DEC 2000

Bee Culture

Bee Culture's 2000 Newsletter Contest Winners

Choosing the winners of *Bee Culture's* Annual Newsletter Contest 2000 was an extremely difficult job. One judge commented that overall this year's entries were far superior to last years, and even those who entered last year seemed better. Another judge, weighed down with the piles of entries made similar comments, but added that judging good work was the best reward for the efforts we've made here to get the word out.

There were 25 entries (almost double last year's efforts), from CA(2), TN(2), TX(2), MO, KS(2), MD, RI(2), NE, AK, PA(2), OH, NY, VA, IL(2), NH, VT, and MA(2).

Judging was done on a point system, looking for basic information, meeting information (time, place, date, agenda) and critical review of the format, reproduction quality and esthetic appearance. Information was the most critical – could we find the officers and editor listed, was there a table of contents, general association news, overall beekeeping information, and even ads.

For the format section, was it easy to read, (columns, headlines, mailer, page numbers and the like). These are important because if the print is too small, the page too busy, columns too wide, stories continued on hard to find pages...it doesn't get read and the purpose of the Newsletter is defeated.

Reproduction has to do with the quality of printing. We considered too-light or dark copy, messy and spotted pages and the like. Can you see the photos (not necessary, but if there they need to be seen). Bright paper (good), but light and unreadable copy (bad). All contribute to readability.

General appearance. This was mostly subjective on the part of the judges, but it was based on both a comfort level of easy to read, easy to look at, and because of that, its usefulness.

WINNERS WINNERS

Tied for First Place, each winning the $200.00 prize for their association were: *The Hive Tool*, published by the TN Beekeeper's Ass'n, Marlene Thomas, Editor; and, *The Diablo Bee*, published by the Mt. Diablo (CA) Beekeeper's Ass'n, Loni Reynolds, Editor.

All alone in second place, taking home the **$100.00** prize was the *Texas Beekeeper's Ass'n Journal*, published by the TX Beekeeper's Ass'n, Linda Smith, Editor.

There was a tie for third place, and it ended up being a strange situation. The two Newsletters are very different in format and style, are published by two different associations, in two different states yet, but, and this was the issue, they have the same Editor. The Judges conferred and, because of the differences, still awarded each the points appropriate for the entry. So. Tied for third, with both Associations winning the **$50.00** prize, were *The Buzzer*, published by The NE Kansas Beekeeper's Ass'n, and *The Beeline*, published by the Midwestern Beekeeper's Ass'n (MO). Both have as Editor Joli Winer.

Honorable Mentions this year include *The Local Buzz*, Nevada County (CA) Beekeepers, Rebecca Sobaje, Editor; *The Susquehanna Beekeeper News*, The Susquehanna (MD) Beekeepers, David Simmons, Editor; *The Rhode Island Beekeepers Association Newsletter*, Bernie Bieder, Editor (and last year's first place winner); *The Beeline*, The Nebraska Beekeeper's Ass'n, Michelle Stenner, Editor (and daughter of Marlene Thomas); and *The Pheromone*, Alaska Beekeepers, Fletcher Miller, Editor.

All the entries this year were simply great with very little difference between the first place winners and the rest of the entries.

CONGRATULATIONS to Every Editor, whether a winner here or not, and whether an entry here or not. We salute your efforts, and rest assured, the rest of us would be clueless without you. And you can tell them that!

Be sure and watch these pages for the announcement of next year's contest. Your Newsletter could be a winner!

Bee Culture

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FEATURES

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Season's Greetings, from the bees and the flowers to you.
Photo by John Steedly

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MAILBOX

Farm Troubles

I am writing regarding the Inner Cover in the September 2000 issue of *Bee Culture* regarding the wise guy. I don't always agree with this person's comments, however often his comments I believe hit right on the mark.

It is obvious this person is a commercial honey producer. Commercial honey producers are struggling with low prices and ever increasing costs of production. Not unlike the cotton, rice, soybean and other commercial farmers in my area. The big difference is these row crop farmers are receiving over 50% of gross income from USDA Farm Program payments due to low commodity prices. I point out that this is gross income not net income.

Honey producers have not received any USDA payments in some time. Perhaps this will change soon.

I should point out that even with these large payments most crop producers are only hanging on from year to year. Even more disturbing to me is that recent USDA figures indicate that over 40% of food consumed in the U.S. is imported. Besides tropical plants such as bananas, coffee, etc such items as cotton, pork, rice, beef, and of course honey are part of a long list of imported food items. This level of imported foods continues to climb.

Why should such commodities that can be readily produced in this country be imported at any level when U.S. producers can produce quality products in quantity. If you guesses price you are correct. World commodities often trade below cost of production. Many countries that we import food from have much less stringent regulations regarding pesticides, contamination etc.

I would like to quote Dennis Robertson, Executive Vide President of the Arkansas Farm Bureau Federation in the Sep-Oct 2000 issue of the Front Porch magazine. Robertson said "How much longer can America's family farmers hang on? And when they're gone, where will our food come from? Will we import most of it? If it's imported, how can we be sure it's wholesome?

We're already dependent on foreign oil, and we've seen what happens to the price of gasoline when the oil exporting countries tighten the supply. Do we want to put ourselves in the same position without food supply? These are serious questions we need to be asking ourselves and the people we put in public office."

Steve Culp
Jonesboro, AR

"Other" Problems?

What a great idea to poll your Honey Report correspondents about what they considered their problems to be! But it is tantalizing to see that Area 10's greatest problems, tying with the obvious "Prices," is "Other." What on earth could it be? Ditto Areas 2, 5, and 8 but at lower levels of hurt. In most surveys, "Other" or Miscl." cover a collection of trivial options , but apparently not here.

Dan Hendricks
Mercer Island, WA

Editor's Note: *Other included vandals, neighbor problems, and 'other' unidentified, but troublesome situations.*

GMO Connection?

The New York State Legislature has been considering enactment of a moratorium on the cultivation of genetically modified (GM) crops, and/or requiring labeling of products containing GM ingredients. State legislative committees held public hearings on this subject during October 2000. I was invited to testify at these hearings. Although I am no authority on the topic, I decided to review publicly available information pertaining to the possible impact of GM crops on honeybees, and present this material at the hearing. I identified three main areas of concern.

1. There is an alarming lack of publicly available information evaluating the effects of GM crops on bees. Biotechnology corporations fund research on GM crops in their efforts to gain regulatory approval for the marketing of GM varieties of corn, soybeans, canola, cotton, and other crops. This research supposedly proves beyond a reasonable doubt that these novel genetic combinations are safe to introduce into the environment. Canadian researcher, Mark Winston, recently attempted to gain access to the results of research that assessed the effects of GM crops on honeybees. Canadian government authorities acknowledged that such research had been conducted, but refused to provide any details. Their refusal was attributed to the fact that such research is confidential and owned by the undisclosed biotechnology corporations who funded the studies in question. I believe FDA/EPA policy is similar in this regard. This lack of openness raises serious credibility issues regarding corporate claims about the safety of GM crops. If their research is solid, then why is it kept secret?

2. Laboratory studies carried out by the French government research institute INRA indicate that pollen from some GM crops shortens the lifespan of adult bees. Also, it seems to cause some learning dysfunctions that could result in the disorientation of foraging bees. Disoriented bees may become lost or unable to locate nectar sources.

Continued on Next Page

MAILBOX

3. Possibly the most important public disclosure came out in June, 2000, when German researchers at Jena University showed that genetic material from GM canola crossed the species barrier, and was positively identified in bacteria that reside in the guts of honeybees. I believe this is the first publicly documented case of horizontal gene transfer from GM crops to bacteria. This discovery may have major implications for the future of GM crops. One main objection to GM crops has focused on the fact that during genetic manipulations required to create GMOs, antibiotic-resistant "marker" genes are combined with the so-called genes of interest. These combined genes are inserted into the target plant. Within the plant, the antibiotic resistant gene has no expression and is harmless. However, if this gene were able to transfer from the GM plant and enter another bacterium, that bacterium would become antibiotic-resistant. This might render commonly used antibiotics useless against diseases attacking humans and livestock, including honeybees.

Bees in the US are increasingly afflicted with a strain of antibiotic resistant American foulbrood (AFB). Before the advent of antibiotics, this bacterial infection was the most serious bee disease in the world. Tetracycline had been used effectively against AFB for 40 years until 1996. In that year, tetracycline resistance was confirmed in both Argentina and the upper Midwestern states of Wisconsin and Minnesota. Since then, it has spread to at least 17 states in the US, including New York, and to parts of Canada. During the 1990s, millions of acres of Round-up Ready crops were planted in the US, Canada, and Argentina. According to my information, the antibiotic resistant gene used in the creation of Round-up Ready crops was resistant to tetracycline. After 40 years of effective usage against an infective bacterium found in the guts of honeybees, suddenly two geographically isolated countries develop tetracycline resistance simultaneously. A common thread between the US, Canada and Argentina is the widespread and recent cultivation of GM crops containing tetracycline resistant genes.

I spoke about this with Dr. Hachiro Shimanuki, who until recently was the research leader of the USDA/ARS bee research lab in Beltsville, MD. He is not aware of any attempt to analyze the resistant foulbrood for genetic pollution from GM crops. I think that the technology exists to be able to determine whether these AFB bacteria have the Round-up Ready gene. That gene should have tagged along with the tetracycline resistant gene if in fact this antibiotic resistant AFB was due to horizontal gene transfer between GM crops and foulbrood bacteria.

I want to stress the specula-

MAILBOX

tive nature of this possible GMO/antibiotic resistant AFB connection. However, if it is true, the public health implications are enormous. A documented antibiotic resistant gene transfer into a disease organism would strongly indicate that the FDA should reassess the potential human risks associated with GM crops, and possibly revoke federal approval for the sale and consumption of some of these modified plants.

As an industry, I think we should immediately request, through our local, state, and national associations, that the FDA analyze samples of antibiotic resistant AFB in order to determine whether or not a genetic transfer has occurred from GM crops.

If we act together, the FDA will find our combined resolutions to be a powerful stimulus to investigate this matter in a timely fashion.

Biotech corporations have maintained that we should trust their research findings that secretly prove to Federal regulators that GM crops are safe. I would suggest that it would be wise to maintain a healthy skepticism on this matter. Often there is a fundamental conflict between the corporate interest in short-term profit, and the public interest in the health and safety of the people. In fact, we have recently seen examples of this conflict exposed in the courts concerning other corporations.

I believe that we all are now participating in a vast GMO experiment without our informed consent. Many European beekeepers are fiercely opposed to the cultivation of GM crops in the vicinity of their apiaries. It is well within the realm of possibility that we should be too.

Joe Rowland
Owego, NY

INNER COVER

The Bill funding the non-recourse honey loan program was signed by the President on October 29. This is essentially a return of the buy-back program that existed several years ago. To use the program, a beekeeper is 'loaned' money from the government using honey as collateral. The 'loan' is valued at $0.65/lb. of honey. Thus, a 660 lb. barrel of honey would qualify for $429.00. If the beekeeper wished to 'repay' the loan, the buy back price, set by the USDA, is the market price, or some similar amount. So, if current market price is, say, $0.50/lb., the beekeeper would repay the loan, but only pay $330.00, plus a small loan fee and interest, pocketing the difference. The beekeeper can then sell the honey at whatever price found reasonable, again pocketing that amount.

An alternative plan is that the loan is not repaid, the beekeeper keeps the money and the government keeps the honey.

I may have some of the details wrong but the overall concept is pretty near right I think...the government is back in the honey business.

Now last month I offered a pretty cynical view of anything the government gets involved in, and specifically the USDA. I zeroed in on AMS, the Oversight folks for all the commodity marketing boards, including the National Honey Board and the just-decided referendum vote. Thus, to say that the government's involvement in the honey business is a good thing would be just a tad hypocritical. So I won't.

The already-existing recourse loan has something like 22 million pounds on the books that automatically qualify for non-recourse compensation. So too does any 2000 crop honey already sold, with proof, of course. There isn't a provision for color grade differences for price so it's all the same to the FSA - the Farm Service Agency which handles this. However, color may have something to do with buying it back, but that's not clear at the moment.

I'm glad beekeepers get a share of the pie the government is slicing up for agriculture in general this year. So far, over 50% of all farm income in the U.S. for 2000 has come from the government. That's not a healthy statistic by the way. The Failure To Farm Bill has been more than successful.

The last time the government was in the honey business the number of questionable practices, by both producers and packers, exceeded even the government's expectations. Quality control was, for the most part a joke, and everybody's reputation was tarnished. Nobody wants to see that happen again. Planners tell me it won't.

What's the answer? I wish I knew. The easy way is to take the money and run. More difficult is to use this window of opportunity to make the changes needed to stay the long haul. Heresy?

•

A commercial pollinator was recently discussing the competitive side of his business. He routinely provides his customers a healthy, generous-sized colony for pollination. His traditional standard is 7 - 8 frames of bees and brood for early crops and 10 - 12 for later crops. He charges $45 and $50 respectively. Still, he's not getting rich.

An out-of-state migratory operation has been moving into his area with pretty aggressive prices. Something like $25 - $30. That's a big difference. A bigger difference is that something like 10-15% of the boxes are empty and more than half are in the 3 - 5 frame size. The 'how' of the low price is easy to figure.

Growers, like all of us, are opportunists and many looked at the low price and switched. Interestingly, the quality of the pollination hasn't dropped terribly and the growers are mostly satisfied. At least so far.

What to do? When the market said customers couldn't afford a Caddy, GM made the Chevette. My advice to the pollinator? Take those 8 - 10 framers, make splits, add a queen to one and rent them for $30 each. "Keep the playing field level", I said.

One of two things will happen. The quality of the pollination will suffer, growers will finally see the light and offer more for the larger colonies, which the migratory operation can't provide; or the game will stay the same. Smaller colonies at lower, but profitable prices for both.If the market says a $30 colony is doing the job why produce a $50 colony and lose money? It's an easy choice. Is it heresy?

•

Be that as it may, All of us here at *Bee Culture* and the A. I. Root Company want to wish you and yours a happy, safe and Wonderful Holiday Season.

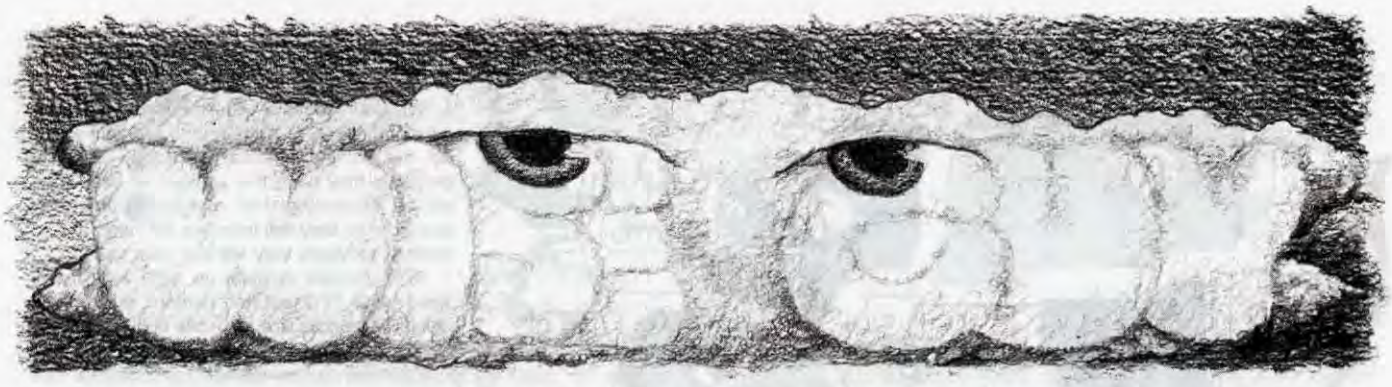
Next year will be better, and probably a lot more interesting.

Kim Flottum

Dawn Teagan

Kathy Summers

Jim Thompson



Will the anti-dumping action work? More important, will it raise the price of honey to the U.S. producer? Yes, yes and yes! The last anti-dumping action put $40 million into the hands of producers in a very short period of time, and during the course of the total action American producers realized over $150 million in benefits. These numbers seem to be larger than life, but let us look at them into the future and see what appears.

Every time we have a 5 cent per pound increase or decrease, the American producer is impacted at a dollar level of more than $10 million! Example:

Avg. Amer. Crop	205,000,000 lbs	
If the average price is:	.60/lb	.56/lb
The total value is:	**$123,000,000**	**$112,750,000**

If you want something that will take your breath away, let's look at 1997. We were getting 85 cents per pound, and in 2000, 55 cents per pound.

