and that childhood-ingrained macho? BC

Earl Hutchison is a professor of English/Journalism at the Tennessee Technological University in Cookeville, TN.

NOT IN ANY BOOK

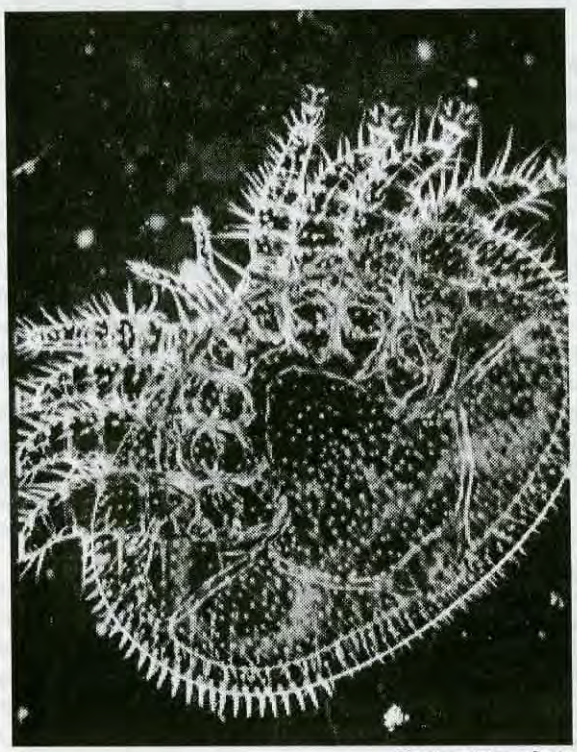
We must continue to direct valuable and scarce research resources toward mite control.

James E. Tew

Years ago, all of us who were keeping bees were forced to live through the harshest transition ever known to hit our beekeeping industry. The Apicultural Apocalyptic Horsemen were: (1) Africanized honey bees, (2) predaceous mites, (3) cheap imported honey, and (4) declining interest in beekeeping. At the time, it seemed that beekeeping had no safe harbor – anywhere. Those of us who have survived the onslaught have been forced to change our beekeeping practices – probably forever.

Now here we are 10 to 12 years later. Currently, we are a mix of both old and new beekeepers. Like the first sunny day after a bad storm, life always seems to go on, one way or another. Unmanaged honey bee populations are still down, but managed populations have recovered a bit. It is as if our industry were diagnosed as having cancer and has been required to take extensive chemotherapy. Both beekeepers and their bees are the worse for wear. Though none of the horsemen have brought good news, predaceous mites, specifically *Varroa* mites, seem to have been the worst of the bunch.

In nearly every regard, the introduction and establishment of *Varroa* has been a setback for us. Rather than our research funds going to develop increased knowledge of pollination biology, or control of other bee diseases, or the development of improved hive appliances, all of our industry's best minds have been focused on one thing – mites. Rather than extension workers and teachers being able to introduce new people to the enjoyable craft of beekeeping, nearly every presentation at every level has been on mite biology and mite control. We talk as much about mites as we talk about bees. At times I can't tell if we are apiculturists or mitaculturists. Due to the severity of the problem, our beekeeping industry has essentially lost 12 years of growth and development. And what do we have to show for our decade of research projects on mite control? Fluvalinate strips and the elusive promise of formic acid as control agents. We still keep our bees in wooden boxes – just like our great-grandparents did. We still build a smoldering fire in a smudge pot (a smoker) and smoke our bees just like our great-grandparents did. We still produce and install queens and package bees just like our great-grandparents did. While every other aspect of agriculture has modernized several hundredfold, we still handle individual hives and individual frames – just like our great-grandparents did. It is ironic that the one thing that has changed from our great-grandparents' day is that, per capita, we consume less honey than our foreparents. Mites have deeply wounded our industry, and even after we heal, we will be left with an ugly scar. I am sick of mites. But who isn't?



Sammataro photo

Though we can't take even the slightest break from developing alternative control measures for mites, we really need to look toward our future every chance we get or we will be unprepared for it – even if we do have mites under total control.

Honey Chemistry We need help in the area of honey chemistry. At the producer level, we can't even tell something as simple as where a honey crop came from. We can usually tell where most of it was generated, but never all of it. This point was clearly made here in Ohio this past season when several beekeepers from around the state got a musty-tasting honey from their colonies. It was amber-colored and full-bodied. Generally a nice product. I

have no way of telling the nectar's source. We label such honey "Wildflower" because we don't know from whence it came and have no practical techniques for determining its source.

Can honey have other uses besides as a topping for pancakes? We know it has medicinal values, but it is rarely used for such purposes. Can honey be made into plastic? Could it be used to make inks? Could it be used to make fabric? Could we use it to pave roads? I know, I know. I'm getting too far out in left field, but my point is that our bees produce a remarkable product and we only know how to do one thing with it – use it as a specialty sweetener. We've not been very creative.

Hive Chemistry The internal chemistry of the dark, warm hive is practically uncharted, but what we do know is exciting. We have known of the existence of honey bee pheromones for years. Yet, with the exception of some erratically performing crop attractants, we are unable to use them to advance our management skills. Shouldn't we be able to use chemical procedures to mask our intrusion into a colony rather than crudely building a fire to generate smoke for that purpose? The smell of smoke and hive manipulations are presently inexorably linked. Shouldn't we be able to use practical chemical procedures to give us information concerning the condition of queens, of brood populations, of food reserves, of the presence of bee diseases, or of nectar and pollen sources? We simply have not kept up with our cousins in other agricultural respects. The only way that a modern-day dairy compares with a dairy of 100 years ago is that milk still comes from cows. Or does it? Sometimes it seems to come from soybeans.

Colony Management and Manipulations As commercial beekeepers, we are simply working ourselves to death. We handle individual frames within individual colonies. What else can we do? How would our workload change if we took in one mega-hive having several million bees with multiple queens. It would have its own road wheels. Pull it into an orchard and unhook it – a veritable pollination factory. On their own initiative, fire ants across the southeastern United States are becoming polygynous, or multiqueened. If ants could do it, certainly bees could do it.

"Rather than our research funds going to develop increased knowledge of pollination biology, or control of other bee disease, or the development of improved hive appliances, all of our industry's best minds have been focused on one thing – mites."

We still make our hives from solid 3/4-inch pine lumber. After several hundred years of development, shouldn't we be using some kind of super-strength, lightweight, rot-resistant hive material? I don't know of one scientist in this country who is working on hive design modernization. Yet we refer to our wooden hives as "Modern Hives" even though they have not changed since the late 1800s. Nearly 15 years ago, Rubbermaid, whose home office is here in Wooster, Ohio, phoned me with all kinds of questions concerning the possibility of producing a line of plastic beehive equipment. I was ecstatic. Though I love woodworking and respect the expertise that our industry has for producing woodenware, here finally was an internationally recognized plastic product company showing interest in our little industry. Though I gave them the best numbers I could, they later told me the potential sales market was not great enough. Not just the U.S. market, but the world-wide market. We all went back to cutting trees. It seems to me that we are due a latter-day L.L. Langstroth with fresh ideas and new design innovations.

Hive Nutrition Every day, I take a multicomplex vitamin with just a bit more of the E vitamin for good measure. Poultry, beef cattle, dogs, rabbits and dairy animals all get vitamin supplements. Who out there can tell me what the current vitamin supplement recommendation is for the average bee colony? If we give them to ourselves, our animals – even our gardens, why don't we have the information to know how much to give to our beehives? Don't even tell me they get enough from their natural food sources. We simply don't know.

How about other minerals – even lowly salt? Beekeepers past did add small amounts of salt to sugar syrup with ambiguous results. We complain loudly about the poor quality of today's queens as though commercial producers are at fault. I have no earthly idea if hive nutrition is a factor or not, but I wish we knew more about things like honey bee nutrition.

Pollination Oh, brother, do we ever need help here. We need help because we get other commodity groups involved in our ignorance of our bee charges. How many hives are needed to pollinate an acre of apples? Answer: "One colony per acre." That's like asking, "How far from Cleveland to Cincinnati?" and the answer being, "A far piece." Within an orchard environment, we are simply guessing at answers to a myriad of questions. But it gets worse. Growers have told me that they want "controlled" pollination, not just unlimited pollination. There is no production reason to set a heavy crop only to thin it out every year. It frequently means that the trees will have a light blossom load the next season. Bottom line – all we really know is that many fruit and vegetable crops require agents of pollination. If honey bees are the pollination agent, usually a colony per acre (for most crops) is thought to be enough. At this point in our industry's development, we should have the information to know how to target bee foragers to specific crops and how to subsidize their

Continued on Next Page

"Can honey be made into plastic? Could it be used to make inks? Could it be used to make fabric? Could we use it to pave roads?"

nutritional needs when those specified crops are not nutritionally rewarding to bees (i.e. cucumber pollination).