1997		2000
205,000,000	– lbs. –	205,000,000
x $.85=		x $.55 =
$174,250,000		$112,750,000
Difference =		**$61,500,000**

Now take that number times four (the total number of years from 1997 through 2000), and the grand total is $246,000,000! That makes our $160 million look small.

Keep that number $246,000,000 in mind. Now also remember that prices on the shelf have not come down for honey. So the next question: Who received the $246,000,000? We know the producer payments were less than those numbers, so they didn't get it. So it's between the packer and the end user. Let's say it's a 50/50 deal with packers and end users, and each got $123,000,000. Using a figure of 25 packers in the United States doing 95 percent of the total honey sales. That would lead you to believe that each of those had an additional $4,920,000 over that four-year period. But we know that some packers are larger than others, and if one of them packed and sold 50 million pounds per year, their take would be $30,000,000!

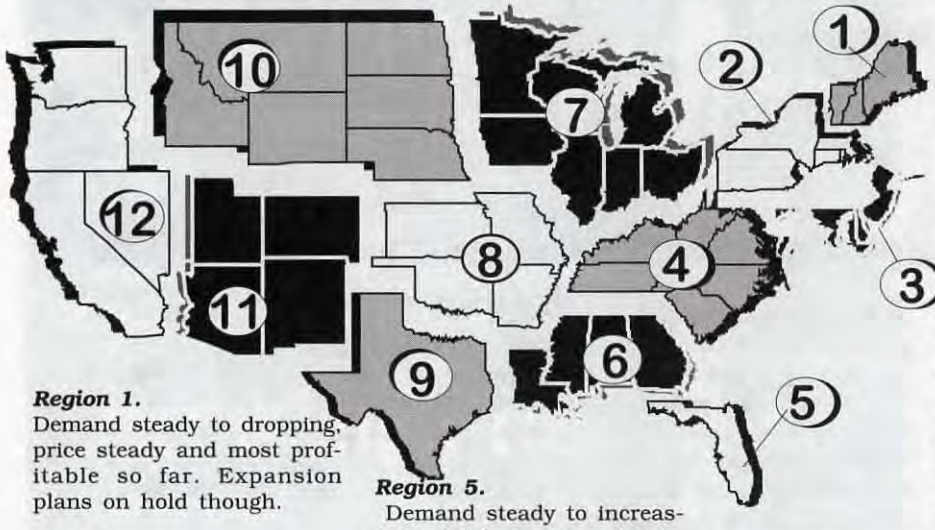
As we all can see, someone is making lots of our money. I wonder how many honey packers are installing new equipment, how many are purchasing new trucks, how many have added on to their buildings and have new packing lines. Guess who has most of that money? We see people expanding and purchasing new equipment.

Now back to the anti-dumping issue. The United States apple industry won an anti-dumping case against China for apple juice concentrate. A 51.74 percent duty was placed against the Chinese. The effect is amazing. Growers of juice apples saw a 70 percent increase in income from '98 to '99, and that related to $49 million going to growers! The three years before their income had fallen 62 percent and a $135 million loss in income to the American apple growers.

Does this sound familiar? Now ask yourself, Why *wouldn't* I support this? There should be no organization in the honey-producing business that supports American beekeeping that does not support the anti-dumping action. The next time someone says the price is too steep, review these numbers with him or call on apple growers to see if they are happy with this investment.

Wise Guy

DECEMBER – REGIONAL HONEY PRICE REPORT



We surveyed our reporters this month on their perception of the demand for their product, the direction of price where they sell, how profitable they were this season, whether they will be expanding their number of colonies, and whether they will increase the number and kinds of products they will sell next year.

37% reported demand up, 42% said it was steady and 21% reported demand down. 23% report their prices are up, while 68% have kept them the same and 11% have dropped prices in response to the market. Fully 56% or our reporters state their operations are profitable this year, while 31% are just breaking even, but 13% are losing money. 20% of our reporters will be expanding their operations next year, 64% will remain the same, but 16% will be reducing the size of their operations. 21% of our reporters will increase the number and kinds of products they will produce, 56% will keep things the same, but 16% will be reducing the products they sell.

Region 1.
Demand steady to dropping, price steady and most profitable so far. Expansion plans on hold though.

Region 2.
Demand strong here and prices steady to increasing a bit. Profitability strong but expansion plans moderate. Very few plan on decreasing.

Region 3.
Demand mixed as is price and profitability. Expansion plans pretty much on hold but a few will be adding new products.

Region 4.
Demand fairly strong but prices unchanged pretty much across the board. A few in trouble but most doing well. Most plan little expansion but a few are downsizing.

Region 5.
Demand steady to increasing a bit but prices steady. This has led most to be able to, and planning to do some expansion next season.

Region 6.
Demand increasing steadily but prices rising only slowly and mostly steady. Profitability is strong with most leading to moderate plans of expansion for next season.

Region 7.
Demand just holding and decreasing more than not. Prices dead steady, but profitability seems strong. Most plan no or very little expansion next season.

Region 8.
Demand mixed, but prices pretty much unchanged, although profitability seems steady. Expansion, however, seems on hold until the dust settles.

Region 9.
Demand steady to increasing, strongly in some areas. Prices steady mostly, but rising for some products. Profitability strong here with few reporting problems, however, hardly anybody is planning expansion in hives or products.

Region 10.
Demand steady to declining just a bit. Price steady, but just, and down for some products. Profitability just holding and expansion plans pretty much on hold.

Region 11.
Demand steady solid but prices mixed along with profitability. Downsizing in the future for many if prices don't move, and expansion of products holding also.

Region 12.
Mixed demand, mostly strong in the north, not in the south. Exactly the same for price, profitability and expansion plans.

	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 (retail)	66.65	74.17	61.00	72.34	75.00	64.67	62.35	71.11	74.47	62.00	78.00	71.11	45.00-100.00	68.32	68.26	70.48
60# Amber (retail)	66.38	69.35	56.50	71.50	75.00	62.50	61.20	60.00	90.00	62.00	70.00	77.58	45.00-120.00	67.75	64.32	67.05
55 gal. Light	0.58	0.60	0.55	0.60	0.63	0.60	0.59	0.63	0.52	0.54	0.68	0.63	0.50-0.78	0.61	0.65	0.63
55 gal. Amber	0.55	0.58	0.55	0.56	0.59	0.59	0.56	0.59	0.47	0.59	0.55	0.59	0.44-0.75	0.58	0.60	0.57
Wholesale - Case Lots																
1/2# 24's	29.55	27.51	32.96	35.42	32.96	25.83	28.10	32.96	30.00	32.96	32.96	44.40	20.40-48.00	30.47	29.19	29.01
1# 24's	42.56	42.33	48.00	44.86	48.40	44.50	41.37	36.00	46.00	42.00	54.00	56.40	29.10-56.40	43.77	43.34	43.75
2# 12's	38.22	40.22	45.60	42.45	39.60	36.30	37.17	40.40	41.40	30.90	40.40	40.40	29.40-52.58	39.21	39.34	38.29
12 oz. Plas. 24's	35.53	36.05	44.40	35.30	34.80	40.40	34.75	30.00	42.00	27.60	36.00	36.96	26.40-48.00	36.48	36.93	36.35
5# 6's	40.75	44.94	44.00	46.98	42.22	39.40	40.18	39.00	48.00	37.50	42.22	42.22	16.80-67.60	42.27	42.37	41.02
Retail Honey Prices																
1/2#	1.72	1.40	2.83	2.17	2.83	1.67	1.58	1.39	2.00	1.49	1.75	2.49	1.19-3.50	1.74	1.76	1.81
12 oz. Plastic	2.14	2.05	2.90	2.32	2.50	2.21	1.95	2.27	2.63	2.02	1.99	2.16	1.29-3.00	2.20	2.23	2.22
1 lb. Glass	2.60	2.22	3.00	3.01	3.50	2.68	2.37	2.62	3.33	2.39	2.99	2.75	1.58-4.00	2.67	2.68	2.70
2 lb. Glass	4.40	3.94	4.80	4.39	4.75	4.50	4.01	4.87	4.98	3.59	4.62	4.62	2.35-7.00	4.51	4.41	4.40
3 lb. Glass	6.01	6.06	6.80	7.21	6.50	6.00	5.62	6.12	6.00	4.79	6.99	6.17	3.30-9.00	6.22	6.26	6.32
4 lb. Glass	6.65	6.60	7.35	7.75	7.35	7.03	6.45	7.99	7.00	7.35	7.35	7.35	5.99-12.00	7.07	7.90	7.79
5 lb. Glass	8.99	9.99	11.00	11.03	8.95	8.00	8.06	10.99	9.00	7.90	7.89	8.95	6.00-14.50	9.34	8.66	9.21
1# Cream	3.00	3.21	3.12	3.45	3.12	3.25	2.71	2.99	3.12	2.29	3.99	3.12	2.25-4.00	3.12	3.27	3.39
1# Comb	3.86	3.99	3.60	4.24	3.68	4.25	3.90	3.99	3.68	3.68	5.00	3.68	1.95-5.00	4.10	4.22	4.21
Round Plastic	3.37	3.11	3.60	3.92	3.51	3.00	3.60	3.99	3.00	3.51	5.00	3.51	2.00-5.00	3.54	3.79	3.82
Wax (Light)	2.36	2.43	3.00	1.83	2.88	3.75	1.55	2.50	3.15	2.88	1.95	4.50	1.25-5.00	2.39	2.47	1.57
Wax (Dark)	2.11	2.16	2.75	1.68	2.39	3.45	1.76	2.39	2.50	2.39	1.75	2.39	1.00-4.00	2.18	2.18	1.27
Poll. Fee/Col.	36.14	39.83	35.00	36.25	37.49	32.50	38.29	37.49	25.00	37.49	37.49	40.00	20.00-55.00	37.48	36.87	38.65

?DO YOU KNOW?

Communication

Clarence Collison
Mississippi State University

Honey bees are social insects and exhibit the highest degree of social behavior. A prerequisite of all social communities is the ability to communicate with each other. Chemical, optical and mechanical means of communication are employed in the honey bee colony. Through their precise and highly differentiated dance languages and their numerous pheromones, individuals are able to recognize that they belong to the same colony, know what position they occupy in the social hierarchy, determine the basic needs of the colony and convey the location of a food source or potential nest site. Communication and regulation of activities by chemicals in the colony is of primary importance to its success. These chemicals are produced by two basic types of glands: exocrine and endocrine. Hormones regulate growth, development and molting and are secreted by the endocrine glands. Exocrine glands produce various secretions to the body exterior. Pheromones, wax and royal jelly are produced by exocrine glands.

Please take a few minutes to answer the following questions on glandular secretions and communication to determine how well you understand this important bee biology topic.

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

1. ____ Secretions from tiny glands found on the upper surface of the queen's abdomen serve to keep attendant bees, the "court," around the queen.
2. ____ "Queen substance" is a mixture of chemical compounds that are secreted by the salivary glands of the queen.
3. ____ Virgin queens produce a pheromone that repels workers and other queens.
4. ____ Honey bees expose their Nasonov gland both inside the hive and outside the hive.
5. ____ The queen uses her Nasonov gland to attract drones during her mating flight.
6. ____ Nasonov pheromone acts as an orientation aid.
7. ____ During the Summer, the hypopharyngeal (brood-food) glands shrink as the bees change from nursing activities to foraging, whereas, in the Winter bees of all ages have large glands.
8. ____ The three major honey bee endocrine glands, the prothoracic gland, corpora cardiaca and corpora allata, are found in both adults and larvae.
9. ____ Laying workers are able to produce queen substance (9-oxodecenoic acid).

(Multiple Choice Question, 1 point)

10. ____ The alkaline gland is associated with the _____.
    A) Ventriculus
    B) Salivary glands
    C) Brood-food glands
    D) Scent gland
    E) Sting
11. Name three ways that saliva, the secretion of the labial or salivary glands, is used by the bee (3 points).
12. Name the swarm-associated functions related to the queen's mandibular gland secretions (3 points).

Endocrine and exocrine glands are important in the development/behavior of individual bees and maintaining the structure of the insect society. Please match the following information with the correct honey bee glands.

A. Salivary (Labial) Glands
B. Mandibular Glands
C. Koschevnikov Gland
D. Hypopharyngeal Glands
E. Dufours Gland
F. Arnhart (Tarsal Glands)
G. Nasonov Gland
H. Wax Glands
I. Poison Gland

13. ____ Believed to produce the "footprint" pheromone.
14. ____ Produces the enzyme sucrase (invertase), a key compound in the conversion of nectars into honey.
15. ____ Involved in metabolizing sugars, cleaning the queen and processing wax scales.
16. ____ Produces chemicals that fortify the venom secreted through the sting.
17. ____ Found only in worker honey bees and are found on the ventral abdominal segments 4-7.
18. ____ Tiny cluster of cells found in the sting chamber of both workers and queens, precise functions unknown at this time.
19. ____ Produces 2-heptanone when workers become guard bees or begin foraging.
20. ____ These glands are located in both the head and thorax of the adult worker bee.
21. ____ In the queen, these glands produce chemicals that attract drones during the mating flight, inhibit queen cell construction and swarming.

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Mark Winston

Juxtaposition, Synchronicity, and Pesticides

"Enthusiasm is not exactly my reaction to a decision making it easier rather than more difficult for the beekeeping community to remain on the pesticide treadmill."

I admit two things: I like big words with their thought-provoking dictionary definitions, and I pay attention to coincidence. For the high-priced words, my selections for today are *juxtaposition* and *synchronicity*, meaning "placing side by side for comparison or contrast," and "coincidence of events that seem to be meaningfully related."

The coincidence that seemed too interesting to ignore were two e-mails I received last Summer, one a frantic request for help and the other a press release. The call for help was from Victoria, British Columbia, Canada, while the press release was issued by the American Beekeeping Federation out of Jesup, Georgia. What connected them was that they both concerned pesticides and bees.

The call for help came from the Swan Lake Nature Sanctuary, where the local beekeepers maintain an observation hive. Observation hives in science museums and nature parks are popular attractions, so it was with considerable concern that the program manager discovered a massive loss of bees one morning.

The symptoms included death of three-quarters of the colony's adult population, and those bees remaining alive were slow, lethargic, almost drunken in behavior. She also noted that the remaining adult workers pulled developing pupae and larvae from their cells, and surviving pupae that emerged a few days later had deformed wings. Coincidentally, the same thing had happened on almost the same date in 1989, and also in 1990.

The sudden onset, massive die-back and strange bee behavior all suggested pesticide poisoning, but being a nature sanctuary, no chemical pesticides are used anywhere in the building or on the grounds. Most likely, the bees were foraging nearby where a backyard gardener or small-scale urban farmer had sprayed a bee-toxic compound on blooming plants, probably first thing in the morning, and likely in violation of label directions.

This incident reminded me of an earlier pesticide incident with my own bees, in our backyard. We live in a single-home urban neighborhood, and used to keep two colonies out behind our garage. One day I found thousands of dead bees outside one colony, with some of the live bees exhibiting symptoms of pesticide poisoning. Being a scientist type, I had some of the bees analyzed. Diazinon, a common ingredient used at the time in home pesticide formulations, proved to be the culprit chemical.

Evidently the bees had been foraging at a site where one of my neighbors had been spraying. Interestingly, the second colony was unaffected, likely because that colony's foragers had not discovered the same floral sources as the pesticide-affected colony.

I have received a number of calls over the years about similar backyard pesticide kills, and commercial beekeepers are all too aware of colonies devastated by agricultural pesticide use. In spite of label warnings, education efforts by beekeepers, development of less bee-toxic pesticides, and even legislation, pesticide kills remain a problem for the hobby and commercial beekeeping communities.

My advice to the nature center was to canvass the neighborhood and work with the neighbors to encourage more bee-friendly pesticide etiquette. I also suggested she contact the media and encourage reporting on the incident as a way of educating the public about pesticides and the importance of bees for urban pollination.

The response at any beekeeping meeting to the word "pesticide" is similar to yelling "fire" in a crowded theater. Foreheads start to sweat, bile boils up in anger, and pesticide manufacturers and users are quickly and creatively cursed out by every soul in the room.

So given our gut negative reaction to pesticides, I'm not sure what I should be thinking about the coincidental press release I received from the ABF. The first paragraph sets the tone: "In some exciting and important news for the U.S. honey industry, the Environmental Protection Agency has agreed to establish tolerances for coumaphos in honey and beeswax."

In case you don't know much about pesticides, coumaphos is an old-fashioned organophosphate type of compound developed during the second, post-DDT generation of pesticides. Today, both the U.S. and Canadian governments are attempt-

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"It may be legal, but there's a big difference between telling our customers that honey is free of pesticides and telling them that the level of pesticide residues in honey meets federal specifications."

ing to phase out this entire class of compounds from food production, because they are more toxic to vertebrates than contemporary pesticides, and also can be quick to induce resistance in target pests. Even the press release mentioned the Environmental Protection Agency's "general refusal to add further food uses while assessing all organophosphates. Other industries have been refused new food uses for OPs pending the overall review."

In fairness to coumaphos and the ABF, the tolerances allowed in honey are legal and similar to those approved years ago for other foods. It's also true that residues in honey are almost inevitable, and if coumaphos is allowed to be used, it is unrealistic to regulate the honey and wax at a zero residue level. Finally, alternative chemicals are not yet available for the small hive beetle, and that is another compelling reason to allow coumaphos use.

But still, should we really be so excited about this news? I found it depressing to consider how dependent our formerly pesticide-averse beekeeping community has become. Enthusiasm is not exactly my reaction to a decision making it easier rather than more difficult for the beekeeping community to remain on the pesticide treadmill.

The routine use of Terramycin and fumidil begun in earlier generations to prevent foulbrood and nosema opened the door, and fluvalinate and coumaphos have waltzed in recently to increase our overall chemical use. And that's only the legal part. As we all know, illegal compounds and formulations have become standard practice in many segments of our industry.

If anything, the treadmill speed is picking up, and my prediction is that we're heading for some bumpy roads ahead if we don't change our increasingly comfortable acceptance of chemical pesticides. It may be legal, but there's a big difference between telling our customers that honey is free of pesticides and telling them that the level of pesticide residues in honey meets federal specifications.

What has surprised me the most about our embrace of chemical pesticides is that we are going against the trend in other agricultural sectors. Farmers went through their enthusiastic phase about pesticides decades ago, and most have adopted Integrated Pest Management protocols to monitor for pests and reduce chemical use wherever possible.

Beekeepers, in contrast, tend to use pesticides routinely and on a schedule, whether needed or not. By overusing both pesticides and antibiotics and using cheap but illegal formulations, we have selected for resistant pests and diseases much more rapidly than proper use would have.

We do have pests and diseases that need to be managed, and perhaps the coumaphos decision is a reasonable one in the short term. Nevertheless, I would have been more comfortable with the ABF press release if it hadn't sounded so . . . happy. Also, I would have appreciated a few lines about how the industry is working hard to reduce pesticide use.

The reality is different: We're not doing enough to move quickly toward putting fewer chemicals into our hives. In the interests of stimulating some discussion, I suggest our major industry organizations adopt the following five-year goals, and stick to them:

1) Eliminate the use of Terramycin, except by veterinary prescription to control European Foulbrood. That's right: No more prevention of American Foulbrood by pouring antibiotics into our hives, and no more illicit treatments for AFB by gorging hives with Terramycin. Other countries control AFB by burning and vigilant inspection, notably the United Kingdom and New Zealand. Sure it requires a bit more skill and labor, but I would hope our North American beekeepers would rise to the task. Rather than paying for antibiotics, let's pay for a private or government-run inspection service.

2) Commit to a 50 percent reduction of fluvalinate and coumaphos use. To accomplish this, let's direct some research money into alternatives. In the long run, it will be cheaper for individual beekeepers to invest substantially in research now, and reduce their costs in the future.

3) Lobby the government to provide more funding toward alternatives, in order to reduce overall pesticide use.

If we would become as enthusiastic and supportive of reduced pesticide options as we have been for using synthetic chemical pesticides, I am confident that the next press release would have a more environmentally friendly message.

We bemoan the loss of bee colonies from pesticide kills induced by farm and backyard sprays, yet remain tolerant of overuse and misuse of pesticides within the beekeeping community. I would be much happier if the next pesticide synchronicity was a bit more consistent, wouldn't you? BC

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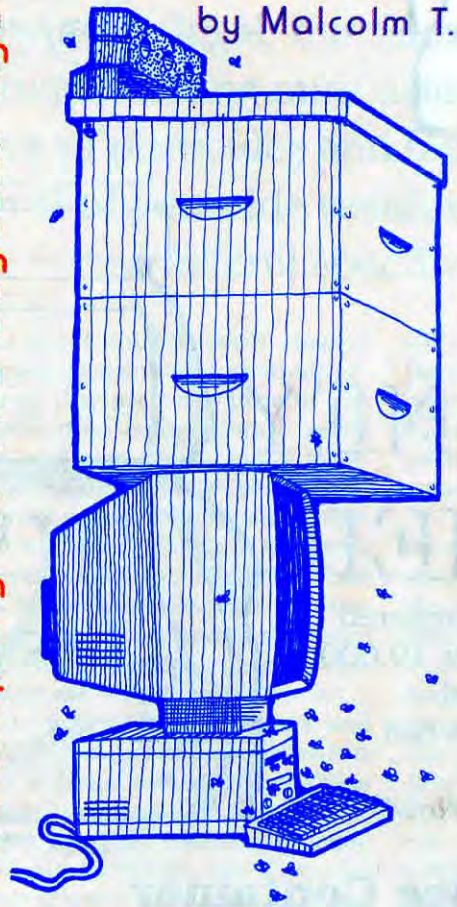
Beekeeping In The Digital Age

by Malcolm T. Sanford



Honey Bees and Alternative Pollinators – The Bee Works

I wrote the following in the **November 1993** issue of my *APIS* newsletter: "Given quality service, growers are not opposed to paying top dollar for pollination fees. There seems to be no better time than now for every beekeeper to look closely at commercial pollination as an alternative enterprise." I followed that up in the **July 1995** issue: "The beekeeper is in the best position to consult with growers not just about honey bee rental, but pollination problems in general. Thus, the day may have finally dawned for pollination to become the growth industry many predicted. In order to remain credible, however, apiculturalists must widen their pollination perspective. Instead of simply focusing on the management of honey bee populations, they should become experts in all facets of the pollination process, including the role played by other pollinators."

And in the **October 1998** edition of the *APIS* newsletter, I wrote: "Dr. Peter Hallett, professor of zoology, University of Toronto, and vice president of the Toronto and District Beekeepers Association, writes that pollen bees, wasps and other "nonentities" may be the coming way to diversify beekeeping (***Bee Biz***, No. 8, July 1998, pp 14-15). Though useless for honey, pollen bees are beginning to meet the needs of some farmers and growers, according to Dr. Hallett. Although the principal motivation is profit in increased pollination, another underlying factor is progressive impoverishment of the natural environment by land transformation and human activity. He gives three examples:

1. Shrunken populations of native bumble bees improves profitability of culturing these insects for **greenhouse** pollination.
2. Reduced populations of native pollen bees caused by tilling large fields, reducing so-called wasteland in Canada's prairie provinces, results in rearing of introduced **leafcutter bees** for alfalfa pollination.
3. Decreased populations of pollinators in British Columbia, Canada, and the United States is beginning to make nest boxes for native and Japanese Blue Orchard Bees (*Osmia* sp.) **economically attractive**.

Besides the above, Dr. Hallett says, there are potentially many more opportunities in pollen bees. This is especially true given their numbers. Globally, there is a huge number of species that have seen little commercial exploitation or conservation. Locally, they could be in the tens to the hundreds. Fourteen species of megachilid bees have been found in southern Ontario alone, and 94 long-tongued bees have been identified in Michigan, the number rising to 224 for the eastern United States.

The time is ripe, according to Dr. Hallett, to include native pollen bees and the environment as part of any beekeeping business. As an example, he describes a show farm in Kent, United Kingdom, which has not used a honey bee pollinator for several years due to *Varroa* depredations of nearby beekeepers. In spite of this, the nearby orchards are fine. Visitors can enjoy a cup of coffee or a restaurant meal and/or pick their own fruit. That's because an unspoiled, steep hillside is being used as a capital asset. It is a nesting place for all kinds of insects, lying safely above the valley and the pesticide applied there.

The growing business of honey bee pollination has generated a number of pollination resources on the World Wide Web. Perhaps most comprehensive is the **Pollination Home Page**. I described this site in some detail in a previous column (**April 2000**). This cause has also been championed by Dr. Keith Delaplane at the University of Georgia in his **publications**, which describe other pollinating insects.

Putting all this into practice, however, are the folks at The Bee Works: **http://www.thebeeworks.com**. This is a brand-new enterprise located at 1870 West Prince Rd., Suite 16, Tucson, AZ 85705, phone and voicemail: 520-888-7422, Fax: 520-888-7332, e-mail: **info@thebeeworks.com**. The founder and president is a well-known individual in both honey bee and pollination circles: **Stephen L. Buchmann,** Ph.D., who was a Research Entomologist with the USDA-ARS Carl Hayden Bee Research Center in Tucson, AZ. He currently is a Senior Research Associate with the Arizona-Sonora Desert Museum (Tucson) and with the Department of Entomology, American Museum of Natural History in New York City. Steve is also an adjunct professor in the Entomology Department and the Ecology and Evolutionary Biology Department at the University of Arizona in Tucson. In 1996/'97 he wrote the best-selling non-fiction book ***The Forgotten Pollinators*** with co-author Dr. Gary Paul Nabhan, Director of the Sustainable Environments Program at Northern Arizona Uni-

versity. The book is currently being translated into Spanish and Japanese language editions.

Steve's partner, **Diana Cohn**, became passionate about bees while doing research for a radio documentary for Pacifica Radio's national magazine, *Democracy Now* on the pollination crisis in America. She interviewed Steve about the **Forgotten Pollinators Campaign**, which led to the concept of a new social and environmentally responsible business, The Bee Works. **Jim Donovan** joined the business at its inception. He has a strong background in field biology and has studied everything from seabird nesting ecology to the pollination of endangered plants. He is currently pursuing interests in geographic information systems and databases. These latter technological specialties are proving to be very useful as The Bee Works grows.

From The Bee Works home page, there are links to **products**, **services**, **downloads of information**, **news and events**, **gallery of pictures** and a section called, appropriately enough, **pollinators**. This unabashedly commercial site with the **dot com moniker** advertises books, posters, screen savers and bee rearing houses for pollen bees. One of the latter, the "bee rancher" bee condominium (12.25 x 4.5 x 8.5 inches), has 50 holes containing cardboard straws and inner white paper straw liners. It costs $50.

Services at The Bee Works include GPS/GIS surveys, which can be composed of high-quality digital maps, satellite imagery, aerial photography and computer landscape simulation. The Bee Works will conduct landscape-level surveys of pollinators with an emphasis on bee biodiversity. Several have been conducted for nonprofit organizations, private landowners and government agencies. The outfit has expertise in evaluating crop pollination quality and has been working with several producers on utilizing alternative pollinators to honey bees for crop pollination. There is an international focus, but The Bee Works also provides domestic landscape architecture services to create beautiful gardens that attract beneficial wildlife.

Information available on The Bee Works site through **computer downloads** includes the **latest paper** by Dr. Buchmann and colleagues on the pollination and pollen starch issue (*Evolutionary Ecology* 2000: 2, pp 227-643) and a sample chapter of *The Forgotten Pollinators*. **News and events** catalogs the current projects of the group and conferences and workshops that personnel from The Bee Works have attended or are going to attend. It also features exhibitions like that associated with **vanishing pollinators** at the National Zoo. The **gallery** features a variety of images, including striking drawings of **moths** and **butterflies**. Most intriguing is the **pollinators** link: "Today, scientists have discovered, described and formally named (using the scientific nomenclature in Latin or Greek for the genus and species) 25,000 different kinds (scientists call them species) of bees around the world. In the United States alone, we have 3,950 species of native bees. More are being described each year. Steve Buchmann estimates that there may be as many as 30,000 to 40,000 species worldwide. If you make careful studies around your home or nearby wildland sites, maybe you will be the next to discover a new species." This also contains a **link** to a listing of other Web sites with pollination as their theme and a description of the **latest** taxonomic or classification information on the world's bees. Finally, there's a **just for kids** area, which discusses some unusual bee facts and features a **drawing contest** for children five to 12.

As a new enterprise, it is not clear where The Bee Works will be headed in the future. I have before me one possibility, a grant proposal entitled *An evaluation of wild plants as food sources for honeybees: Israel as a case study*, which is being developed by Dr. Buchmann and his group, working in collaboration with scientists in Israel. It seeks to develop a predictive model for the evaluation of Israel's plant communities and potential forestry trees as food sources for honey bees. This research includes measuring pollen and nectar standing crops, nectar production rates, flowering phenology and abundance of about 300 plant species in the country. The researchers will monitor food collection through weighing of the whole colony and analysis of bee-borne pollen. They will combine these data with GIS analyses to make recommendations for an efficient distribution of bee colonies throughout the country of Israel. This innovative study with funding from outside traditional sources is clearly is a case of widening the pollination perspective that will also yield dividends down the road for beekeepers in the United States and elsewhere. BC

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Bees & Genes

Gene Robinson

Dedication

This article is dedicated to the memory of Roger Morse, my graduate school advisor. "Doc" was a generous, stimulating and demanding mentor. He did much to help launch the careers of many scientists, myself included, and for that I shall always be grateful. Roger Morse himself was never involved in bee genetics, but I hope he would have enjoyed this article because he always delighted in seeing honey bees studied from new perspectives. The perspective described here is so new, in fact, that this article is more perspective than retrospective, that is, long on ideas and short on new discoveries. This article outlines a new approach to studying bee behavior and provides a rationale for this approach that goes "beyond the beehive."

Introduction

We are now in the midst of one of the most ambitious and far-reaching scientific endeavors of all time, the Human Genome Project. The first goal of the Human Genome Project is to identify all of our genes, known collectively as our genome. The second goal is to understand what all the genes in our genome do. When a gene is discovered that appears to be involved in, say cancer, the reaction from the public is usually quite enthusiastic and hopeful. On the other hand, when a gene is discovered that appears to be involved in behavior, the reaction is more mixed. In addition to hope and enthusiasm, there often is fear. Fear that "biological determinism," the notion that genes play a dominant, if not exclusive, role in causing behavior, will diminish our appreciation for the important role of the environment in shaping behavior. Unfortunately, the "nature-nurture" controversy still seems to be alive and well, at least in the hearts and minds of the public at large, even though biologists have come to realize that behavior is influenced by genes, the environment and complex interactions between them.

Studies of genes and social behavior can be used to demonstrate the influences of both nature and nurture, i.e., genes and the environment. This is because social behavior is especially sensitive to environmental influence. *Many people believe that discoveries* that relate genes to social behavior will provide information of profound biological and biomedical significance, such as identifying genes that influence mental illness. Another important potential benefit of studying genes and social behavior is to highlight the intricate ways in which the environment can influence gene activity and therefore behavior. Showing that the same genes can have different activities in different environments provides the scientific underpinning for the application of new discoveries about genes and behavior in ways that are politically and socially responsible.

Bees, genes and social behavior

Honey bees, with their rich and sophisticated repertoire, can contribute profoundly to the study of genes and social behavior. Bees can discriminate members of their colony from foreigners, intensify their guarding activity during times of dearth and "tell" their hivemates where to go to find plentiful nectar and pollen, to name just a few of the amazing things bees can do. Bees, like humans, also grow up, changing jobs as they do. These job changes are the underpinnings of the colony's intricate division of labor, the aspect of bee behavior that my laboratory has concentrated on for the past 10 years, and the subject that we are now beginning to address by studying genes in the bee brain. A bee usually spends its first few weeks tending to duties in the hive such as "nursing" brood and its last few weeks foraging for food outside the hive. Foraging is probably the most challenging task of all. To be a successful forager, a bee must learn how to navigate in the environment and to obtain nectar and pollen from flowers.

Although bees go through a rather consistent path of behavioral maturation, it is not rigidly determined. Bees can accelerate, retard or even reverse the maturation process in response to changing environmental and colony conditions. For example, favorable environmental conditions in the late Spring might cause a surge in worker birth rates, and that could result in a colony with a smaller foraging force. Under these circumstances, some adult bees start to forage about two weeks earlier than usual, when they are as young as one week old. We call these bees "precocious foragers."