Stinging and Swarming We should know how to eliminate – not just control – stinging and swarming. If we could stop bees from stinging, we could all be beekeepers. No upset neighbors, no legal problems, no hypersensitive reactions. Yet the very best we can do is fiddle around with instrumental insemination procedures that only about 30 people can expertly do in this country. Our practical use of bee genetics is primitive. Essentially, we save our best corn for seed. Oh wait! That was our great-grandparents who did that. Modern corn producers use hybrid, "round-up ready" crop material while we do nothing more than breed from our best. Having said all that, without aggressive swarm control, all our nutritionally balanced, stingless bees would fly away to do their own thing. And then the neighbors would complain.

Honey Bee Pathology Though we can control mites reasonably well, except for Terramycin for the foulbroods and Fumadil-B for nosema (which most of you don't use), we are marginal hive physicians. But enough said on this entire issue. There's no reason to go into detail in this area – or any other for that matter. I sense that I have made my frustrating point. Honey bee mites have cost all of us greatly and, unfortunately for both beekeepers and bees, we have not finished paying. But we are showing signs of recovery.

Making Plans for the Weekend Not being able to efficiently control mites within our bee colonies is much like making big plans for the weekend just after being catastrophically run down by a car. We must continue to direct valuable and scarce research resources toward mite control. Hive nutrition means nothing if the bees within the colony are dead. But having said that, we cannot continue to sacrifice our industry's future to the all-consuming mite. If they have done nothing else, mites have brought beekeeping's worth and beekeeping's problems to the forefront. We are more appreciated by the public now than at any time in our past. We've just been through a terrible storm. We could really use a sunny day. BC

James E. Tew is State Specialist in Apiculture, The Ohio State University at Wooster, OH. Tew.1@osu.edu

AUSTRALIAN QUEENS

Alan Harman

"In a good year you can breed queens all year round."

The center of Australia is a harsh uncompromising place, beset by drought, flood, freezing temperatures and stifling heat. It's the Outback – vast areas of often hostile desert with little vegetation and even less water. Annual rainfalls range from nothing to 12 or 15 inches – the latter would represent a pretty wet year.

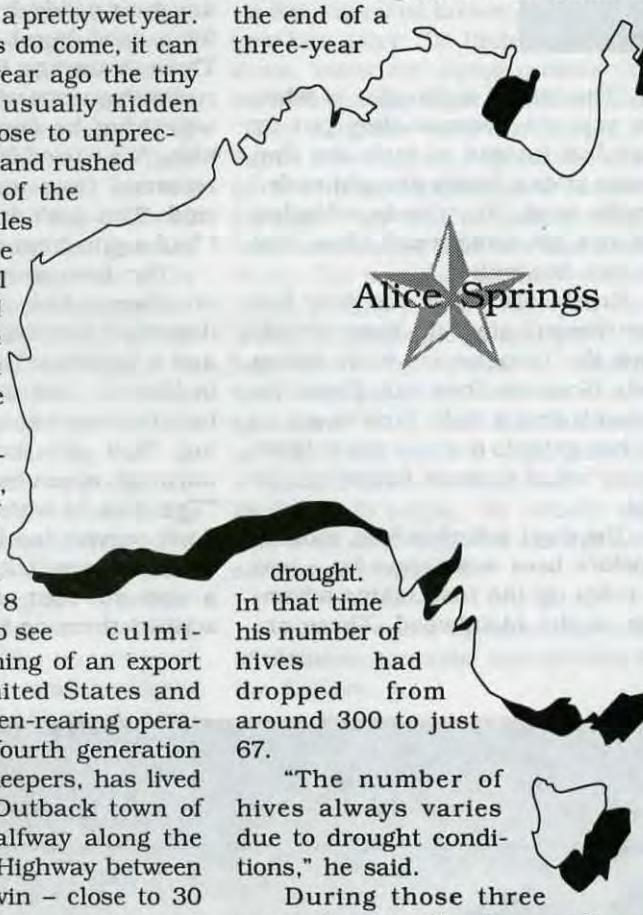
When the rains do come, it can be disastrous. A year ago the tiny Katherine River, usually hidden deep in a gorge, rose to unprecedented flood level and rushed through the city of the same name 195 miles from Darwin. The four commercial beekepers based around Katherine lost about about 800 hives in the flood.

But in this hostile environment, Keith Brooke of Alice Springs has resumed a project that in about 18 months he hopes to see culminate with the opening of an export market in the United States and Canada for his queen-rearing operation. Brooke, the fourth generation of a family of beekeepers, has lived in the legendary Outback town of Alice Springs – halfway along the 1,900-mile Stuart Highway between Adelaide and Darwin – close to 30 years.

Originally from Robe in South Australia, he followed his father into beekeeping. "I've been playing around with bees since 1959 when I was eight or nine years years old," he said. His first career was as a diesel mechanic, working on the massive road trains that keep the Outback – and even cities such as Darwin – supplied with everything from milk to diesel fuel. Then beekeeping was a hobby.

"I played around with the genetics and I got it right, so I went full time," Brooke said.

Right now Brooke is smiling, even optimistic. Good rains a month before had signaled what could be the end of a three-year drought. In that time his number of hives had dropped from around 300 to just 67.



"The number of hives always varies due to drought conditions," he said.

During those three years when month after month saw brilliant, cloudless blue skies, Brooke put his hives out in groups of 20. He covered thoursands of miles, constantly carting water to the sites, usually from Alice Springs.

"If you are lucky, you find a bore," Brooke said. "There's quite a bit of underground water – it ranges from drinkable to bloody near straight epsom salts." Twenty hives at any one location was the maximum because of the lack of food during the three-year drought. Despite the best care possible, that lack of food saw his bee numbers plummet.

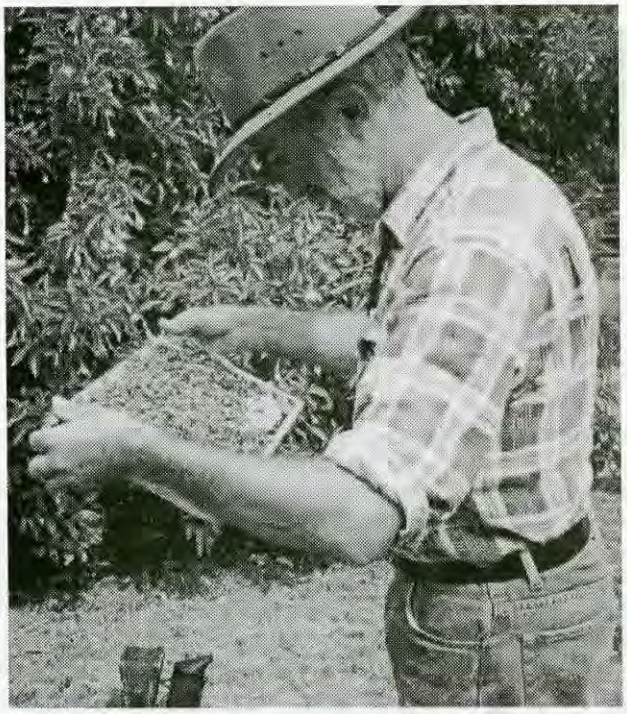
"The food is patchy," he said. "You have to migrate to it a lot. It takes up a lot of time shifting the hives around. I must have been traveling 500 to 600 kilometers (312-375 miles) a week." He mainly focused on his main breeding stock. "They're pampered; they have to be," Brooke said. "Now we're coming out of the drought we'll start breeding and fill up the hives again."

Brooke averaged about 66 pounds of honey a hive during the drought. But when the rains come as scheduled and the desert blooms, the story is much different. "In a good year it will go up to between 60 and 90 kilograms (132-198 pounds)," he said.

Bees around Alice Springs produce probably one of the densest honeys in Australia. "It's down to between 10 and 12 percent moisture content," Brooke said. "It goes from medium amber to dark amber and has a pretty reasonable flavor to it." Once a year, in October and November when the Corkwood tree blooms, the bees produce what could be the blackest honey anywhere. "It's an acquired taste," Brooke said. "It has a very strong, malty flavor. If the Corkwoods get rain they are annual flowering. A few people put hives out for them. Quite a few people like that honey."