This remarkable behavioral flexibility is one of the secrets of success for honey bees. Their labor force – both tightly structured and exquisitely adaptable – surely would be the envy of any Fortune 500 company. In addition to recognizing and studying it as a marvel in its own right, my laboratory and others use the phenomenon of honey bee behavioral flexibility to address potentially vexing problems in the brain and behavioral sciences. For example, what if one finds that a particular gene is more active in the brain of foragers relative to nurse bees? Is the high level of gene activity associated with advanced age or current occupation?

These two factors are often extremely difficult to separate in the lives of most animals. But the act of making a colony composed of only young bees can solve this puzzle, because some bees will accelerate their maturational process and become precocious foragers. A few weeks later it is also possible to observe "overage nurses," bees that continue to tend the brood despite advancing chronological age. Similar manipulations can be made to explore the role of experience on gene activity because it is possible to tightly control a bee's social and work experience, even under reasonably natural conditions. These manipulations require a sound understanding of both bee science and beekeeping – the essential ingredients of any successful bee research program, according to Roger Morse.

We have used techniques of manipulating the social environment to study some of the social and brain factors that control age-related division of labor in honey bee colonies. We have learned, for example, that higher levels of juvenile hormone and the brain chemical octopamine speed up the transition from working in the hive to foraging. Readers of *American Bee Journal* may recall the recent article by graduate student David Schulz that describes our results on the acceleratory effects of food deprivation. We also have discovered social factors that slow down the pace at which bees grow up and become foragers, including queen mandibular pheromone and an as yet unidentified inhibitory factor spread by older workers. These findings are probably just the "tip of the iceberg" and suggest that many other intricate social and neural processes occur to regulate colony social organization. Though fragmentary, they also provide a foundation for understanding how the actions of specific genes in the bee brain can influence this complex social system. This is because genes encode proteins that give rise to the various brain mechanisms that underlie behavior.

Genomic studies of honey bees are important in their own right, to better understand these beloved and environmentally important creatures. But when one contemplates the resource investments by funding agencies required for this kind of high-tech research, another question emerges: *Will bees help us understand the social behavior of other creatures, including ourselves?* Results from another branch of biology suggest that the answer will be a resounding yes! It is abundantly clear that there is striking conservation of function between insects and vertebrates – including humans – for many genes involved in the development of a multicellular organism from a single fertilized egg. This follows logically from the precepts of evolution by natural selection, which is the foundation for all of the biological sciences. But studies in the realm of developmental biology have gone beyond logical prediction and have provided overwhelming evidence that is impossible to ignore. Genes involved in the development of the fruit fly are also involved in the development of mammals. For example, there is a gene that plays an important role in the development of the eye of both the fly and the mouse. This is remarkable because the eyes of insects and mammals work in very different ways and were never before considered even to be related structures.

"There is a gene that plays an important role in the development of the eye of both the fly and the mouse. This is remarkable because the eyes of insects and mammals work in very different ways and were never before considered even to be related structures."

Surely the principle of conservation of function also applies for social behavior. All social animals, including honey bees, must obtain and process information about their changing ecological and social milieu and act accordingly. In social evolution, the sophisticated ways in which animals deal with the essentials of life – food, shelter and reproduction – stem from increased abilities to communicate and synchronize behavior with other individuals around them. From these considerations it seems reasonable to conclude that some genes identified from bees will also be important in the social behavior in vertebrates.

Sociogenomics

The Human Genome Project has given us powerful new technologies for the study of genes. It also has spawned "genomics," which refers to a commitment to study many, even all, of an organism's genes, rather than just one at a time. The impetus for the new science of genomics is the growing feeling that to continue focusing on just a few genes is to "miss the forest for the trees." My laboratory has started to use the perspectives and techniques of genomics to study social behavior, an endeavor I call "sociogenomics." Implicit in the name is the realization that many genes must be studied simultaneously to decipher the complexity behind social behavior.

We have chosen to begin by focusing on two of many questions involved in sociogenomics: 1) Is gene activity in the bee brain sensitive to changes in the social environment; and 2) To what extent do changes in gene activity influence socially mediated neural and behavioral plasticity? It is well-known that changes in gene activity play profound roles in the development of the nervous system, but much less is known about their role in behavioral regulation. A notable exception is the burgeoning evidence demonstrating that changes in gene activity are crucial to the control of learning and memory, but these studies take place in the laboratory, where the experiences of an animal are more limited and can be better controlled. Scientists just do not yet know how much of the intricate regulation of

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"We became interested in the *period* gene when we discovered an intriguing link between biorhythms and division of labor in honey bee colonies."

brain function that is required to control complex behavior is orchestrated by changes in gene activity.

Studies of rodents, birds and fish have begun to provide hints of extensive, two-way communication between the nervous system and the genome in the control of social behavior, and as described below, we are getting a first glimpse of this in our studies of honey bees. What this means is that information acquired by the nervous system on social conditions can induce changes in gene activity that in turn adaptively modifies the structure and functioning of the nervous system, thus contributing to the ability of an animal to respond to changing social conditions.

Fortunately, to study the activity of many genes in the genome does not require that the whole genome be sequenced. Such a task is still extremely expensive and therefore limited to only a few species selected by the officials in charge of the Human Genome Project, which at this point includes only three animals: the nematode *Caenorhabditis elegans*, the fruit fly *Drosophila melanogaster*, and the house mouse *Mus musculus*. Instead, we are using a technique popularized by Dr. Craig Venter, a leading scientist in the recently completed sequencing of the human genome, that involves sequencing just a small, but diagnostic, fragment of each gene. To be most valuable, the fragment must belong to the "expressed" region of the gene, i.e., the region that is ultimately translated from DNA to messenger RNA and finally into protein. These fragments are called "Expressed Sequence Tags" (ESTs). Using ESTs as an entry to genomics is an idea that is spreading rapidly in diverse communities of biologists.

Recently we launched a bee brain EST project, funded by a grant from the University of Illinois Critical Research Initiatives Program. With the work being performed at our new Keck Center for Functional and Comparative Genomics, a set of 5,000 ESTs from the bee brain has almost been completed. This is estimated to represent most of the genes expressed in the bee brain. The Bioinformatics Division of the Keck Center is now organizing the EST sequences into a database, "b-EST," that will eventually be available to the entire scientific community via the World Wide Web. By comparing the sequences (the particular order of DNA's component nucleotides, "A," "C," "T" and "G") of our bee brain ESTs against the sequences of genes identified from all other organisms, we will be able to get some ideas about the functions of many of the genes in the bee brain (because of the principle of conservation of function). Because so many genes have been identified in other organisms, it is estimated that over 50 percent of the ESTs sequenced from the bee brain will be matched to genes encoding proteins in other organisms, many of them proteins of known function. This "hit rate" is expected to improve dramatically now that the full sequence of the fruit fly's genome has been released.

Our next step is to use the bee brain ESTs to make bee brain "gene chips," a project that has just begun in my laboratory thanks to an Innovation Award in Functional Genomics from the Burroughs-Wellcome Trust. Gene chips allow an unprecedented simultaneous analysis of the activity of many genes, rather than the traditional one-gene-at-a-time approach. To make one, thousands of tiny spots of DNA are arrayed on a specially prepared glass microscope slide, each spot containing millions of copies of an individual EST. The gene chip, or microarray, is then exposed to extracts of bee brains that contain snippets of all the genes that are activated. These snippets are very similar to the ESTs themselves and will actually bind to their corresponding EST. That is, a gene snippet for Gene X will bind to the EST that originally also came from Gene X.

In our first experiments we will make extracts from nurse brains and forager brains. Each of these extracts is labeled with a different color fluorescent dye. When the extracts are applied to the bee brain microarray, genes that are more active in forager brains will show one color pattern, genes more active in nurse brains another color pattern, while genes with about the same activity in nurse and forager brains will show yet another pattern. Because many spots on the microarray represent known genes, this is a powerful method of obtaining data on genes that might be important in the regulation of division of labor. These genes can then be studied in more detail using more traditional techniques from molecular biology. Gene chip analysis is a high-tech version of natural history; it allows for exploration of new terrain, and will, I'm sure, help us generate a host of new ideas on how regulation of gene activity contributes to social organization.

Glimpses of the future

Our gene chip work is only now beginning, with no results to report on yet. But members of my research team have been studying a few individual genes in the bee brain for the past several years, and our findings suggest that honey bee sociogenomics will be a fruitful line of inquiry in the future. I will illustrate this by describing some of our research with the *period* gene.

Our first scientific publication on this topic appeared in the June 6, 2000 issue of the *Proceedings of the National Academy of Sciences*. The period gene was so named in the 1970s because when mutated in a fly it caused differences in the length of one of the fly's biorhythms: the time period of the fly's daily rhythm of locomotor activity in the laboratory. Scientists went on to show in the past two decades that the protein encoded by the period gene actually forms one of the central components of the daily biological clock. Daily biological clocks, found in many cells and in all organisms, enable many of life's processes to wax and

wane according to a strict daily schedule.

We became interested in the *period* gene when we discovered an intriguing link between biorhythms and division of labor in honey bee colonies. Prof. Darrell Moore, East Tennessee University, spent two Summers as a Visiting Scientist collaborating with Prof. Susan Fahrbach and me here at the University of Illinois. We designed an ambitious project that required the assistance of energetic undergraduates Jennifer Angel and Iain Cheeseman: to follow the activities of individually marked bees at three-hour intervals, day and night, day after day, from the time they began their adult life working in the hive to the time they became foragers. This was a major departure from the typical protocol for studies of division of labor, which, logically enough, involves observations during normal, human, working hours. The new approach paid off. Everyone already knew that foragers have pronounced biorhythms, necessary to time their visits to flowers and to use in their sun-based navigation system. We were therefore very surprised to learn that young bees had no daily rhythms of activity for the tasks that they perform in the hive! Any particular nurse bee, for example, was just as likely to be observed tending brood in the middle of night as in the day. Our study, published in 1998 in *Behavioral Ecology and Sociobiology*, contained results similar to a paper published in *Apidologie* from Prof. Karl Crailsheim's laboratory in Graz, Vienna. These findings indicate that part of growing up as a bee involves a transition from being a hive bee with a more casual daily schedule to being a forager who is almost a slave to the clock. Because the period gene was known to be involved in the regulation of the daily clock in flies, we thought it may show interesting changes in activity as a function of division of labor.

Graduate student Dan Toma cloned the honey bee version of the *period* gene, which was relatively straightforward because its sequence turned out to be very similar to the sequence of the *period* gene in several other animals, including humans. Using the sequence information to design a probe, he was then able to measure the activity of the *period* gene in the bee brain. His analyses indicated that forager brains contain almost twice as much *period* messenger RNA as do nurse brains. This is a strong indication that the *period* gene probably is much more active in producing protein in forager brains, an issue we are currently examining in collaboration with Prof. Fahrbach's laboratory. Is the high level of *period* gene activity associated with advanced age or current occupation? Using the social manipulation described above, it was found that precocious foragers also have high *period* messenger RNA levels in their brains. This finding clearly indicates that it is not the advanced age of the forager that causes the change in gene activity. Recent, still unpublished, findings from postdoctoral associate Dr. Guy Bloch suggest that the change may not be tightly linked with the occupation of foraging either, but may be a consequence of experiences that occur prior to foraging. We also do not yet know whether the change in *period* gene activity influences the division of labor. But why is a gene, known only to be involved in biorhythms, also sensitive to cues from the social environment? Our results demonstrate that new challenges to the understanding of even well characterized genes like *period* can emerge by studying animals that live in complex societies.

Conclusions

Pioneering studies by Prof. Robert Page and colleagues at the University of California, Davis, have demonstrated that one can use artificial insemination of queens, artificial selection and sophisticated molecular biology techniques to identify regions of the genome that contain genes that are behaviorally relevant. These results, and our research on the *period* gene, bode well for the kinds of sociogenomic studies outlined in this article. However, it is important to point out, especially to a readership of bee enthusiasts, that bees are not an ideal model for genetic studies for a variety of reasons. Maintenance of selected lines and inbred lines is very difficult with bees, and tools for manipulating gene activity have not yet been extended to the bee. To understand the function of a particular gene, one must be able to manipulate its activity level or even delete it entirely; this goes beyond the correlative results that a gene chip experiment can provide. Fortunately, it is expected that such manipulations will be possible with many species of insects including bees, within the next few years, if for no other reason than because of the intense interest in making transgenic insects that are agricultural pests or medical dangers. (In other words, it is likely that soon it will be possible to make Genetically Modified or "GM" bees. This prospect raises issues that go far beyond the use of bees as model organisms in sociogenomics; these issues are beyond the realm of this article.) Clearly nematodes, flies and mice will likely remain the premier animals for initial discoveries of gene function, even for behavior. But honey bees can play an important role in sociogenomics for one simple reason. Finally understanding the influences of nature and nurture on social behavior will require that some animals with complex social behavior be studied under conditions that are both reasonably natural and amenable to precise social manipulation. Emulating some of Roger Morse's fierce bee partisanship, I assert that there is no better creature on earth for such studies than the honey bee. If so, the identification of genes influencing social behavior in the honey bee will likely yield insights that go well beyond the beehive.

Acknowledgements

Portions of this article are based on an article published in *American Scientists* (Robinson, G.E. From society to genes with the honey. Volume 86: 456-462, 1998), used with permission. I thank Harris Lewin, Hugh Robertson and David Smoller for valuable advice on the EST project and Guy Bloch, Elizabeth Capaldi, Michelle Elekonich and Charles Whitfield for reviewing this manuscript.BC

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Introduction

Selling a few hundred pounds of extra honey is easy to do. Co-workers, friends, and family will scoop up most of it. A roadside stand is efficient and by word of mouth alone people will begin arriving at your doorstep all hours of the day! With 100 hives however, you have got to be more systematic in your selling efforts.

A good wholesale outlet will sell hundreds of pounds of honey each year. They will have expectations of you however. They expect year-round availability, and few surprises such as frequent price increases. They want a variety of products and do not want to deal with crystallized honey.

I believe that by adopting a few strategies and principles you can easily sell all of your honey. This, the third article in the series will focus on selling, marketing, and the business aspects of a 100-hive operation. The final article will be a forum for your comments and questions so feel free to send in your thoughts.

Starting a business

First, obtain a DBA (doing-business-as) to record the name of your business. I chose "Ballston Lake Apiaries" because I live in Ballston Lake, New York. Next, get insurance. While it is not strictly needed for many outlets, you will rest easier knowing that you have product liability for the 6,000 containers you place into area kitchens each year. And to simplify tax filing and managing the yards, keep good records. Save every expense receipt and know what each yard produces. And when you begin to write more than 10-15 checks each month, consider a business checking account. It further legitimizes your business in the eyes of your customers and the IRS.

Keeping the business going

Keeping the business going is a different matter. The following lessons were acquired through years of trial-and-error and by selected listening to the many experts in the field!

1. Grow patiently. I began extracting with a rented hand-operated extractor. A handful of hives took three days to extract. Now with powered equipment in the same three days I can with two helpers process three tons of honey. After each season I find further ways to fine-tune the process. This year I added a holding tank beyond the filter and can fill pails when I am ready rather than tending over each pail as it fills. Rather than buying a big operation, grow into one incrementally. Buy good equipment so you can sell it when you outgrow it. Don't jump in over your head. Remember that the speed at which you learn lags your ability to overspend on equipment. On the path to my present equipment configuration I have undergone four major acquisitions based upon real experienced needs.

2. Consider buying products instead of making them. I have 35 outlets for my honey and buy approximately 15% of what I sell through cooperative arrange-

Having many products available, well labeled and attractive is a big part of the job.

ments with other beekeepers. This provides a cushion in case I lose a store or gain a big one. Certain outlets such as farmer's markets require that you sell only what you make but not all of the outlets are so strict. Reserving the strategy of buying some products wholesale and reselling them provides a margin of safety on growth (or loss) and helps insure a year round supply for your entire customer base.

3. Get professional labels. All of my labels are purchased and have the same look about them. A certain style of let tering, called a font, on a yellow background, with my slogan, provides a distinctive look that is the "Ballston Lake Apiaries" look. My humorous slogan never fails to catch attention – "Pure Honey made by Tireless Saratoga Area bees with help from Ballston Lake Apiaries, 518-384-2539." When supermarkets and large stores required barcodes, I had them made with the same distinctive look. And, a good label manufacturer will help you comply with the state mandated labeling laws for position and size of required information such as the size of the container.

4. Avoid taxes with good records. By keeping good records such as truck mileage, equipment costs, etc. you can prepare accurate filings. Use Form 4562, Depreciation and Amortization, and Schedule F, Profit or Loss From Farming. Depreciate the truck, building, and hives, and expense all other costs in the year incurred.