Northern Territory honey is packed in 135-pound drums and shipped south to the heavily populated coastal markets. The main

Continued on Next Page



Alice Springs beekeeper, Keith Brooks, in shirtsleeves checking out a queen's activities.

source of Brooke's honey is the River Red Gum. "It's going to start early and really bloom this year because of the rain," Brooke said. He follows the gums as they bloom, starting near Tennant Creek, 300 miles north of Alice Springs, in August, and then moving down as far as the South Australian border 300 miles south of the desert town of 27,500 people. "Beyond that it gets too expensive; it's not economic," Brooke said. "The expensive thing up here is the fuel. It's about 89.4 cents a liter (US$2.03 a U.S. gallon) for premium. When you get a full load of bees on the truck a liter doesn't go very far at all." The Red River Gum is annual flowering even in a drought.

"The end of a drought is when you cop out because they put on more leaf instead of buds the first season after a tough drought ends," Brooke said. "It's ironic – Mother Nature's got some weird ideas, but you can live with it."

Brooke said when the River Red Gum doesn't start up there are always the bloodwoods with snowy white blossoms that only flower for a month and a half. "You've got to hit that, get into it about two or three weeks before it starts flowering," he said.

The day I talked to him, most of Brooke's bees were close by – just 40 miles up the road taking advantage of the bloodwood. There are also the legendary coolabah trees and Thozetbox – a flowering tree found in just one 12- by 20-mile area of the Northern Territory. "That's where we get our start for the queen breeding season, in that stuff. It's quite good, too. Some years it's full of pollen, some years it's got both, nectar and pollen – depending on the rain." That's important for Brooke, who is not into beekeeping mainly for the honey production.

"I want to get a full-sized queen rearing outfit going," he said. "I'm aiming for the U.S. and Canada. "In a good year you can practically breed queens all year-round and you can get them close to pure mated too, if you use a very isolated location."

He said in about another 18 months he hoped to be ready to start exporting – "providing we don't get any more ruddy drought. We are due for a good burst of rain, I think." Three years ago Brooke did a trial run with queens when the conditions were what he described as reasonable. "We trialed 200 and we got 200 returned from mating flights," he said. "You can't do better than that. I had a grin from ear to ear."

The bees around Alice Springs are disease-free, something Brooke described enthusiastically as a joy and a blessing. There is chalkbrood in Darwin, 100 miles to the north, but the desert stops it from spreading. "You also don't have to worry too much about ferals," Brooke said. "The lack of water sees to it they don't survive too long." Most of the wild bees are Italian ferals and are a very old root stock. Brooke described them as being more leath-

The terrain around Alice Springs.

ery than the modern hybridized Italian bees. A farmer used to keep them and a few got away. "A lot of people have complained about them, hanging around water buckets," Brooke said. They're very aggressive – it's a full suit of armor job. "They are pretty hardy; they have to be," he said. "But there's not many of them, the climate controls the population. Last year I put a good drone mother out there, and of course we got two, I think, mated pretty close to her. All the rest of them went hob-nobbing with the Italian bloody ferals."

His bees are a near-pure acclimatized Hastings strain of gray Caucasian that he has back-crossed to ensure their purity. They're a long way from their original roots in Russia. They were originally imported into Tasmania, the colder island state to the south of the Australian mainland. Brooke brought a hive of the Hastings strain to The Alice in the 1971-72 season. "We got some more a few years ago." he said. "They were virtually the same strain. They were a bit hybridized, so we dehybridized them, back-crossed them, straightened up the genetics on them a bit. Now they are quite hardy and survive reasonably well." His dedication to the purity of the strain means Brooke is reluctant to supply local beekeepers with his queens. "If they do have a site near where you've got a mating yard or something, and if they've got genetics that have gone feral or something, you can skew the whole show up," Brooke said, "I try to keep my strain fairly close to the original." The reason for this is the darker color and the temperament." The requirement for the temperament – and the darker colored bees – is the Outback environment. "You can't work bees up here in the Summertime wearing a full suit of armor – it's too hot," he said. Brooke's bees have a very passive temperament, and he works with them in shirt sleeves.

In Winter, Alice Springs temperatures can drop below freezing at night, but in the Summer the thermometer soars above 100°F and the ambient temperature reaches into the 120°Fs. There is no way a beekeeper can wear full protective gear – the suit of armor, as Brooke called it. "You get heat-locked here in the Summer." "You can't even move bees at night – they'll smother or suffocate even with the entrances open. Beekeeping is a challenge up here."

The darker colored bees are favored over bright yellow bees because of another Outback resident – a five-inch bird known as the rainbow bee eater. "It finds bees delicious, especially flying queens out on their mating flight," Brooke said. "They migrate between here and Papua New Guinea – spend the winter in PNG and the Summer in Alice Springs. They tend to come through here in corridors and you can avoid them. The sceret is to know where those corridors are. Then you can watch other people go and put their bees on the flight paths ...." Adding insult to injury, the birds are wasteful eaters. "They bash the abdomens off and just eat the legs, thorax, wings and head," Brooke said. "They also do it to wasps. We usually say they'll eat anything with six legs and an orange bum." BC

Alan Harman is a freelance journalist who makes numerous contributions to Bee Culture.

CLUB CORNER

by Herb Day

FARMER'S MARKET

A series of articles designed to provide ideas, guidance and a road map for regional beekeeping clubs. Prepared by members of The Back Yard Beekeepers Association (BYBA). Founded in 1993, the BYBA's membership consists of 150 hobbyist beekeepers from Fairfield and Litchfield Counties (Connecticut) and Westchester County (New York). www.fairfieldweb.com/byba

Our club is always looking for ways to increase our visibility in the community. That's not for egotistical reasons. It's because we are continually seeking ways to let the public know that bees are beneficial and friendly neighbors. That's our mission in life. In addition, any club stays healthy by continually attracting new members and creating new beekeepers.

This year our club tried something new. We asked the Farmers' Market in Weston, Connecticut, if we could set up a booth at their weekly market. They agreed, and the end result has been most beneficial on several accounts. We were able to:

- Provide a new sales outlet for our membership's honey
- Give the community a wide selection of all-natural, bee-related products
- Educate more of the public about bees and beekeeping
- Encourage a few new beekeepers
- Add a tidy sum to our club's coffers

The town of Weston, Connecticut, isn't that large for our part of the world: There are 9,000 residents. It's a rather affluent community, so there's money to spend at the weekend market. The Weston Farmers' Market is held on Saturday mornings from 7:30 a.m. until 11:00 a.m. – rain or shine. Farmers and vendors come from as far away as 30 miles. They offer fresh produce, flowers, baked goods, honey, maple syrup and crafts. Booths are set up in the public school parking lot. Each week approximately 300 customers come to the market.

Upfront planning. Here are some of the things for your club to consider when planning a booth at the farmers' market:

- Do you have enough people to "host" the booth each week? Usually one person can handle it, but two can make things easier when it gets busy. We got volunteers from our board and membership, and then published a schedule that included the dates, and names and telephone numbers of the hosts.
- Do you have members who can provide honey, candles, pollen, beeswax and other products for sale? Members donated some of the products we sold – but most were purchased (wholesale) from members. One of our club members is a small commercial beekeeper, so we can always call on him if our supplies run short (hasn't happened yet).
- Will one of your members step forward to be the coordinator for the club's involvement in the market? This individual should call folks on the list to confirm their presence at the upcoming market. The coordinator would also have the responsibility to pay the weekly fee to the market organizers (we pay the market $10 a week).
- The club will need to invest in a simple and attractive display to draw shoppers to the booth. For us, a few hundred dollars and some donated equipment gave us the necessary tables, tablecloths, signage, posters, demonstrations, etc.

- Prices should be prominently displayed. A sign with your bee club's name is important. And don't forget a tarp or umbrella for rainy days and to keep the broiling sun in check.

What products to offer. Virtually all products of the beehive are offered at our booth. In addition to an assortment of honeys from our members, we also sell bee pollen, rolled and molded candles, beeswax, furniture polish and lip balm. We also have honey bee coloring books for the kiddies, honey/walnut dessert topping (we suggest it's a great housewarming gift) and a display of flavored honeysticks (at two for 25 cents the children can't resist). The customers seem to love the fact that our products are noncommercial (homemade), all-natural and local. They can't get those qualities in the local supermarket.

Setting up shop. Most vendors have an aluminum frame tarp to keep the rain and hot sun off the display. We invested in two 3 x 5-foot folding aluminum tables, and we found some fabric with honey bee design, which we use as a table topper. We cover the tables with clear plastic if the rain persists. The back of a van or pickup makes a good seat for the retailer, and we even bring along some folding chairs for older customers who wish to sit and talk awhile.

Additional displays and attention getters. Beekeeping presents highly visual opportunities, and so we have displayed more than just the products we sell. Here are some of the "other things" your club can have on hand to attract attention to your booth and educate the public:

- A hive body with frames (so customers can get a close-up look at a nonactive hive)
- A live observation hive (to show customers what bees do in the hive)
- Close-up photos and colorful posters (to educate customers about bees and beekeeping)
- Preserved samples to show the difference between honeybees, wasps, hornets and yellow jackets (we have these insects embedded in a single block of plastic resin)
- An extractor to show how the honey is removed (best to demo this without really extracting honey, lest you want to attract a gang of six-legged visitors)
- Brochures about your club, plus printed information on bees and becoming a beekeeper

The organizers of the market appreciate the added interest and visibility we bring to the event. And the theatrics always attract the local newspaper photographer, creating additional publicity for both the market and our club.

Finances. Some of our members have generously donated their honey and bee-related products to our booth. But our club is pleased to buy honey and products from members at a standard wholesale price (set by our club's board). In our Tony town, the club is able to retail honey at $5 per pound.

The bottom line. The Weston Farmers' Market runs for 16 weeks. On average, we sold about $185 worth of products each Saturday. That meant we grossed about $3,000 for the season. The net (after inventory and expenses) was approximately $1,200. To put that new revenue in context, if we relied on membership dues, we would need to add 50 new members to accomplish the same net revenue. So the market brought us a tidy sum to add to our treasury.

Non-measurable value. In addition to selling products, we're successfully promoting the rewards and benefits of bees and beekeeping. We're building good will with our neighbors. And we're attracting new beekeepers. Participating in the local farmers' market has been good for our club. We encourage you to consider such a project if the opportunity becomes available in your area. BC

Herb Day has been keeping bees for 18 years in Weston, CT. He is a retired Agronomist who researched and sold crop protection chemicals for over 30 years across the U.S. For the past 10 years, he has sold honey and other bee products at a local farmers' market. You are welcome to contact Herb at: thesevendays@worldnet.att.net

COLLECTING BEE STAMPS

Richard Dalby

If you're not already a collector of stamps displaying honey bees and beekeeping I hope this article will pique your interest. *Bee Culture* has published several good articles over the years that are very helpful to the novice collector, most recently "Collecting Bee Stamps" in the December 1996 issue.

Believe it or not, there are hundreds, probably thousands, of stamps out there depicting bees and beekeeping, issued over the years by countries around the world. Collecting these stamps makes you realize that beekeeping is truly a worldwide pursuit. You realize, too, that as a beekeeper you are a member of a global group.

Stamp collecting (*philately* is the technical term) is a fascinating hobby, especially so when you collect stamps on a topic in which you have a special interest (such as honey bees and beekeeping). Like beekeepers, stamp collectors love their pursuit and are some of the nicest people around.

Honey bee stamps vary greatly in the scientific accuracy of what they depict. Some stamps aim at realism, some at a symbolic representation of the subject matter. Those who design the stamps probably have little firsthand knowledge of bees and beekeeping, which no doubt accounts for some of the errors to be found on certain stamps. But this is a minor point, and something that applies to stamps depicting many other topics.

There are lots of ways to collect stamps, and every collection reflects the collector. You can collect just the new stamps (called *new issues*) as they become available from countries around the globe. Or you can have as your goal a collection of every honey bee-related stamp ever issued over the years. And you may become interested in collecting so-called First Day Covers, which consist of the stamp or stamps in question on an envelope (which may be decorated with a related design or vignette) and a cancellation obtained on the first day the stamp was available. You may even decide to branch out and begin collecting stamps depicting bumblebees, or honey plants, or flowering trees. As for cost, you can spend just what you want to spend. Most of the bee stamps out there are still quite reasonable in price, and all of them, so far as I know, are still available.

Here's how to get started as a collector of honey bee stamps. I would recommend that you subscribe to *Global Stamp News*, P.O. Box 97, Sidney, Ohio 45365-0097. A year's subscription to this monthly publication costs just $6.95. Another fine publication is *Linn's Stamp News*, P.O. Box 29, Sidney, Ohio 45365. They will send you a sample copy of their weekly magazine and subscription rates upon request. If you wish to obtain such stamp supplies as a stamp album, a pair of stamp tongs, or whatever, you will find many ads in these publications.

Also, you may want to write to the American Topical Association, P.O. Box 65749, Tucson, Arizona 85728. Ask for a sample copy of *Topical Time* and membership information. If you become a serious collector of honey bee stamps (or stamps representing any other topic), you

will want to join this organization.

The easiest way to collect honey bee stamps, in my opinion, is to have a stamp dealer who specializes in topical stamps get them for you as they become available. Typically, such dealers will have available not only the most recent honey bee stamps, but also some of the older stamps. You can obtain the specifics of a topical stamp dealer's new issue service by writing to him or her. I've listed a couple of dealers here. You can find others in the classified ad section in *Linn's Stamp News* under the heading "Topicals For Sale."

Mail-Order New Issue Topical Stamp Dealers:
Eastern Shore Stamp Company
P.O. Box 298
Fruitland, MD 21826

County Stamp Center
P.O. Box 3373
Annapolis, MD 21403

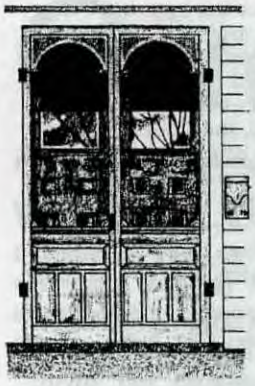
Now on to a description of some recent honey bee stamps from different countries, to give you an idea of what you can find in the world of honey bee philately:

Central Africa – Sheetlet of eight stamps, each depicting a different insect. One of the stamps shows a honey bee loaded with pollen on an exotic flower. In the background is another bee and a nice depiction of a skep. Another stamp depicts a bumblebee (Bombus terrestria) with a straw skep nearby, so apparently in Central Africa this bumblebee is kept in a skep for some purpose. Perhaps a reader could enlighten me on this. These are all large and colorful stamps with nice designs. I should mention that two of these stamps depict butterflies, since many topical stamp collectors are keen on butterflies.

Zimbabwe – This country in Central Africa recently issued a set of six stamps depicting bees and beekeeping. Each stamp shows the familiar hexagonal shape of a honey cell, within which are found the following six designs: Honey Bee on Flower; Queen, Worker and Drone; Queen and Retinue; Rural Beekeeper; Commercial Beekeepers; Products of the Hive. This is an interesting set of stamps. I like the fact that commercial beekeepers and products of the hive are given recognition, along with the typical depictions of the bees themselves. Also, check out the rural beekeeper stamp, which shows a young man removing honeycomb from a round homemade hive, with no bee veil and only a bundle of burning sticks for a smoker.

Belgium – A booklet (cover, top of page) of six different stamps (opposite page), produced by this country, was issued to commemorate the 35th International Apicultural Congress, which was held in Antwerp in September of 1997. The booklet cover has a wonderful beekeeping scene on it, and the stamps themselves are artistically outstanding and technically accurate (with one small exception). The six stamps depict the following beekeeping scenes: The Queen and her Court; Development of the Egg; Birth of a Bee; Bee Collecting Nectar from a Flower; Bee Fanning and Bee Bringing in Pollen; Worker Feeding a Drone. This booklet makes a fine addition to any collection of honey bee stamps.

Well, that's it for now from the world of apiculture on postage stamps. I hope this article entices some of you to become collectors of such stamps. Stamp collecting, like beekeeping, will bring you pleasure, satisfaction and knowledge. Comments or questions? Please write me and include a SASE. Richard Dalby, Box 6, Levan, UT 84639. BC



Ann Harman

Home Harmony

Rise & Shine, Beekeepers!

November is a nice month because it has Thanksgiving and all the festivities it brings. Thanksgiving is a family holiday, a time of year for young and old to get together and eat entirely too much. At this time, homes are usually full of visiting relatives. There's no problem with assembling Thanksgiving dinner, and dinner the day after, even if it's leftovers. Breakfasts could get ignored. However, there is no reason why breakfast the day after Thanksgiving needs to be ordinary and boring. Get out the jar of honey and use some of these recipes to start the day.

Some of the foods can be made ahead of time and frozen until needed. That saves time. Others can be partially prepared the night before and then just assembled and cooked in the morning. That saves time and effort, too.

For those who find breakfast an awful thought, suggest an interesting brunch instead, or even lunch. There's nothing wrong with waffles for lunch. We just don't ordinarily think of it.

Breakfast does not have to be the same for everyone. Someone may want an egg with his or her biscuits; someone else may prefer a dish of warm applesauce. You may wish to offer a choice of waffle toppings or two different kinds of muffins (which have been hiding in the freezer until time to use).