5. Have product variety. In addition to pure honey I sell candles, balm, postcards, posters, propolis, cream, comb, presentations, consultations, my slides, complete hives, nucs, and bee removal services. Variety sells. I bottle in 8oz. bears and glass, 16oz. bears and glass, 32oz. bears and glass, 2.5#, 5#, 12#, and pail sizes. It all sells.

6. Have multiple markets. Don't put all of your eggs in one basket. I sell presentations and outings to schools, bee removal services to homeowners, pollination services, consultation to new beekeepers, at a farmer's market on Saturdays, to a chain of supermarkets, and to a variety of stores. Each has a different expectation of me as follows:

a. Schools – My one-hour presentation is memorable. I use slides, bring in samples, show an observation hive, and actual beekeeper's equipment. It is hands-on and fact filled. The slides include close-ups of inside the hives, of flowers, of honeybees, and other stinging insects. Some schools now book my presentation a year in advance. Each teacher is given a poster. It is high profit and lots of fun.

b. Stores – I provide wholesale price sheets that are non-negotiable. My price for extracted honey is approximately $1.50 a pound plus the cost of the container, labels, hangtags and boxes. I deliver quickly, within 2-3 days, and know each owner by first name. I offer my poster for their wall to help strengthen our relationship. I seldom loose a store customer.

c. Supermarkets – They want large deliveries boxed in 12 and 24 count cases, with barcodes. While these customers are hard to get and they expect the best prices, they place large orders year-round. Supermarkets provide your business with great visibility. Barcodes are easy to get and cost according to the size of your business.

d. Farmer's markets – These outlets are face to face selling with retail customers. I charge premium retail prices. These customers want a show. I dress up in a beekeeper's outfit, bring the bees, and answer their dumb questions such as – "Do you ever get stung"? I answer with a straight face, "Why I have never been stung in 30 years of keeping bees!" –

Continued next page

which invariably draws a smile and a sale. Variety is critical here because the same families frequent the market but infrequently buy honey compared to purchases of honey cookies, candles, and honey drinks.

Conclusion

I enjoy selling. Each sale affirms that I am providing something of value and receiving money in return for my hard work. I believe however that selling has an undeserved bad reputation for two reasons. The occasional overbearing sales type threatens many and irritates most. And two, selling is not natural to most farmers. A "No" is hard to take if you are not used to it. Selling can be learned however, especially when you have helped make such a fine and wholesome product as honey.

In my years of selling honey and other products, some of the slogans that have stuck with me, that have sustained me, are the following...

"Perception is reality"
"Persistence overcomes resistance"
"Rule #1 in selling: shut your mouth"
"Don't confuse activity with progress"
"Sell the sizzle not the steak"

"Perception is reality"
"Persistence overcomes resistance"
"Rule #1 in selling: shut your mouth"
"Don't confuse activity with progress"
"Sell the sizzle not the steak"

I hope they settle well with you and may they provide guidance in your bee business.

You may think falsely that your biggest challenge are those that undersell you, and that what is important is how little you heat your honey, and how few bubbles are in it. It is not. Your real challenge is to unlearn what you have been told at old stodgy bee club meetings, and to regain the enthusiasm you first experienced with this craft. Do you remember how you felt when you opened your first hive? Share this enthusiasm with your customers and you will be successful. People like a show...a sincere one I might add. BC

Rick Green can be reached at 8 Hickory Grove Lane, Ballston Lake, NY 12019 or, gothoney@aol.com

This is a poster I use in my school demonstrations, and I sell it to others who want to use it for their demonstrations. It is simple and easy for children to understand.

YOU CAN BUILD THIS

Observation Hive Philosophy

In my opinion, observation hives fall into two broad categories:

- Nicely constructed, permanent furniture-type hives.
- Simple, quick, glass box-type hives for short term use.

Furniture-grade hives are much more satisfying from a quality standpoint, but they are normally too heavy and cumbersome to take to a single talk. I frequently need to put a frame into an observation hive and dash off to a talk. Upon my return, I replace the frame in the colony and life goes on for both me and the beehive. In my lab at Wooster, I constructed a nine-frame observation hive that is permanently positioned, yet I need a smaller, simpler observation hive more frequently. Having both types of observation hives is a good idea for beekeepers who commonly give talks on various aspects of beekeeping.

The hive I am describing below is intended to be as simple as possible to construct. This is not intended to be a high-quality, visually pleasing observation hive. I have used various designs, but for the present time, I have settled on the design given below.

The Observation Hive Design

Though I have built observation hives as high as three deep frames with the concept presented below, I like the single-frame deep best. Only one frame of bees is required so I can establish the hive quickly and break it down quickly. The hive is constructed from-low grade wood and screws available at any building supply store.

In theory, only simple tools such as a drill and a handsaw are required to build the unit, but power tools are still very handy to use if they are available to you. Six wood pieces and two Plexiglas® pieces comprise the hive. A top, a bottom, two slats, two end uprights and two Plexiglas® sides form the hive.

The Building Materials

The building materials required are:

- 1 standard 2"x4" board (stud) as straight and clear as possible
- 1 common pine board ¾" x 8" x 8'
- ¼" Plexiglas® Two pieces cut to fit the observation hive sides-probably 10 ¾" x 25"
- 2½" pan head screws with washers and nuts (4 required)
- 2½" drywall screws (6 required) for attaching uprights
- 1" drywall screws (4 required) for attaching the bottom slat to the bottom board
- wood glue
- 8-mesh hardware cloth (or aluminum window screening)

The Cutting List

Beginning from the bottom and moving upward, the sizes of each of the required pieces are:

- Bottom – ¾" x 8" x 25" (one each)
- Bottom slat - ½" x 1 ½" x 18 5/8" (one each)
- End uprights – 1 ½" x 3 ½" x 10 ¼" (two each)(This is a standard dimensioned 2 x 4 board)
- Top slat – ½" x 1 ½" x 25" (one each)
- Top – ¾" x 2" x 25" (one each)

Frame Rests

Cut a notch in each of the upright tops. The notches should be ¾" down and 7/16" over. See Figure below.

Assembly Instructions

- Cut all wood and Plexiglas® pieces to specified dimensions.
- Bore ventilation holes (7/8" spade bit)(two in each upright - one 2" from top and a second 2" from bottom of both uprights)
- Cover ventilation holes with screening and staple or tack in place. If a hive entrance is desired, leave one of the lower ventilation holes unscreened for later use.
- Attach the top slat to the tops of the uprights. The top slat should completely cover the upright tops from end to end.
- Center the bottom slat on the bottom board and attach with 1" drywall screws. The bottom slat should be between the uprights.
- Position the previously assembled top slat and upright component astraddle the attached bottom slat.
- Using the bottom slat as a guide, glue and screw the end uprights to the bottom board. Screw from the bot-

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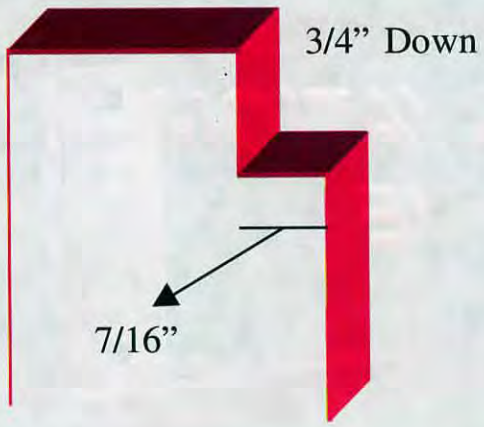


tom surface of the bottom board.

- Attach the top to the top slat with two 2½" (one in each end) drywall screws that penetrate the end uprights. There should not be a reason to ever remove the top. The hive will always be loaded from the side.
- Paint with latex varnish or paint or leave as bare wood.

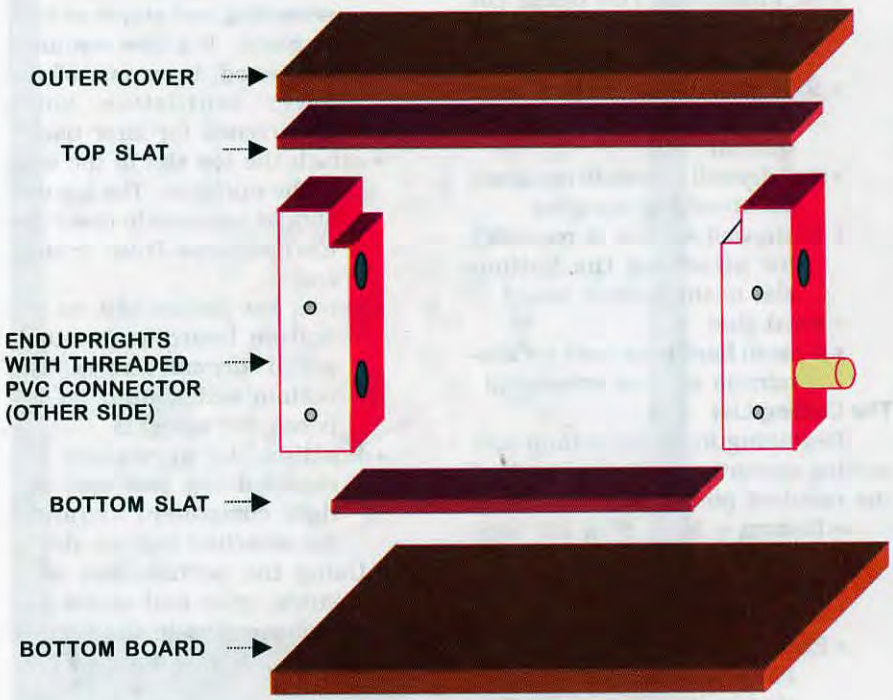
If an entrance is desired, glue clear, flexible plastic tubing into the unscreened vent hole. The length of the tube should be whatever meets your needs. Alternatively, glue a short piece of PVC tubing into the vent hole and stretch appropriately sized flexible tubing over the PVC nipple. A more complicated procedure is to thread a ¾" PVC coupler into the vent hold and attach plastic tubing to that. A 7/8" thread cutter is handy if this procedure is used.

Plexiglas® Sides

In the center of the uprights 1" down from the top and 1 ½" up from the bottom, drill a ¼" hole through the glass and the wood uprights. Using 1 ½" pan head screws, attach the sides to the uprights.

The Exterior Entrance

If an entrance is desired, using part of the 8' pine board, cut it to length to fit within your desired window. Drill a hole of the necessary diameter to allow the plastic tube to pass through to the outside. Position the board within the window and close the window onto the board. If the hive is to be used for short periods only, all the vent holes can be closed with screening and the entrance eliminated.



Quirks of the Design

- After installing the selected frame with adhering bees, extraneous bees are sometimes crushed between the glass and the uprights. A bee brush is handy to keep bees off the sides of the uprights while positioning the glass walls.
- It is difficult to bore holes so precisely that the glass walls are interchangeable. It is handy to use a couple of 1" screws to permanently attach one glass wall and always load the frame from the removable side.
- Due to the lightness of this unit, a feeder hole was not provided. Either replace the frame with one full of honey or feed the unit from outside the window.
- This is a temporary hive and will not survive even a mild winter.
- The dimensions of the upright are very tight. Do not remove any more wood from the uprights when sanding or planing.
- Scrape all propolis or comb from the selected frame before attempting to put it into the unit. Combs bulging with honey should not be selected.
- Be careful not to drill the side holes through the vent holes.

Your Confidence

These have been tedious instructions that describe the building of a remarkably simple observation hive. You can build it. Make any changes you desire that will make the unit more appropriate for your use. The primary requirements are that the frame sits on the frame rests and that bee space be respected. Otherwise, it is nothing more than a glass box used to take a frame of bees to a demonstration. Good luck. BC

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B1	Metal Cover w/ inner cover	$25.00	12 lbs.
B1A	Metal Cover only	$17.50	9 lbs.
B8	Inner Cover only	$8.50	3 lbs.
B12	Bottom Board	$11.00	7 lbs.
B18	Entrance Reducer	$1.50	call
B20	Observation Hive	$50.00	10 lbs.
B25	Hive Stand	$10.00	4 lbs.
B37	Wood Bound Excluder	$9.00	3 lbs.
C1	Deep Hive Body-empty	$14.00	12 lbs.
C1F	Deep Hive Body w/Frames	$21.50	18 lbs.
G14	9-1/8" Frames(10)	$9.00	5 lbs.
G15	9-1/8" Frames(50)	$37.50	24 lbs.
H8B	Deep Wired Foundation (10)	$9.00	2 lbs.
H11B	Deep Wired Foundation (50)	$43.00	8 lbs.
H21	Deep Med. Brood Foundation (10)	$9.50	2 lbs.
H23	Deep Med. Brood Foundation (50)	$43.00	8 lbs.
B50	Frame Supports	$2.50	1 lb.
C19	6-5/8" Super w/Frames	$19.00	11 lbs.
C21	6-5/8" Super, empty	$11.00	7 lbs.
G45	6-1/4" Frames (10)	$9.00	5 lbs.
G46	6-1/4" Frames (50)	$37.50	23 lbs.
B57	Spacers	$0.50	1 lb.
H60	Med. Wired Foundation (10)	$7.00	2 lbs.
H61	Med. Wired Foundation (50)	$31.00	7 lbs.
C12	5-11/16" Super, Empty	$10.00	6 lbs.
C17	5-11/16" Super w/Frames	$18.00	9 lbs.
G24	5-3/8" Frames (10)	$9.00	4 lbs.
G27	5-3/8" Frames (50)	$37.50	21 lbs.
H27	Shallow Med. Brood Fnd (10)	$6.00	2 lbs.
H29	Shallow Med. Brood Fnd (50)	$29.00	5 lbs.
H50	Shallow Wired Foundation (10)	$7.00	2 lbs.
H51	Shallow Wired Foundation (50)	$34.00	6 lbs.

HARVESTING

N92	Cappings Scratcher	$8.00	1 lb.
M26C	Nylon Strainer Cloth	$8.00	1 lb.
M28	Filter Sock 150 Mesh	$10.00	1 lb.
O63	Epoxy Tank Coating	$16.50	3 lbs.

PROTECTION

N11	Alexander Veil (No Hat)	$18.00	1 lb.
N10	Indestructible Veil	$15.00	1 lb.
N12	Delphos Steel Veil	$18.00	1 lb.
N16A	Ventilated Helmet	$13.50	1 lb.
N16C	Plastic Helmet	$13.00	2 lb.
N20	Replacement Zipper Veil	$19.00	1 lb.
N22X	XLG. Leather Gloves	$14.00	1 lb.
N22	LG. Leather Gloves	$14.00	1 lb.
N21	Med. Leather Gloves	$14.00	1 lb.
N25A	SM. Vinyl Gloves	$10.00	1 lb.
N25	Med. Vinyl Gloves	$10.00	1 lb.
N26	LG. Vinyl Gloves	$10.00	1 lb.
N26(XL)	XLG. Vinyl Gloves	$10.00	1 lb.

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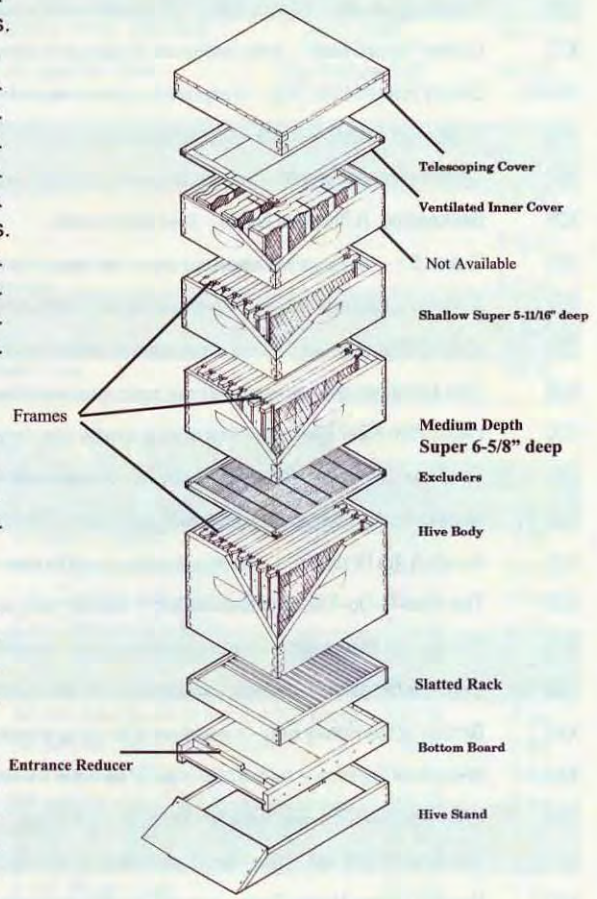
Parts Of A Modern Hive



SMOKERS

N4	4X10 S. S. Smoker	$40.00	3 lbs.
N6	4X7 S. S. Smoker	$33.00	3 lbs.

TOOLS

G62	1/2 lb. Frame Wire	$6.00	1 lb.
G63	1 lb. Frame Wire	$9.00	2 lbs.
H13	Support Pins (100)	$8.00	1 lb.
H13A	Support Pins (500)	$28.50	1 lb.
N65	Spur Wheel Embedder	$5.50	1 lb.
N77	Metal Eyelets (1000)	$4.20	1 lb.
\79758	Eyelet Hand Punch	$2.50	1 lb.
N81	10" Hive Tool	$6.50	1 lb.
N83M	Alum. Frame Hand Grip	$13.00	1 lb.
N85	Bee Brush	$3.00	1 lb.
N90	Section Knife	$7.50	1 lb.
N91	Frame Cleaner	$5.00	1 lb.
NL23	Hive Staples	$3.55	2 lbs.
O2	Entrance Feeder	$2.50	1 lb.
O3	Feeder Pail w/Lid	$5.00	2 lbs.
O5P	Plastic Bee Escape	$1.85	1 lb.

MEDICATIONS

O71	1/2 Gram Fumidil-B	$10.00	1 lb.
O83	6.4oz. Terramycin	$5.50	1 lb.
O84	1# Terra-brood Mix	$5.00	2 lbs.
O88	5.25oz. Apicide Powder	$5.00	1 lb.
P39P	Menthol Crystals (10)	$33.00	2 lbs.
PA10	Apistan Strips (10)	$25.00	1 lb.
P38	Para-moth	$6.00	2 lbs.

ASSEMBLED EQUIPMENT

CIFA	Deep w/frames (waxed plastic foundation)	$40.00	20 lbs.
C19A	6 5/8" w/frames (waxed plastic foundation)	$35.00	13 lbs.
NUC5	5 frame NUC w.frames (waxed plastic foundation)	$53.00	15 lbs.
G14A	10 deep frames	$20.00	7 lbs.
G45A	10 med. Frames	$19.00	7 lbs.

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X1	Eyewitness Account of Early American Beekeeping – *Taken from his column in Gleanings, Our Homes, this book is priceless.*	A.I. Root Co.	$3.69
X4	Breeding Super Bees (Close-out Special) – *Still one of the best practical guides for raising queens, for anybody.*	Steve Taber	$4.99
X5A	The 40th Edition of ABC & XYZ of Bee Culture – *The classic encyclopedia of beekeeping information and knowledge.*	Roger Morse/Kim Flottum	$32.00
X16	Queen Management – *Gleaned from many articles on raising, nurturing and caring for queens.*	From the Best of *Bee Culture*	$8.99
X18	Selling Honey – *How many ways are there to sell honey? Here's a whole book full of ideas.*	From the Best of *Bee Culture*	$8.99
X21	Smoking Allowed – *A pictorial history of the smoker in America, from burning sticks to today's best.*	Paul Jackson	$7.99
X22	Colony Record Book – *3 ring notebook with 50 page pad for colony and apiary notes. Keep good records.*	*Bee Culture* Staff	$12.99
/83494	Colony Record Pad Only – *50 page pad for additional records for X22.*	*Bee Culture* Staff	$5.99
X38	Equipment Supply Record – *Tracking equipment sources and use. use with X22.*	*Bee Culture* Staff	$5.99
X52	Sales/Purchase Record – *Expences last year? Use with X22 for good records.*	*Bee Culture* Staff	$5.99
X25	Beekeeping, A Practical Guide – *Great beginners book.*	Dick Bonney	$20.00
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X28	Making Craftwax Candles – *A simple how-to for making rolled candles with embossed craft or beeswax.*	A. I. Root Co.	$3.95
X29	Hive Management – *An intermediate level colony management boo, . . . for more experienced keepers.*	Dick Bonney	$17.49
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Grey Rollins

PROLOGUE

So, you've heard about mead and you're curious about what it tastes like. Commercial examples are few and far between. What to do?

Make your own, of course.

Is it legal? Yes. You can't sell it, though; that's the catch. You can drink it or you can give it away, but you can't sell it.

Is it hard? Not really. After all, the bees and the yeast do the hard parts. You're reduced to the role of a supporting actor. Don't worry about it; the payoff is wonderful.

Is it expensive? Honey is the heart of mead, and you've already got that. What else will you need? Some simple hardware, some yeast and a few other odds and ends, none of which are expensive.

Note: Mead is an alcoholic beverage. Those with objections to alcohol need read no further ... unless you're just curious.

SOAP BOXES AND DISCLAIMERS

Before we go any further, let's get our terminology straight. Mead isn't 'honey wine.' It's called mead ... period. By definition, wine is an alcoholic drink made from fermented fruit and we all know that honey isn't a fruit. Look at it this way—you don't like it when someone gets stung by a wasp and calls it a bee, right? In the same vein, it's your responsibility to educate yourself and others about mead.

Pay attention to this, it's important: People sometimes complain about bitterness and off-flavors in mead. Lack of cleanliness is the problem. You must be very, very clean when making your mead. No arguments.

Mead takes quite a while to ferment—months, in fact. Imagine that you're fixing hamburgers for supper—but not tonight's supper—we're talking supper three months from now. Any bacteria in the meat today will have plenty of time to multiply between now and when it's time to eat. Not a pleasant prospect. Obviously, the solution is to reduce the number of bacteria present to zero, or as near to it as you can get. This is just common sense.

But what about honey's antiseptic properties? Unfortunately, after being diluted with water, they're not very effective. The alcohol content will help, but that won't come along until later. It's not an impossible job, but you've got your work cut out for you.

A WORD OR TWO ABOUT YEAST

Yeast is that stuff you buy in the grocery store, right? Nope, not for this purpose. Just as there are Italians, Carniolans and Buckfast bees, there are numerous different strains of yeast. Don't use baker's yeast to ferment an alcoholic beverage. You'll end up with an unacceptably high percentage of fusel alcohols (also called fusel oils). There is one and only one alcohol as far as drinking is concerned, and that's ethyl alcohol (ethanol).

So where do you get the right kind of yeast? At your friendly, local brewer's supply shop. Look in the Yellow Pages under Beer (or Wine) Equipment & Supplies. If all else fails you can order via mail or the Web.

There are two general classes of yeast for fermenting beverages: ale and lager. You'll want an ale yeast for fermenting mead. Some manufacturers produce strains of yeast carefully bred just for mead. If you can find one, great. If not, don't worry about it. Get a good ale, champagne or wine yeast and follow the directions on the package. If you choose a dry yeast that needs rehydrating, use pre-boiled water.

It wouldn't hurt to talk the project over with the folks in the brew shop. They've probably made mead before and can give you a few pointers. They'll also be more than happy to sell you a few gadgets to make the cleanup chores easier and more efficient. There's a list of what you'll need at the end of this article.

THE NITTY GRITTY

Let's start with a one-gallon glass jug like the kind you buy apple juice in. In addition to the jug, you'll need a solid rubber stopper, a rubber stopper with a 3/8 inch hole in it, and a length of clear vinyl tubing about two feet long that fits snugly into the hole of the stopper.

First, scrub the dickens out of the stuff with plenty of dish soap and elbow grease. The hose will be tricky,

Continued Next Page

Protein foam on surface of boiling mead. Skim this off.

Mead after skimming most of the foam off. Maintain a rolling boil for 10 to 15 minutes.

A fermentation rig. Plastic wrap keeps things clean. Note the placement of the stopper and the hose.

but at least clean the outside. The inside should be fairly clean if it's new off the spool.

Done yet? Good. Clean it again. You're not just trying to remove visible contamination, you're trying to remove any bacteria or wild yeast that might be lurking in the bottom corners or any other crevice in there. Be savage. Show no mercy. The only good germ is a dead germ. Got the idea? Excellent.

Now to carry things a step further, soak the tubing, one-hole stopper, solid stopper, and glass jug with a solution of bleach and water (one tablespoon bleach/one gallon of water). Never use aluminum to hold this sanitizing solution; use only stainless steel, glass or plastic. Be sure that the bleach solution completely fills the inside of the tubing, with no bubbles. Allow everything to remain in contact with the bleach solution for at least 10 minutes, then rinse in water that you've previously boiled for five minutes and allowed to cool. Leave everything covered or filled with pre-boiled water. This will both rinse and protect them until you're ready to use them.

While the hardware is soaking, bring three quarts and one cup of water to a boil. Add 1/2 teaspoon of gypsum and 1/8 teaspoon Irish Moss. Pour in three cups of honey. Bring back to a rolling boil and hold for 10 to 15 minutes. A white, meringue-ish foam will rise to the top. Skim off as much as you can with a clean metal spoon. Don't worry if you leave a bit, getting the majority will suffice. Once you're done boiling, turn off the stove, cover the mead and let it cool to room temperature. Placing the pot in a sink full of cold water will greatly speed up this process. Make sure the pot remains covered and that it doesn't tip over.

While we're waiting for it to cool, let me answer three obvious questions. One: Why boil the honey, doesn't heat detract from the flavor of honey and darken it? Yes. This is one of those necessary evils. There are wild yeasts present in your honey. In its pure state, there is too much sugar in the honey for the yeast to start its work, but when you dilute the honey with water, the yeast begins fermenting. Some wild yeasts are just fine, but most produce odd flavors. Don't gamble on having one of the good ones—the odds are not in your favor. And there are absolutely no good bacteria as far as mead is concerned.

The second question is: What is this white goop on top of my mead, and why am I removing it? The short answer is that it consists of unwanted proteins. You can leave them in if you like, but the resulting mead will be a bit cloudy. I like my mead clear, so I take it off. (You'll also catch the odd insect body part this way. Needless to say, a bee leg floating in your mead is unappetizing.)

Third: What's with the gypsum and Irish Moss? They help clarify the mead and provide the yeast with some basic nutritional elements.

Okay, you've let the mead cool to room temperature. Drain the rinse water out of the glass jug. Pour in the mead and the yeast starter. Shake the bottle vigorously for a minute or two with the solid stopper in place. This is to oxygenate the mead to give the yeast a head start; it's the last time you should allow air to have ready access to your mead. Insert one end of the tube into the one-hole stopper and place that in the top of the bottle. Place the free end of the tube into a quart jar half-full of pre-boiled water. Make sure that the end stays submerged in the water.

Place the jug somewhere out of the way. An unused corner of the kitchen counter is perfect. You'd like to maintain a more or less steady temperature of 70-75 degrees. By the next day, assuming that you pitched a strong starter of yeast, bubbles should be blowing through the tube into the water in the Mason jar. A thick layer of foam will form on top of the mead. Some of this foam may flow down the tube into the mason jar. Don't worry, this is normal. Just empty the jar if it gets full. Don't forget to refill it with pre-boiled water.

After, say, a week the yeast will begin to settle out and the foam head will collapse. If you've had any overflow, place a clean stopper and tube on the mead and settle in for the long haul. Every week or two, gently agitate the bottle to rouse the yeast from the bottom and remind it to go back to work. Don't worry if you forget, the yeast will muddle through on its own.

By the way, you can drink the mead at any point in this process. At no time is it in any way dangerous or bad for you. You already know what straight honey tastes like. The mead before fermentation is just

diluted honey. Once the yeast begins to work, you'll be getting a healthy dose of brewer's yeast in addition to the mead. (Bear in mind that people pay cash in health food stores for something you're getting as a byproduct of making your own mead.) However, it is best to let the mead continue to ferment quietly for at least two or three months. Don't be surprised if bubbles are still rising out of the mead six months later. Mead takes time to ferment. Be patient.

EPILOGUE

There are many variations and refinements to this process. Don't be afraid to scale it up if you happen to have a five gallon carboy on hand. Five gallons may sound like a lot, but you'd be amazed how quickly it will go, especially if you have friends helping you drink it. (Hint: Get them started making their own mead and you'll have another market for your honey...) Incidentally, mead can be consumed when fresh but, like wine, it's meant to age, mellowing and developing complexity over the years. If you have the equipment, feel free to bottle some (cleanly, of course!), then taste it again a year or two from now. You might be surprised. BC

WHAT AND WHERE TO FIND IT

One gallon glass jug
One Qt mason jar
Water, tap is fine
Grocery store...
- Bleach

Homebrew shop...
- Two one-hole rubber stoppers
- Solid rubber stopper
- Vinyl tubing (about 4 feet)
- Bottle brush
- Yeast
- Gypsum (calcium sulfate)
- Irish Moss

Honey...
- go see the bees

Grey Rollins is a mead maker, and freelance writer from Irmo, South Carolina.

From the Mead Lover's Digest A Directory of Meaderies in the U.S. All are potential buyers of honey

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info@linanore-wine.com

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715.372.5656
goodmead@win.bright.net

Spurgeon Vineyards & Winery
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608.929.7692
spurgeon@mhtc.net

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Sultan, WA 98294
360.793.6761

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Gainsville, FL 32653
877.886.9472

Lakewood Vineyards
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Watkins Glen, NY 14891
607.535.9252
LVwinery@aol.com

Little Hungary Farm Winery
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Buckannon, WV 26201
304.472.6634

Volcano Winery
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Volcano, HI 96785
808.967.7479
volcanowine@aol.com

Cuthills Vineyards
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402.329.6774

Earl Estates Meadery
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Himrod, NY 14842
earle@linkny.com

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honeyrun@honeyrun.com

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Moscow, ID 83843
208.882.9158

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pirtlewie@aol.com

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253.307.5156

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Grapevine, TX
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Heidrun Meadery
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Arcata, CA 95521
707.825.8748

Jilbert Winery
1496 Columbia Rd
Valley City, OH 44280

Mtn Meadows Mead
12 Third St
Westwood, CA 96137
530.256.3233

Make This Hot Box For Your Honey

Bob Harrison

It takes me about 15 minutes to convert one of these refrigerators, but allow an hour and go carefully. Find an attractive refrigerator as there are plenty free for the asking. I have two of these and love them.

Use for crystallized jars or five gallon pails. 120 degrees is good for pails, and 80 degrees works for jars.

Walter Kelley lists the heat limit control at $38 plus shipping. These refrigerators are safe, they won't cook your honey and they maintain accurate temperatures.

First, remove the freezer tray separating the top from bottom and put a heavy plywood board in its place. Cut the board so heat from the light bulb below won't be blocked and can move up.

Mount the metal box that will hold the ceramic light fixture in the lower part of the refrigerator.

Take the old refrigerator cord (or a cord with a male plug) and run in through an opening in the back if there is one, or through a half or three-eights hole in the side that you must drill. This cord goes to the metal box for the light bulb. Hook the wires to the back of the ceramic light fixture.

Mount the Kelley heat-limit control in a convenient location on the outside of the unit.

Then, either drill a hole for the temperature control bulb and wire, or slip it through the opening in the back of the unit. Plug the light cord from the light bulb unit into the female cord from the heat limit control, and then plug the male cord from the heat unit control into the wall socket.

EASY STEPS

1. Cut the old refrigerator cord off. This can be reused (if in good condition).

2. Remove plastic trays, these can be put in later if the heat from bulb will not melt them.

3. Drill a half inch hole for wire for light fixture in location you want light. Usually bottom on the side.

4. Mount metal light fixture box at bottom part of refrigerator.

5. Mount the limit control outside. Now you should have a metal fixture mounted inside at the bottom with hole and a heat control mounted on the same side outside.

6. Take your old refrigerator cord (or a new cord and plug) and slide through the drilled hole (3/8 to 1/2 inch) of the lower light metal box. Leave the plug on the outside. This cord will plug into the "female" plug from the heat limit control. Hook the two wires to the back of the ceramic light fixture and the green wire to the green ground terminal. Mount the ceramic fixture to the metal box with the two screws provided with fixture. Screw in light bulb and lower part is done

7. Drill a 1/2 inch hole for the bulb to slide in to run the temperature control. I put these about mid way down the side of the refrigerator.

8. Tape around holes to conserve heat. Plug in heat limit control and set desired temperature. Light should come on and go off with higher and lower settings.

The outside of the unit, showing how the heat-control unit is mounted, the hole the temperature measuring bulb goes through and the wires to the wall for power (on the left), and to the bulb inside (wire on the right).