HEARTY HONEY SQUARES

These not-too-sweet biscuits are great for breakfast. Try them with a cup of hot coffee and a dish of warm applesauce. Of course you may also find them useful at other times of day.

1-1/2 cups all-purpose flour
1/2 cup whole wheat flour
3 teaspoons baking powder
1 teaspoon salt
1 teaspoon cinnamon
1/2 teaspoon baking soda
1/2 cup chilled butter, cut in small pieces
1/2 cup dark raisins OR 1/2 cup golden raisins
3/4 cup buttermilk
1/4 cup honey

Glaze:
1 tablespoon honey
1 tablespoon butter

In a large bowl mix together dry ingredients and cinnamon. Using a pastry blender or 2 knives, cut butter into flour mixture until coarse crumbs form. Stir in raisins. Mix together buttermilk and honey. Make a well in the center of flour mixture. Add honey mixture all at once to well, tossing with a fork until dry ingredients are just moistened and a dough forms. Dough will be slightly sticky. Spread dough evenly in a 9-inch square baking pan. Cut into squares, 1/4 inch deep, cutting through, but not separating squares. Bake squares in 425°F oven until golden, about 15 to 18 minutes. Cool pan slightly on wire rack. To prepare glaze, in a skillet, melt honey and butter over low heat. Brush squares with glaze. Let stand until glaze has set. Makes at least 9 squares.

Great American Home Baking

HONEY-APPLE OATMEAL TOPPING

Many people like a good bowl of oatmeal to start the day. It's true that butter, honey, maple syrup and raisins make good toppings for oatmeal. However, here's something a little different and very, very good.

1/4 cup honey
1 tablespoon lemon juice
2 cups apple slices about 1/8 inch thick
2 tablespoons butter or margarine

Bring honey and lemon juice to a boil. Reduce heat; add apples and stir just to coat. Simmer, covered, for 3-4 minutes or until apples are tender. Stir in butter. Spoon topping onto bowls of hot oatmeal. If desired sprinkle with cinnamon and serve with milk or cream. Makes 6 servings.

Mississippi Homegrown
Mississippi Beekeepers Association

HONEYED WHEAT WITH TOPPING

There's bound to be someone who wants a cold cereal instead of oatmeal. Here's an interesting variation on shredded wheat (which somebody once called "bales of hay"). Fixed this way, shredded wheat cannot be called bales of hay.

9 biscuits of shredded wheat
3/4 cup melted butter
1/2 teaspoon cinnamon

Honey sauce:
1 cup honey
1/2 cup water
1/2 teaspoon cinnamon
3/4 cup chopped nuts

Cut 9 biscuits of shredded wheat in half - across to give a top half and a bottom half. Place on baking sheet. Drizzle with 3/4 cup melted butter. Bake in a 300°F oven for 10 minutes. To make the sauce, combine the 1 cup honey, 1/2 cup water and 1/2 teaspoon cinnamon in saucepan. Bring to boil and simmer for 10 minutes or until syrupy. Dip hot biscuits in honey sauce and place on a cooling rack to drip. Sprinkle nuts over the bottom halves, place top halves on top and sprinkle nuts over them.

Mississippi Homegrown
Mississippi Beekeepers Association

CRANBERRY GEMS

You can fix a double batch of these muffins well before Thanksgiving and freeze them until needed. The season for fresh cranberries is all too short so you might want to make some extra batches for later in the Winter.

1/4 cup butter or margarine
1/3 cup honey
1 egg

Continued on Next Page

HOME ... Cont. From Pg. 45

1-3/4 cups all-purpose flour
2 teaspoons baking powder
1/2 teaspoon salt
1/2 cup milk
3/4 cup chopped cranberries

In mixing bowl cream butter. Continue creaming while adding honey in a fine stream. Add egg; beat well. Sift together dry ingredients. Add alternately with milk, mixing only until well-blended. Fold in chopped cranberries. Fill 12 well-greased large muffin cups 2/3 full. Bake at 425°F for 15 minutes or until done. Serve hot.

Treasured Honey Recipes
California Honey Advisory Board

BREAKFAST WAFFLE CLUB SANDWICH WITH HONEY APPLE SYRUP

Now for some waffles. To make life easier during the holiday season you can use frozen waffles. Or you can make some waffles in advance and freeze them. The waffles might not be as good as freshly made ones, but we are going to dress them up with some wonderful sauces. I don't think anyone will notice the frozen waffles.

3/4 cup honey, divided
1/4 cup apple juice
2 tablespoons butter or margarine
2 crisp, red apples, cored and sliced
8 frozen waffles, toasted
8 thin slices ham

To prepare syrup, place apple juice and 1/2 cup honey in small saucepan over medium heat; heat through. Set aside and keep warm. Melt butter with remaining 1/4 cup honey in large nonstick skillet over medium-high heat. Add apples; cook and stir about 4 minutes each or until apples are lightly caramelized and crisp-tender. For each serving, place 2 waffles on plate, overlapping slightly. Top each waffle with 1 slice ham. Top with 1/4 of apple mixture and drizzle with 1/4 of syrup. Makes 4 servings.

Sweetened Naturally With Honey
National Honey Board

HONEY AND SPICE BLUEBERRY SYRUP

To give everyone a choice of syrups for the waffles, use this next recipe. Fortunately, frozen blueberries are available the year around.

1-1/2 cups honey
1/2 cup water
1/2 teaspoon ground cinnamon
1-3/4 cups fresh or frozen blueberries
1 tablespoon lemon juice
1/2 teaspoon vanilla

Combine honey, water and cinnamon in large saucepan. Bring to a boil; reduce heat to low and simmer 10 minutes, stirring occasionally until sauce thickens. Cool to warm. Stir in remaining ingredients. Use syrup to top waffles, pancakes or French toast or spoon over granola or yogurt.

Sweetened Naturally With Honey
National Honey Board

SPICE MUFFINS

These muffins, which are not too sweet, would go very nicely with ham and eggs. A side dish of applesauce, preferably homemade and sweetened with honey, can round out the breakfast.

1 cup unbleached white flour
1 cup rye flour, preferably stone-ground
2 teaspoons baking powder
1/2 teaspoon baking soda
1/2 teaspoon salt
1/2 teaspoon white pepper
1/2 teaspoon nutmeg
3/4 teaspoon cinnamon
1/4 teaspoon ground ginger
1/4 teaspoon ground cloves
1/2 cup currants or raisins
2 eggs
1/3 cup honey
2/3 cup buttermilk
4 tablespoons melted sweet butter

Sift together the dry ingredients and spices. Toss in the currants or raisins. In another bowl beat the eggs until they are light in color and slightly thickened. Add the honey, buttermilk and butter and beat well. Stir in the flour mixture with a rubber spatula or wooden spoon until the flour is almost incorporated and the batter is still rough and lumpy. Spoon the batter into buttered muffin tins, filling each 2/3 full. Bake at 400°F for 18-20 minutes. Makes 12-14 muffins.

The Garden Way Bread Book

Now the day is off to a good start. Keep these recipes in mind for a chilly Winter's weekend, too. Invite someone to share honey's goodness with you.

Questions?

Wax Moth Dilemma

I inserted the Apistan strips in my hives in early August, as recommended, removing all honey supers. The full supers I took in the house, but the partially filled ones I stacked in the apiary with window screen on top and bottom, for ventilation and a protective cover on top. Checking later, I found these supers infested with wax moths. How does one deal with this problem? There are always some partially filled supers on the hives when it is time to treat with Apistan.

Robert S. Hough
Beaver Falls, PA

First of all, supers containing honey should never be stored outside, where they are vulnerable not only to wax moths, but to ants and vermin of all sorts. Storing them inside is no protection against wax worms, either because there will be wax moth eggs in the supers when they are taken inside. The best thing to do is extract the partially filled supers, provided the honey in them is not thin. This you can determine by holding the comb horizontally and seeing whether the honey or nectar can be easily shaken from the cells. If you have supers of thin, unripe honey, you might stack them all in a colony that does not have Apistan strips in it, keeping this colony aside for later treatment. And you can also plan your supering a little better, by having fewer supers on the hive as August approaches, resulting in their becoming better filled and capped. If honey that would otherwise go into supers thus ends up down in the brood nest, for lack of room above, there is no harm done.

Winter Concerns?

What is the purpose of an entrance reducer? Does ventilation affect the incidence of chilled brood? Does it affect wintering? What is the purpose of wrapping hives in Winter?