The inside of a finished unit. The ceramic fixture is attached to the box, which is attached to the inside wall of the fridge. A wire goes through the fridge wall and attaches to the heat-control unit. The themostat bulb, above, regulates the heat-control unit, which turns the light bulb on and off, as temperature dictates. The bulb is located near the bottom to more evenly distribute the heat.

For Mite and Brood Disease Treatment

Essential Oils

Where Are They Today?

Adony Melathopoulos

Remember 1996? Let me remind you. That was the year 'essential-oil-mite-control mania' hit North America and the word in the bee yard was wintergreen, spearmint and patchouli. You may remember the testimonials about how well essential oils worked and how little they cost to treat bee diseases and parasitic mites. The promise of keeping bee colonies healthy using natural instead of synthetic chemicals was certainly an exciting idea.

With some time having passed, and the initial haze of oil vapors having cleared, many beekeepers wonder how essential oils have fared. Did essential oils work at keeping bees healthy? Were they safe to use in bee colonies? How were they supposed to be used?

Scientists have conducted a wealth of research in an effort to answer questions beekeepers have about essential oils. Surprisingly, much of the research was conducted well before the 'oil fever' year of 1996. In fact, Varroa control products containing essential oil ingredients have been in use in Europe since the early 1990s. The progress made in essential oil research, however, is not commonly known within the North American beekeeping industry.

What are essential oils anyway? Essential oils are strong-smelling liquids distilled and extracted from plants. Plants manufacture essential oils as a chemical defense against harmful insects, bacteria, fungi and vertebrates. The compounds found in essential oils not only possess directly toxic effects to certain pest organisms, but they also make plants taste bad and make them smell vulgar from a distance, thus deterring pests from arriving at the plant in the first place. Remarkable arrays of unique and powerful molecules are found mingling in essential oils, a fact employed widely by human cultures that used them in folk medicines and perfumes as well as in food flavorings and preservatives. We still depend on essential oils today. The next time you visit the drugstore looking for an over-the-counter nasal and bronchial decongestant see if you can find one that contains 1,8-cineole; a sophisticated-sounding name for nothing more than a common compound found in the essential oil of eucalyptus.

The hazards of synthetic pesticides prompted entomologists to investigate essential oils as safe and effective alternatives. Why? Essential oils are generally considered safe for humans at doses required to kill many pests and biodegrade quickly in the environment. The low human and environmental toxicity prompted the Environmental Protection Agency (EPA) to substantially reduce the regulatory hurdles required to register essential oil pesticides in the United States in 1996. Consequently a number of products containing essential oils have been commercialized, primarily for the home and garden pest control market. Examples include citronellal (from citrus oil) in insect-repelling candles, limonene (from lemon oil) and linalool (from lavender oil) in anti-flea shampoos for pets and thujone (from cedar wood oil) as a mothball alternative. Large publicly traded companies are now turning their attention away from synthetic chemicals in favor of pesticides that contain essential oils.

Two thymol-based mite control products: Api Life VAR (left) and Apiguard (right). Api Life VAR incorporates thymol in a green ceramic tablet and Apiguard in a white gel. Both products are presently used in Europe and are not yet registered for use in North America.

The use of essential oils in honey bee pest management began in the 1960s, when researchers in Italy discovered that menthol, a major component of the essential oils from plants in the mint family, was effective at controlling tracheal mites. When tracheal mites were found in North America, of course, this finding was immediately used to develop treatments for beekeepers. When Varroa mites became widespread through Europe in the 1970s, researchers hit the drawing board again and revisited essential oils as a cure for the new mite.

By the close of the century there were over 100 studies evaluating essential oil for Varroa control. More than 150 essential oil compounds and blends have been evaluated for Varroa control to date. The numerous compounds investigated kill Varroa, but also attract, repel and interrupt their reproduction and development.

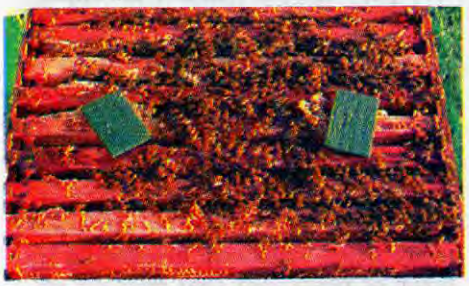
Early on in essential oil research for Varroa, many compounds were found to be just as poisonous to

Continued on next page

Essential Oils, from pg. 33

honey bees as to Varroa mites. Consistently, laboratory studies around the world have shown that most essential oils are unsuitable for use in colonies. Only a few essential oils and their component molecules are more toxic to mites than bees. Unfortunately, of these essential oils which are safe to bees, only a few have proven themselves in replicated and properly conducted experiments on colonies in the bee yard.

Thymol is the compound that



Two Api Life VAR tablets are placed on top of the brood nest in the late-summer following honey harvest. The tablets release a vapour of four essential oils that fumigates the colony, providing control.

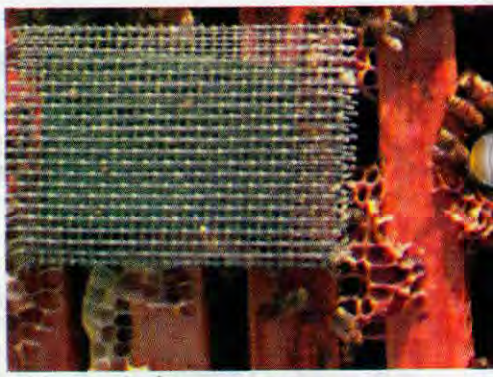
has been the most widely tested and successfully used in combating Varroa mites. Thymol is a white crystalline powder found in the essential oils of many herbs. Years of research have been conducted into thymol, and trials in bee colonies have been repeated in a number of countries, under a variety of conditions and under different bee management systems.

Research into fumigating colonies with thymol for the control of Varroa began in the late 1970s. The earliest thymol treatments consisted of applying crystals into mesh bags and placing them on the top bars of colonies. By 1989, a formulated Italian product containing primarily thymol, Api Life VAR (Chemicals Laif, Italy), was available to beekeepers in Europe. Besides thymol, Api Life VAR contains minor components of eucalyptol (16.4%), menthol (3.8%) and camphor (3.8%) mixed into a porous ceramic sponge. The sponges are placed on top of the brood nest for seven-10 days and are replaced for a total of two applications. The essential oil components evaporate from the sponge over a period of 10 days, resulting in the fumigation of the colony.

Anton Imdorf at the Federal Dairy Research Institute in Switzerland, and his colleagues, have conducted extensive research into the optimal use of Api Life VAR, making it the most widely tested essential oil product in the world. Their research has shown that the addition of eucalyptol, menthol and camphor to Api Life VAR do not appear to contribute significantly to the product's efficacy, the primary control being provided exclusively by thymol. Treatment efficacy in Europe has been very high, but requires ambient temperatures to exceed 15°C (59°F) and colonies to be in one super and have low amounts of sealed brood.

Dr. Nicholas Calderone at Cornell University and his collaborators have been experimenting with thymol under US conditions since 1993. Thymol treatments exhibited outstanding success in initial trials, killing greater than 95 percent of the mites found in colonies. Subsequent experiments with colonies containing larger amounts of brood resulted in poorer mite control. The inability of thymol to work well when there is a large amount of brood in colonies makes sense, as Varroa reproducing below the sealed brood capping are protected from the treatment. The research suggests that effective use of thymol under North American beekeeping conditions requires paying attention to the timing of treatments, so they coincide with periods when there are low levels of brood but high enough temperatures to make the treatments work.

The British company Vita (Europe) Ltd. recently released a second thymol product called Apiguard, which formulates thymol in a gel. The gel used in Apiguard was designed to provide a more consistent release of thymol compared to earlier sponge designs. Vita founder and president Dr. Max Watkins explains, "after five years (of) research in European institutes and universities we determined a dose rate and formulation that supplied just enough thymol to hit the mites and at the same time does not harm bees or brood". The gel, it is claimed, not only provides consistent and uniform release of the vapor, but also is picked up by the bees on contact and distributed around the colony for more even treatment than a single point source dispenser.



Many users of Api Life VAR place tablets within a wire mesh cage to prevent them from being shredded before the 7-10 day treatment period is over. A treatment consists of two successive rounds of tablets.

Heather Mattila and Dr. Gard Otis of the University of Guelph recently evaluated Apiguard in Canada. Treatments in the experiment were applied in July, although the product is recommended for use in the late Summer after honey harvest. Despite the presence of brood in the colonies, significant levels of Varroa and tracheal mite control were achieved. There was a reduction in the average amount of honey produced by thymol-treated colonies; however, the difference was not significant. Treatments are thus recommended for use strictly in the late summer, as indicated by the manufacturer's label.

Apiguard is being sold in Europe in two forms: a single-use packaged tin container, designed for hobby beekeepers, and a 3kg (6.6 lb) tub that holds enough gel to treat 30 colonies, for larger beekeepers. Like Api Life VAR, Apiguard is applied on the top bars of colonies, either in the tray or as the bulk gel applied to the top bars on a piece of cardboard. Vita is looking to market the product in the United States and is pursuing EPA registration. Dr. Watkins believes there are great benefits to Apiguard over sponge designs. "There is no absconding from hives when using Apiguard, no bee toxicity and very, very low residues of thymol in brood comb compared to using thymol alone or vermiculite blocks". Unfortunately, there are no studies that directly compare the various methods of administering thymol under North American conditions.

Thymol has been found to be effective against both Varroa and tracheal mites with no or minimal effects against bees. Although not as

effective as Apistan, a number of studies have shown that thymol can provide control on a par with formic acid. Improved and more consistent Varroa control with thymol may be achieved by combining treatments with non-chemical control tactics such as organic acids, trapping and destroying Varroa in drone brood, mite-resistant bee stocks or screened bottomboards. Experiments conducted by James Ellis Jr. at the University of Georgia found that combining Api Life VAR treatments with screened bottom boards provided more consistent control across bee yards than using Api Life VAR on its own. Nathan Rice at Simon Fraser University, has taken the combined use of thymol and screened bottom boards a step further, by running treatments in colonies with screened bottomboards AND mite-resistant bee stocks. The combination of thymol, screened bottomboards and bee stocks exhibiting hygienic behavior appears to provide great benefits in managing Varroa without synthetic chemicals.

Treatment with thymol does leave residues in honey and wax; however, they do not persist and generally cannot be detected when treatments are applied outside the honey-producing season. Furthermore, consumers of honey can taste high levels of residues. Applying thymol treatments in the Autumn, as suggested by manufacturers, presents a very small risk of leaving residues in honey. The low residue risk posed by thymol, compared to other compounds, has prompted the European Union to exempt thymol from requiring a maximum residue limit. Simply stated, the decision means shipments of honey to Europe with residues of thymol are considered acceptable.

The use of essential oils to control honey bee brood diseases has not been well studied. Most experiments with essential oils and brood diseases have been restricted to the laboratory. The results from the laboratory, nonetheless, show much promise. Studies by the USDA and work from Argentina and Europe have shown that thymol and the essential oils of cinnamon and clove inhibit the growth or kill laboratory cultures of the organisms causing American foulbrood and chalkbrood. The toxicity of these essential oils to honey bee larvae at doses required to control the disease, however, remains undetermined. Few field trials, furthermore, have been performed. Consequently, using essential oils for the safe management of brood diseases offers more distant prospects to beekeepers than mite control.

An Apiguard tray dispenser is placed on top of the brood nest in the late-summer following honey harvest. The gel face is exposed to the top surface of the colony. A plywood spacer is placed between the hive body and the inner cover to make enough space for the thymol vapours to make their way down into the colony.

Although the essential-oil fever of 1996 has cooled, mite control using essential oils is just starting to pick up speed. Increasingly, European beekeepers are learning how to incorporate thymol with more powerful synthetic mite control strips for a more robust Varroa management program. Use of thymol in combination with other non-chemical control tactics, such as screened bottomboards and mite-resistant stocks, may further reduce the reliance on synthetic miticides. Increased adoption of thymol by beekeepers in Europe has prompted companies to develop more consistent and effective formulations. Research is still required to determine how to use thymol most effectively in North America. Furthermore, the role of thymol and other essential oils in managing brood diseases is promising but remains inconclusive.

The verdict? Essential oils have an important role to play in managing honey bee pests by lessening the reliance on synthetic chemicals, and not 10 years from now, but today. Effective and powerful thymol products are awaiting registration for use in North America and may be available for use within the next two years. Continued research will inevitably determine how to integrate essential oils with other control tactics into a robust, consistently effective and inexpensive overall bee health strategy. All being told, the verdict looks very good. BC

Mention of the products in this article does not constitute a recommendation by Agriculture and Agri-Food Canada. Presently the only essential oil ingredient approved for use in Canada and the US as a honey bee miticide is menthol for the control of tracheal mites.

Resources

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Mattila, H.R. and G.W. Otis. 2000. Trials of Apiguard, a thymol-based miticide. Part 2. Non-target effects on honey bees. *American Bee Journal.* January: 68-70.

Chemicals

LAIF (manufacturers of Api Life VAR)Viale dell'Artigianato, 13 35010 Vigonza (PD),Italy e-mail: info@chemicalslaif.it

Vita (Europe) Ltd. (manufacturers of Apiguard) Brook House, Alençon Link Basingstoke, Hampshire, England RG21 7RD information@vita.demon.co.uk

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Adony Melathopoulos is an Apiculture Biotechnician for Agriculture and Agri-Food Canada, Beverlodge, Alberta, Canada

Selling Service

(That Looks A Lot Like Honey)

Ann W. Harman

The weather was perfect for nectar gathering, your bees were healthy and hard working, the flowers bloomed profusely, and you are sitting with hundreds, perhaps thousands of pounds of honey. Now what?

This is the gift-giving season and you can take advantage of that. Not in the sense that you will be doing the giving – no, you will be doing the selling to gift-givers.

Think about it for a minute – honey is a perfect gift, suitable for all people of all ages. Some may only put it in their tea or use it for a sore throat this winter. But honey certainly is an appreciated gift and certainly more creative and useful than many things in the gift category.

Now where are these gift-givers? The businesses in your community. At this time of year doctors, lawyers, veterinarians, accountants, and other business owners are not only receiving gifts from various suppliers and clients but also giving gifts to say thank you to those who have helped them during the year. You will have to seek these potential customers and interest them in your product. Yes, that takes time and some effort but you will also be creating future sales, either during gift season next year or actually during the year.

These customers are busy people and may well be used to looking through a catalog and ordering a dozen boxes of something without giving that something very much thought. Your approach to these people needs to be as simple as the catalog approach. So that requires some "homework" on your part. You need to show this customer that your product is ready to give and needs no preparation, and perhaps not even the effort of mailing – just like the gift catalogs. Those gift catalogs are actually your main competition for this honey endeavor.

Let's see what those catalogs offer. First, the gift comes in some container – say a box – that is easy to wrap and easy to mail. We all know that fruit is fragile, yet fruit is boxed ready for shipment and is a much-used gift at this time of year. Bottles of fancy vinegar, barbecue sauce and jams are just as fragile and those are also popular in the gift catalogs. Next, the purchaser has several options – the gift box can be mailed directly to the recipient of the gift, or it can be sent to the purchaser to be hand-delivered to the recipient. Cards can be included saying "Season's Greetings from ..." which are necessary for gifts mailed directly to the recipient. These gift catalogs are selling service. Before you start grumbling at the costs, time and effort you are looking at, remember that your costs include everything including time and effort. And your customers will be paying that.

This year, MAKE the gift that keeps on selling. Make and sell gift packs and gift boxes to those who GIVE gifts

Go to the supermarket and see what a dozen apples – ones you have hand-selected from the bin – will cost you at checkout. Now open one of these gift catalogs and see what a dozen apples will cost. Then go to the pages with "shipping and handling" and see what that will cost. Now you have an idea of the difference between your supermarket apples and the gift catalog apples. This comparison will help you on your way to figuring what to sell your honey for plus all the services you are rendering.

Before you bottle that honey you should take a look through some of the equipment supply catalogs, such as Mid-Con, BetterBee and Brushy Mountain. Mid-Con also sells mailing boxes and stuffing to secure the jars. Select your gift pack style and shipping box before you purchase jars. Your approach to all of this needs to be kept simple but the end result must be attractive. You may have a local source of mailing boxes at a reasonable price. You just need to make certain that the sizes available fit your needs.