Timothy Martin
Potsdam, NY

The purpose of the entrance reducer is to keep mice out. Unfortunately, it also obstructs ventilation, which is important for good wintering. If there is not good ventilation through the hive in Winter then moisture condenses inside the hive, creating great stress on the colony. For best wintering, hives should be well up off the ground, with space underneath for air to circulate, and up where mice are less likely to try to get in. Entrances should be covered with hardware cloth, the hives tipped slightly forward to reduce accumulations on the bottomboard, and the inner cover hole left partly open for moisture to escape. Some beekeepers wrap hives to conserve warmth, but this sometimes causes the bees to fly out on cold sunny days, where they perish in the snow.

Use or Not?

I harvested some honey and discovered Apistan strips in the brood chamber under the excluder. Can I use the honey? It was not in contact with the strips.

Walter Chatham
Sidney, OH

It would be unlawful to offer that honey for human consumption. It can, of course, be fed back to the bees for Winter stores.

How Big Is A Quart?

I sell honey in quart home canning jars. What should be the net weight on the label?

Joe Lambert
Pollard, AR

This raises a large question concerning honey weights. A standard five-gallon plastic pail is represented as a "sixty" when filled with honey, but if you fill standard honey jars from such a filled pail they never add up to 60 pounds. If you check the measurement of a one-quart canning jar by pouring water from standard honey jars, you will find that it is going to hold less than three pounds, even though we have become accustomed to thinking of a gallon of honey as weighing 12 pounds. Still, quart canning jars are attractive as honey containers. If represented as "3 lbs" I think the customer is not really misled, because the amount of honey – one quart – is perfectly obvious. Perhaps the best way to handle the problem would be to simply put on the label "One Quart." There are regulations concerning the labeling of weights, intended to prevent fraud, but so long as a beekeeper is clearly not trying to mislead, then no one is going to object to how this is done.

Winter Mouse Guards

You have mentioned using quarter-inch hardware cloth for Winter mouse guards. Do you leave these mouse guards in the entrances all Summer?

Donald Steinke
Wapakoneta, OH

Yes, they can stay in year 'round, unless you need to clean off the bottomboard in Spring, which is seldom necessary if the hive goes through the Winter tipped slightly forward.

Questions are eagerly solicited. Send them to Dr. Richard Taylor, Box 352, Interlaken, New York 14847 (not Medina) and enclose a stamped envelope for direct response.

Answers!

Richard Taylor

INNER ... Cont. From Pg. 6

lected will continue to develop detection techniques for new adulterants, and all segments will have access to the labs and techniques developed. This will, we are assured by some, take funny honey off the market, reducing supply and thus increasing price. Or, at least make everybody play the same game. Price advantage will then be set because of efficiency and good business rather than cunning and deceit.

Further, honey in all channels of commerce will be monitored and laws enforced. This area is a bit gray yet as to 'who' will monitor, and 'how' it will take place. Currently, government agencies are responsible for this, and it seems they will continue. Better tools to monitor, and recommendations from both industry and government will help. And, those who produce and/or sell adulterated honey will be punished in a timely and effective manner.

Who pays for the monitoring and enforcement? Good question. Probably some QA money, and probably some from fines and assessments made on those caught and convicted. Adulterated honey, whether imported or domestic, will not be resold (or resold as pure honey anyway), and, perhaps, will be destroyed or 'dyed' at owners expense to make certain it does not again show up on the market.

So, four points have been brought up here, and if you're going to discuss this, or cuss this, or debate it, or argue for change, these are the items to focus on: 1. A change in the makeup of the Board; 2. An assessment change; 3. A quality assurance program, and; 4. A bee research program.

One final note. What has been passed is an act, which by definition is a bit vague. What will be voted on is an order, which will be more specific. Orders can be modified, streamlined, refined and tweaked. Acts, on the other hand are very difficult to change. So, change or modify the order, and, for the moment, leave the act at rest.

•

Mites resistant to control using Fluvalinate are increasing in numbers, and in numbers of locations. Many states have reported hot spots where conventional controls aren't working. And bees are moving and will be moving again in February and March from all over to all over. We are, it seems, headed for real trouble on a national scale.

But not everybody has these mites. In fact most 'beekeepers' don't have a problem. However, if you suspect that your mites are sucking Fluvalinate like sugar syrup, here's a quick non-lab test to try next Spring (or even now) as soon as you can.

First, determine if you have mites in a colony using ether roll, tobacco smoke or brood inspection. If you have mites, put Apistan strips in that colony at label rate. Then, wait *four* weeks. If the Fluvalinate is doing its job after four weeks there shouldn't be any, or hardly any adult mites in that colony. So, do another ether roll or smoke the colony with tobacco, heavily, with a sticky board on the bottom. Look for mites. If you have none or only a very, very few, your Fluvalinate is working fine. If, however, you find several – in the hundreds – you, and your bees have a problem. But be careful. Make sure it's a full four weeks, and when retesting use the same number of bees in the ether roll or the same amount of tobacco smoke and closed-up time as before. Be certain, but be fair.

Formic acid is near (still), and other treatments (some essential oils [I have no details yet]) are pending, and if we're lucky, section 18s for other products may get filed in states with severe problems. Help is on the way, but most of us don't need it, yet.

•

Honey Loan Reinstated – The House-Senate conference committee working on the Agriculture Appropriations Bill has reinstated the honey loan program. Details of the new program are not yet available, but it is expected to provide a recourse (no forfeiture) loan-only program.

The House and Senate must vote on the Appropriations Bill and the President must sign it for it to become law. Then, loans will not be available until regulations are adopted by USDA.

At press time this came in, but we don't have enough to comment, yet. Basically, it's a loan program with the loan price set at 85% of the average price of honey over the last five years, minus the highest, and lowest. This comes to 56 cents/pound. The cost is roughly a 5% 'interest' payment. This isn't free, you can't forfeit, but as soon as it's available, you won't have to settle for lowball prices. For awhile anyway. Stay tuned.

So, study these proposed NHB changes so you can make an informed decision, check for mites resistant to fluvalinate, keep your smoker lit, your hive tool sharp, and your wits about you if you choose to use the loan program.

Kim Flottum

Gleanings

NOVEMBER, 1998 • ALL THE NEWS THAT FITS

Meetings For More Info
BIOENGINEERED FOOD & FIBER

The Food & Drug Administration's Office of Science is organizing the 1998 FDA Science Forum on Biotechnology: Advances, Applications, and Regulatory Challenges. The Forum will bring FDA research and review scientists together with representatives of industry, academia, government agencies, consumer groups, and the public to discuss the impact of the enormous advances in biotechnology on product development and regulation.

The meeting will be held on December 8 and 9, 1998 at the Washington Convention Center, Wash., DC. Attendance will be limited; therefore, interested parties are encouraged to register early.

The program will encompass bioengineered products, novel therapeutic and preventive approaches, diagnostics and detection methodologies, and safety and efficacy assessment. Regulatory issues related to standards and product quality and the impact of the Food and Drug Administration Modernization Act (FDAMA) will also be addressed. The Forum will feature plenary lectures and focused discussion groups that include FDA, industry, and university leaders in the field, on the following topics:

- "Biofarming & biopharming" (bioengineered plants and animals as sources of foods and drugs);
- diagnostics & detection methods;
- microbial pathogens, antibiotics, and resistance;
- therapeutic & preventive agents (novel therapies, gene therapy, cell & tissue engineering, & vaccines);
- new models/methods for safety and efficacy assessment;
- regulatory challenges: standards, product quality, FDAMA & impact on biotechnology regulation, & public acceptance of novel products.

The meeting is co-sponsored by FDA, the American Assn. of Pharmaceutical Scientists, and the FDA Chapter of Sigma Xi, the Scientific Research Society. For information, contact the American Assn. of Pharmaceutical Scientists at 703-518-8429, email: meetings@aaps.org, or Susan Homire, Food & Drug Adm., Office of Science, 301-827-3366, e-mail: shomire@bangate.fda.gov.

A conference on Agricultural Biotechnology... Food, Feed and Fiber will be held January 14 & 15, 1999 at the Fairmont Hotel, San Francisco, CA. Subtitled "Aggressively Addressing Today's Industry Issues," the meeting is targeted to professionals from life science, seed, agricultural, food, and pharmaceutical companies.

Conference topics include:

- Understanding and Communicating with the Public
- Biotechnology & the Environment
- Ambition-Driven Future of AgBiotech
- Value Chain Highway: Freeways and Roadblocks
- The International Regulatory Environment for GMOs
- Issues in the Introduction of Transgenic Foods
- Biotech Delivers Value to End-Users
- Creating and Capturing Value Through Strategic Alliances
- Performance Testing and Safety Evaluations
- International Trade Issues Affecting Biotechnology
- Anticipating and Handling Questions About Risk

The meeting is being organized by International Quality and Productivity Center. For more information, contact Laura Powers at 212-885-2768; email: info@ipqc.com.

For Cranberries
MUD BEES & POLLINATION

One difference between the mustached mud bee and the familiar honey bee relates to perfume, facial hair and sex. To woo females of the species, the male mud bee grows a mustache soaked in plant sap and the bee's own sex attractant.

Scientists' interest in the mud bee centers on its apparent knack for pollinating cranberries. This bee may someday offer cranberry growers an inexpensive alternative to the honey bee, according to entomologist Suzanne Batra at the Agricultural Research Service in Beltsville, MD.

Wet, cold cranberry bogs would not seem like fun places for any bee. But mustached mud bees are pollinating pros under pressure. In rainy, windy weather, they tend to be more active than honey bees. Mud bees (Anthophora abrupta) don't build honeycombs or make honey—except to feed their young. They dig nests in dry clay in the ground or, when raised by beekeepers, in tiny manmade "adobe huts."

Mustached mud bees from MD form a research colony at a cranberry bog in NJ. Univ. of DE entomologist Harold Bechmann established the colony with Batra's help.

Despite fierce winds, flat lands and lack of trees, the transplanted mud bees have expanded their colonies and gathered more cranberry pollen each year than in the previous year. Batra collected some of the bees from a Baltimore chicken coop. Bechmann obtained the rest from an Elkton, Md., home built in 1735, when clay was used as mortar.

In addition to their pollinating expertise, mud bees have lower maintenance costs than honey bees, which keepers must feed and maintain in hives during the Winter.

NOMINATIONS SOUGHT

The James I. Hambleton memorial award was established by the Eastern Apicultural Society of North America to recognize research excellence in apiculture. The EAS Student Apiculture award was established to recognize students studying apiculture at the undergraduate or graduate level in a recognized college or university in the United States or Canada. The awards for 1999 will be presented at the annual meeting of the society at Maryville College, Maryville, TN, July 26-30, 1999.

Nominations are now being accepted for both awards. This is an excellent opportunity for the beekeeping industry to recognize the research excellence of its members. Undoubtedly, many deserving researchers are bypassed for this recognition for lack of a sponsor.

Each award nomination must include a biographical sketch of the nominee, a list of his/her publications, specific identification of the research work on which the nomination is based and an evaluation and appraisal of the accomplishment of the nominee, especially for work in the last five-year period for Hambleton award nominees (or a shorter period for Student nominees). Two letters of recommendation supporting the nomination are also required.

Nomination and letters of recommendation should be sent to Clarence H. Collison, Box 9775, Mississippi State, MS 39762 and received no later than January 15, 1999.

Industry Support

CANADIAN RESEARCH

The Canadian Bee Research Fund, along with the W. Garfield Weston Foundation, is pleased to announce that two new grants have been awarded to further bee research in Canada. We are now in our second year of operation, and have awarded over $49,000 towards research important for the survival and prosperity of the Canadian beekeeping industry. To date, the following projects have been funded:

Gard Otis (Ontario; new): Evaluation of the efficacy and residues of Apiguard, a potential product for the control of parasitic mites of honey bees, $12,000, 1998

Peter Kevan (Ontario; new): Botanicals for mite control and novel means of administering them for greater efficacy and safety, $8800, 1998

Kerry Clark (British Columbia): Evaluation of mesh bottom boards for the management of *Varroa* mites, $6300, 1997

Don Nelson (Alberta): Evaluation of indoor winter treatments on bee colonies using oxalic acid, lactic acid, thymol, and formic acid, $7000, 1997

Mark Winston (British Columbia) A semiochemical trapping system for the parasitic mite *Varroa jacobsoni*, $15,000, 1997

The Canadian Bee Research Fund (CBRF) was established to counteract the problems caused by severe reductions in federal and provincial funding for honey bee research. The Fund has been set up as a long-term endowment to support bee research, with interest generated by the CBRF available for annual grants. The CBRF is administered by the Canadian Honey Council, and decisions concerning what projects to support are determined according to the priorities set by the Canadian beekeeping community.

With the grants awarded to date, the CBRF is more than fulfilling its mandate to stimulate and support research important for the beekeeping community, and our reach and impact are both national in scope and significant in attracting matching funding for projects. Grant funds clearly have been directed towards projects identified as high priority by the beekeeping industry, and the partnership between beekeepers and researchers that is at the core of the CBRF has become a functioning reality.

Another noteworthy aspect of the CBRF grants is that all recipients are required to submit a "beekeeper-friendly" report in the fall, to be published in Hive Lights, provincial newsletters, and other appropriate outlets. In addition, grant recipients must attend the annual CHC meeting to report on their projects. There will be further competitions for grants each year, with application deadlines in the late summer.

Fund raising for the CBRF also is off to a strong start. The funds raised to date, about $147,000, have been due to contributions from Canadian beekeepers and beekeeping associations, and a generous $110,000 grant from the W. Garfield Weston Foundation. Their expression of confidence in the CBRF is deeply appreciated by the entire Canadian beekeeping community.

We can all be proud of what we have built to date, but there is still a long way to go. The financial support for the CBRF needs to continue to grow if the fund is to reach its goal of self-sufficient, beekeeper-directed support for Canadian bee research. Our objective is to raise $1 million over a ten-year period. To reach that goal, we suggest that each beekeeper donate $0.25 per hive annually, and that each provincial association contribute 10-50% of funds raised annually to support research within each province.

We deeply appreciate and need the support of the entire beekeeping industry if we are to realize our goal of raising $1 million. With your continued support, the CBRF will become an increasingly important instrument for bee research in Canada. To make a contribution contact Mark L. Winston, Department of Biological Sciences, Simon Fraser University Burnaby, B.C. V5A 1S6 Canada phone 604 291 4459, FAX 604 291 3496 winston@sfu.ca

Adulteration!

TROUBLE IN MEXICO

The president of the National Union of Apiculturists, Javier Pompa, admitted there is a serious problem of adulteration of honey in Mexico, which is damaging the image of the nation's products abroad. For this reason the industry is setting up a new certification laboratory in Merida, Yucatan, in addition to the two already operating, in order to guarantee the quality of exports. There are currently 40,000 beekeepers in Mexico, providing 70,000 direct, and 500,000 indirect jobs. However, 85% of apiculturists have few resources, and manage only 20 or 25 hives.

NHB NEWS

Recent Retail Sales Data From Nielsen

Nielsen reported that retail honey sales were down 1.5 percent (pounds) and down 2.5 percent (dollars) for the four-week period ending July 4, 1998 (versus the equivalent period in 1997). During this period, the average retail price per pound was $2.36. For the 52-week period ending July 4, 1998, honey sales were down 2.3 percent (pounds) and down 1.0 percent (dollars).

The Latest Numbers From Research Dimensions

Research Dimensions' packer tracking study, based on data from 15 honey packers representing approximately 50 percent of all honey sold, reported that total honey sales in July were up .59 percent compared to July of last year. The following are changes by segment:

Export	+14.13%
Retail	+5.23%
Foodservice	-22.39%
Bulk	+8.30%

Covers Marketing Orders

NEW AMS WEB PAGE

The USDA announced on September 1 that its Agricultural marketing Service (AMS) is offering two Internet home pages that allow interested parties to view proposed rule making actions and electronically mail comments from the same site. The two home pages cover information on fruit and vegetable marketing orders, import regulations and the Perishable Agricultural Commodities Act, which enforces interstate and foreign fair trade practices and contracts. Other AMS programs with rule making activity are also expected to offer this option on their home pages in the near future. Look at www.ams.usda.gov/index.htm

UNITED STATES POSTAL SERVICE

Statement of Ownership, Management, and Circulation

(Required by 39 USC 3685)

1. Publication Title	2. Publication Number	3. Filing Date
BEE CULTURE MAGAZINE	0 4 8 3 - 1 8 0	10-01-98
4. Issue Frequency	5. Number of Issues Published Annually	6. Annual Subscription Price
MONTHLY	12	$17.00

7. Complete Mailing Address of Known Office of Publication (Not printer) (Street, city, county, state, and ZIP+4): P O BOX 706; MEDINA; OHIO; 44258-0706 — Contact Person: DAWN FERGAN; Telephone: (330) 725-6677

8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer): P O BOX 706; MEDINA; OHIO; 44258-0706

9. Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank)

Publisher (Name and complete mailing address): JOHN A. ROOT, P O BOX 706; MEDINA, OHIO; 44258-0706

Editor (Name and complete mailing address): KIM FLOTTUM; P O BOX 706; MEDINA, OHIO; 44258-0706

Managing Editor (Name and complete mailing address):

10. Owner (Do not leave blank. If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.)

Full Name	Complete Mailing Address
John Root, Medina, Ohio; Stuart Root, Wadsworth, Ohio; Elizabeth Judkins, Silver Bay, MN; Brad Root, Medina, Ohio; Katherine Warner, Kent, Ohio; David Root, Sebring, FL; Andrew Hever, San Diego, CA; Barbara Tweedie, Davidson, NC; Kathryn Frank, San Diego, CA; Robin or Richard Kuntzelman, Bozeman, MT; Haber Warner, Bethesda, MD; CEDE & CO, New York, Ruth Packard, Pensacola, FL.	

11. Known Bondholders, Mortgagees, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box → ☒ None

Full Name	Complete Mailing Address

12. Tax Status (For completion by nonprofit organizations authorized to mail at special rates) (Check one)
The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:
☐ Has Not Changed During Preceding 12 Months
☐ Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

PS Form **3526**, September 1998 — See Instructions on Reverse

13. Publication Title: BEE CULTURE MAGAZINE	14. Issue Date for Circulation Data Below: OCTOBER 1998	
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)	13,499	13,290
b. Paid and/or Requested Circulation (1) Sales Through Dealers and Carriers, Street Vendors, and Counter Sales (Not mailed)	229	125
b. Paid and/or Requested Circulation (2) Paid or Requested Mail Subscriptions (Include advertiser's proof copies and exchange copies)	11,592	11,119
c. Total Paid and/or Requested Circulation (Sum of 15b(1) and 15b(2)) ▶	11,821	11,244
d. Free Distribution by Mail (Samples, complimentary, and other free)	95	95
e. Free Distribution Outside the Mail (Carriers or other means)	102	102
f. Total Free Distribution (Sum of 15d and 15e) ▶	197	197
g. Total Distribution (Sum of 15c and 15f) ▶	12,018	11,441
h. Copies not Distributed (1) Office Use, Leftovers, Spoiled	1,681	1,849
h. Copies not Distributed (2) Returns from News Agents	-0-	-0-
i. Total (Sum of 15g, 15h(1), and 15h(2)) ▶	13,699	13,290
Percent Paid and/or Requested Circulation (15c / 15g x 100)	98%	98%

16. Publication of Statement of Ownership
☒ Publication required. Will be printed in the November 1998 issue of this publication.
☐ Publication not required.

17. Signature and Title of Editor, Publisher, Business Manager, or Owner: Kim Flottum Editor — Date: 9-24-98

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including multiple damages and civil penalties).

Instructions to Publishers

1. Complete and file one copy of this form with your postmaster annually on or before October 1. Keep a copy of the completed form for your records.
2. In cases where the stockholder or security holder is a trustee, include in items 10 and 11 the name of the person or corporation for whom the trustee is acting. Also include the names and addresses of individuals who are stockholders who own or hold 1 percent or more of the total amount of bonds, mortgages, or other securities of the publishing corporation. In item 11, if none, check the box. Use blank sheets if more space is required.
3. Be sure to furnish all circulation information called for in item 15. Free circulation must be shown in items 15d, e, and f.
4. If the publication had second-class authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or, if the publication is not published during October, the first issue printed after October.
5. In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
6. Item 17 must be signed.

Failure to file or publish a statement of ownership may lead to suspension of second-class authorization.

PS Form **3526**, September 1998 *(Reverse)*

Display Advertisers

DEVELOPING A PUBLIC BEEKEEPING PRESENTATION

INTENT – What do you hope to accomplish with your presentation? – education, promotion, entertainment
AUDIENCE – How do you identify, locate and/or create your market? – schools, special interest groups, community groups
"HOT SPOTS" – How do you "speak their language?"
FORAGING – Where do you go for materials and further resources?
COMPENSATION – When and how do you set fees?
NUTS AND BOLTS – How do you approach advertising, contracts and all that jazz?
OUTCOME – What do you want from your audience? – enlightenment, action

REMEMBER: WHEN YOU SPEAK PUBLICLY AS "A BEEKEEPER" YOU ARE REPRESENTING ALL BEEKEEPERS!

After negotiating a price of $50 for a recent presentation to be given at our local library, I asked the librarian if she would have paid more. "Would you help me?", I asked, "I am still exploring what to charge for my bee presentation. Would you have paid $150?"

"No," she said, "But we pay in the $65-85 range for this type of presentation."

I make good extra money giving presentations about my favorite subject – honey bees, and you can too if you deliver something of value. Too often we give it away. Here are some ideas that have worked for me.

Poster Leave something behind. I developed the **BEE-ATTI-TUDES** poster to illustrate the many behaviors characteristics of honey bees. Teachers love it. I never mention it when I negotiate a presentation and so it becomes a pleasant surprise when I give one away at the time of the presentation. You might also consider donating some to schools, have a fund raiser, or sponsor a coloring contest to generate further interest in our beloved insect.

Bees In season I bring bees but save them for the end. Kids and adults crowd around looking for things that were said, and of course everyone wants to see the queen. Marking her with a white dot helps save time. But regardless of what else you do bring bees then everyone will be pleased with your presentation!

I've developed an easy to carry suitcase style observation hive that holds one deep frame. The night before or the morning of the presentation I pull the one frame I found the queen on. Covers on the observation hive help to maintain control. Only at the end do I remove the covers and encourage everyone to come up to see the bees. Importantly, the observation hive is ruggedly built to withstand a direct attack by a first grader.

Slide Show I bought a macro lens and take close up photography. What a difference to see a huge foot-long queen surrounded by attendants. I don't spend too much time on each slide. People's attention span is short and they get the message quickly anyway. I go through 30 slides in about 15 minutes with 10 additional minutes reserved for questions. I show the bloom sequence, queen cells, drones, harvesting, preparations for Winter, bees entering the hive with pollen baskets, fanning, and the dance. Consistently audiences are enthralled. I help them see the marvels of nature found in their own backyard, and my name more quickly gets around which helps sales.

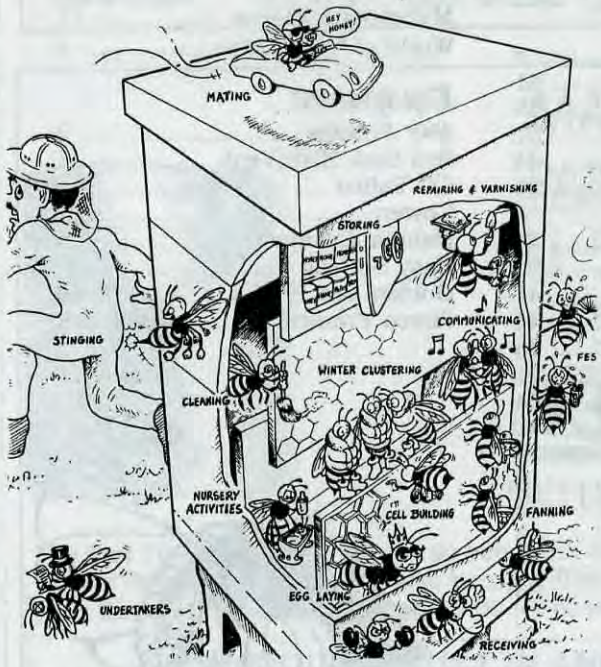
Hands On Display At the end I also encourage everyone to handle the equipment, and smell the pollen, candles and smoker. A recent copy of *Bee Culture* is introduced. Kids particularly enjoy trying on the helmet and gloves that go up to their shoulders! Uniformly they turn up their noses at the smell of pollen and the burnt smell of the smoker, but most like the piece of honey candy I give them. I have seeded many new customers with these presentations.

Dress Like A Beekeeper When you dress in white coveralls, put on the veil, gloves, and hold the hive tool and smoker at the beginning, you will get everyone's attention.

Conclusion Believe me it's not hard to hold their attention either. I start with an overview and ask that questions be held for a few minutes until I get on a roll. The poster opens their eyes. The slides tell the story in color, and when they come up at the end they are prepared to understand what they see.

Kids are enthusiastic about whatever you do. I am particularly thrilled however to see adults who at first have folded arms, and are obviously impatient waiting for their kids, gradually become interested in the presentation. By the end they usually open up and start asking questions themselves. This is a sure sign that you have given a quality presentation.

Incidentally, I said to the librarian that the next time I give the presentation I will be asking $85. She said O.K.



*(Betterbee and Circle B Ranch sell the **BEE-ATTI-TUDES** poster. And if I can be of help to you with your presentation, please write me: Rick Green, Ballston lake Apiaries, 8 Hickory Grove Lane, Ballston Lake, NY 12019.)*

What Price A Presentation?