For these gift boxes you will want to select very attractive jars. The Gamber Classic is good, as are the hex jars in different sizes. Bears are good containers, too, and many find them not only useful but charming. If you decide on a squeeze bear, the completely transparent bears are better in gift packs since the color of the honey can be clearly seen. You can make a gift pack of one bear and one jar. Select the jar to fit the ready-made packaging. You may want to include a honey dipper in your package. They are inexpensive and add a nice touch. Since time is short, it is wise this year to have only a few nice choices to show your prospective customers. This approach can give you guidance for next year.

Just a few reminders: labels must be attractive and put on straight, container threads must be clean; jars and lids must not have even a hint of sticky anywhere. Containers must be filled correctly. And that honey must be clean and without foam!

Continued on next page

Keep Good Records... Who Bought Your Gift Packs - And Where Did They Send Them. Next Year You'll Be Prepared.

The label must be appropriate to the shape of the jar. Hex jars can use either a rectangular label (the best choice) or a horizontal oval. A label for a bear will depend on the style of bear you use. If you are making your own labels on a computer, you could make a customized label reflecting the business purchasing your gift packs. However, you will still need to have your name and address on as producer or producer/packer. A holiday theme can put a nice touch to a label. Just do not use a label stock that is red or dark green. Black print will not show up. If this gift pack venture is successful and future holiday season sales are anticipated, appropriate labels can be made quite in advance of the season.

Recipes for using honey make a good addition to your gift pack. The National Honey Board has a folder entitled "Honey I Love You" that folds to the size of a 3X5 card. This size is ideal for a gift pack and adds a useful but attractive touch.

Now to begin. Make up two of the gift boxes – one of a hand-delivered kind and one of a to-be-mailed kind. Have a nicely-printed price list ready. If you have a logo or some design on your label, the price list can have that also. Your price for each of the gift boxes will include your "handling" as well as the costs of honey, jars, labels, and box itself but do not detail this on your price sheet. Determine what a mailing cost would be for the to-be-mailed package and put this on your price list as "shipping." You will have to follow your state's rules on sales tax. If you wish you can have a quantity price – a discount if say 10 or more are ordered. However be certain that that discount does not shave off some of your costs or profits. It is appropriate to have two prices for your gift packs – one simply for delivery to your customer and one for shipping to that customer's gift list.

The post office can be helpful to calculate a shipping cost. Carriers such as UPS and FedEx can also give you a schedule of prices. Don't try to have a shipping cost for each state or zone. Just select someplace far away and use that cost or have just a very few zones. There is no point in trying to make shipping complicated.

Now for a dignified card for those packs that will be mailed. In general you are safe with something that simply says "Season's Greetings." Your customers may well have a card they prefer to use. However, be ready to offer your selection. The catalogs that send out cheese or fruit always have a gift card included.

Here are a couple of hints for repeat sales next year. Sometime in January pay a visit to the customers who bought your gift packs. You are just checking to see if the customer's clients were happy with their gift of honey. Mention that next year you will repeat the same popular gift packs and also be adding new ones. There is no need to describe new ideas at this time. That will be more useful next autumn when your customers start thinking Christmas again.

Keep good records! Keep a record of who bought your gift packs and where that customer's gift packs were sent. Next year, at some appropriate time before the season, say about mid-October, contact your customer. Give him the list of his selections and recipients for last year. Now you are in a position to sell that customer your gift packs again. However, it means that each year you may have to change the design of your gift pack, or add something different, for example a pair of candles, or creamed honey, or perhaps a wax ornament.

At this time you can also tell your customer that you can prepare special labels for your products if so desired. Such labels can reflect the customer's business name and address in addition to your information as honey producer. Perhaps the customer has a logo that can be used. Cooperate with the customer on specialized labels but do not make the situation too complicated. Just remember that you are selling service but keep in
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*Ann Harman is a s
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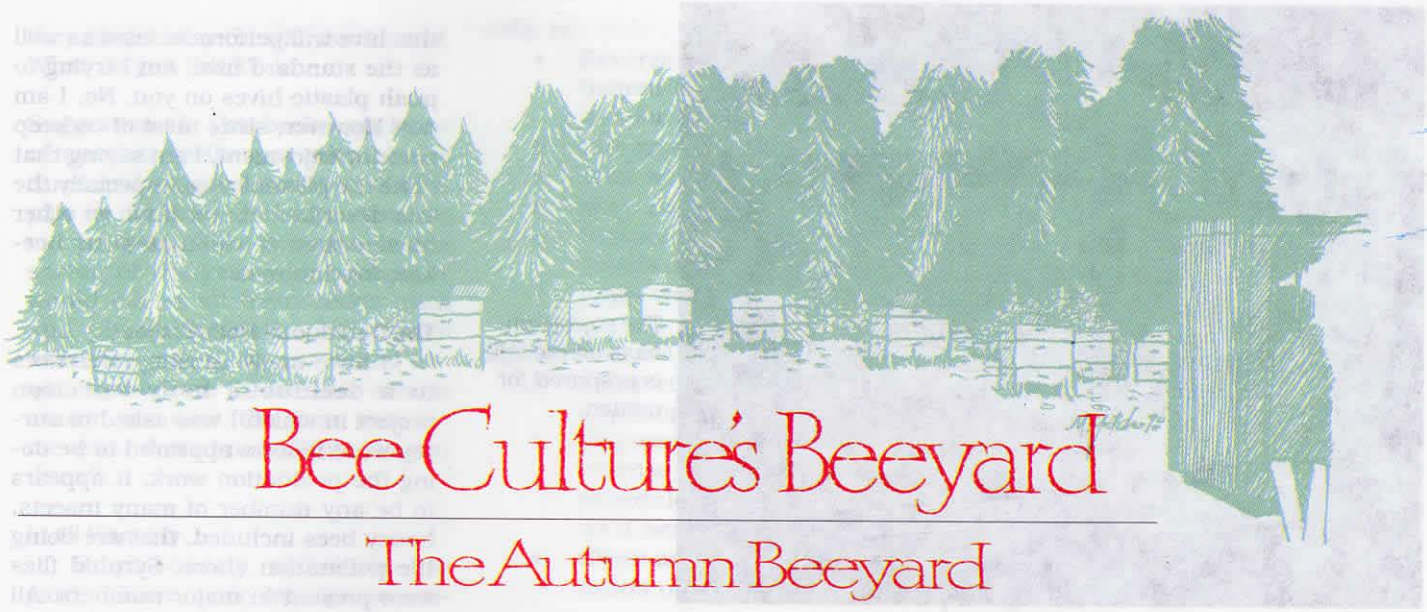


Bee Culture's Beeyard

The Autumn Beeyard

The past few Autumn days have been spectacular. Foliage colors, warm days and blue skies all came together to form the days of which memories are made. Naturally, I had work obligations and mostly enjoyed these days from behind the steering wheel of the truck. Tuesday was to be my day to work in the bee yard and get updates for both you and me. Well, it's presently Tuesday, and rain is pouring down. Now what?

A Rainy Yard in Ohio

It was not just a casual light rain, but one of those serious rains that falls straight down with a purpose. Everything was drenched. Yet, in the middle of all this water, bees were still flying from most of my colonies. For what purpose, I don't have a clue. Don't get me wrong. It was not the flight pattern that would be seen on a warm Summer's day, but there were numerous bees flying from the entrance into an obvious warm rain, and there were occasional bees returning. I sat in the truck pondering why they would be doing that. *Well, they're just screwed up and are out looking for nectar sources that have all been washed away.* I don't think so. Surely after several million years of development, bees have enough sense to stay out of the rain. Cleansing flights? I suppose it could be, but yesterday was a perfectly beautiful day. Why would there be such urgent needs for the bee toilet today - just a day later? Bottom line: *Bees will fly in the rain. I don't have a clue why they are doing it, but there is a reason.*

Styrofoam Hives

In the August 2000 Bee Culture[1], I discussed the Insul-Hive and my observations upon using it. In that article I indicated that I would return to this subject and review a different polystyrene hive that is simply called "Styrofoam Hives"[2] in the equipment catalog. I have only one of them and am not prepared to endorse them outright, but they are interesting to work. The Betterbee catalog states that they have been used for more than 15 years in Germany and Scandinavia. In fact, they are the most popular hive design in Scandinavia. The outside dimensions are completely different from our Langstroth hive, but the inside dimensions are sized to hold a standard Langstroth frame.

The purported advantages of a Styrofoam hive are:

- Thick walls make the hive warmer in the Winter and cooler in the Summer
- Hardened plastic frame rest

The styrofoam hive, on the left, is prepared for winter.

protects the Styrofoam frame rest lip

- Accepts both wooden and plastic Langstroth-sized frames
- Equipment is assembled without nails
- Bottomboard has a 3/8" entrance with a built-in *Varroa* mite screen
- Telescoping top cover can be as a bottomboard for a split

These hives still require painting with a latex paint to prevent sun damage. They will not stand the abuse that wooden equipment will stand, but if reasonable care is given, they should last for many years. Mice or skunks can conceivably cause damage, but these animals can also damage wooden equipment.

This hive design is not perfect, but it is refreshing. I have done no research, having only made casual observations, but I enjoy having some the plastic equipment around. I have not used the hive long enough to establish opinions concerning wintering, brood production or honey production, but I would suspect that this hive will perform at least as well as the standard hive. Am I trying to push plastic hives on you. No, I am not. However, since most of us keep bees for enjoyment, I am saying that I like the plastic hives, especially the one described above, if for no other reason than it stimulates my beekeeping interest.

Late season deciduous holly with red berry fruit. This can be an attractive landscape plant, and a honey plant, too.

A forager on a deciduous holly blossom. They are attractive to bees and other pollinators.

The Deciduous Holly Project

I have made passing references to a deciduous holly selection project in which I was asked to survey what insects appeared to be doing the pollination work. It appears to be any number of many insects, honey bees included, that are doing the pollination chore. Syrphid flies were present in major numbers. All in all, for about two weeks during the bloom period, the holly blossoms appeared to be a nectar and pollen cafeteria for foraging insects. These plants are deep green and are a pleasant plant with bright red berries in the Fall. They bloom here in late Spring/early Summer. Apparently a male and female plant will be required for the female plant to set fruit. We will continue to look at these plants next spring. In the meantime, if you want to play with an uncommon "bee" plant, you might consider these deciduous hollies (not to be confused with the more common perennial holly).

The Fall 2000 Tennessee State Beekeepers' Meeting (Oak Ridge, Tennessee)

I participated in the Fall meeting of the Tennessee State Beekeeper's Association meeting a few days ago (a few months ago to you now). It was an exceptionally good meeting – well planned, well attended and a good time had by all. Beekeepers there gave me a couple of interesting procedures. I apologize for not getting their names and will acknowledge them if they notify me.

Suggestion #1. Remove the honey crop during the spring following the production year. Worded differently, remove the 2000 year crop in the spring of 2001. Why? Bees have complete use of all the stored honey without the beekeeper having to guess at how much to leave for the upcoming winter season (unless

they produced nothing). I don't know. What do you think?

Suggestion #2. This beekeeper knew of another beekeeper who placed three or four short sections of PVC pipe in the ground a short distance out in front of his colonies. In the spring of the year, the beekeeper would cut small fresh cedar trees and put them in the PVC holes where departing swarms would frequently land on them. After swarm season was over, the trees were removed. I don't know. What do you think?

In all Honesty...

In all honesty, within the bee yard, I have more trouble accomplishing some tasks than others. I have decided that it is a correlation between good intentions and time restrictions.

What I have managed to do on a reasonable schedule is:

- Treat for diseases and pests (mites)
- Deal with swarms (either by prevention or by hiving them as I found them)
- Super up
- Remove the crop after supering
- Process the honey crop

What I have managed to do erratically is:

- Reverse deeps and scrape bottom boards (in preparation for Spring)
- Cut grass
- Trim weeds
- Keep records
- Replace mulch around hive stands and the yard house
- Apply weed killer

What I have not done at all:

- Paint equipment (or paint anything for that matter)
- Requeen all colonies (In my defense, I am only behind schedule on this if I don't do it next spring)
- Clean and maintain organization of the yard house

As I review my accomplishments, there appear to be three categories: top priority, some priority, and low priority. When given life's usual time restrictions, I seem to get the important things done and make promises about all that is left undone. I promise to try harder.

Bee Yard Philosophizing

Several of you have told me that I appear to be a bee yard philosopher. Is that good or bad? Bee yard pontificating is not something that I have intentionally tried to do. There was a time in my life when I would probably have suckered for a commercial beekeeping career, but for many reasons I did not take that path. Now all these years later, every aspect of beekeeping is fraught with memories and experiences for me. This very morning when I was in the bee yard as it rained, wondering why bees were flying in the rain, it was a quiet, relaxing moment. The smell, the sounds and the sights all amalgamated into a general pleasant memory. I don't spend hours and hours reflecting, but the few minutes I do spend doing it are pleasant and relaxing.

Therefore .... I would like to put a garden bench and possibly a picnic-type table in the yard by next spring. Also, I would like to put down paving blocks and set a solar wax melter there. How about a sundial or a wind vane? Should I take on these changes before tackling the undone chores listed above? In reality, I probably won't do any of them, but planning and anticipating are free. BC

Dr. James E. Tew, State Specialist, Beekeeping, The Ohio State University, Wooster, Ohio 44691, 330.263.3684, Tew.1@osu.edu

[1] Bee Culture, August, 2000, Vol 128 (8), pp 28-30

[2] Styrofoam Hives are available from Betterbee, Inc. Greenwich, NY, 12834, (800)632-3379

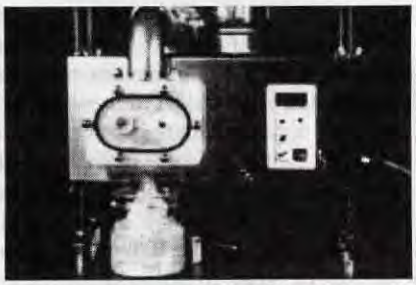
?Do You Know? Answers

1. **True** Tiny glands found on the upper surface of the queen's abdomen secrete a pheromone that interacts with the mandibular glands to attract workers who feed and tend to the queen. The abdominal glands are active only on direct contact and serve to keep the attendant bees, the "court" around the queen.
2. **False** "Queen substance" is a blend of at least five different chemicals that are produced by the queen's mandibular glands.
3. **True** When virgin queens are about 24 hours old, they produce a pheromone that repels workers and other queens. This pheromone is produced for about two weeks and is discharged as a fecal exudate from the rectum.
4. **False** Workers expose the Nasonov gland and disperse the odors by fanning in a number of orienting situations, including nest entrance finding, forage marking and swarming. The gland is never exposed inside the hive.
5. **False** During the exposure of the Nasonov gland (scent gland), the worker honey bee usually stands with its abdomen elevated and fans its wings, drawing air over the exposed gland and canal and so facilitates dispersal of the Nasonov pheromone. The scent gland is absent in queens and drones, so Nasonov pheromone is not involved in the attraction of drones to the queen during her mating flight.
6. **True** The Nasonov pheromone is used primarily as an orientation aid. The pheromone is often produced by bees that have temporarily become disorientated, and upon finding the hive entrance, expose their Nasonov glands to guide other bees that are still disorientated to the safety of the hive. The pheromone is also involved in the clustering and movement of a swarm.
7. **True** Honey bees in the Summer are physiologically different than those found in the hive during the Winter. During the Summer, hypopharyngeal glands change rapidly in size as the honey bee ages. The glands shrink after the worker switches from nursing activities to foraging in the field. In the Winter, all bees have large hypopharyngeal glands.
8. **False** Both the corpora allata and corpora cardiaca are found in adult and larval honey bees. The prothoracic gland is found only in the larvae. The gland produces ecdysone, the hormone involved in molting.
9. **True** Queen substance has been found in the mandibular glands of some laying workers, which indicates that the mandibular glands are capable of producing it.
10. E) Sting
11. Dissolve or dilute sugary foods (dry sugar or granulated honey). Clean surfaces (brood cells or the body of the queen). Moisten substances being chewed.
12. Attract workers to the swarm cluster. Stabilize the swarm cluster. Aid in swarm movement to a new nest site.
13. F) Arnhart (Tarsal Glands)
14. D) Hypopharyngeal Glands
15. A) Salivary (Labial) Glands
16. I) Poison Gland
17. H) Wax Glands
18. C) Koschevnikov Gland
19. B) Mandibular Glands
20. A) Salivary (Labial) Glands
21. B) Mandibular Glands

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

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

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



Richard Taylor

Bee Talk

"She asked me (I swear), how much do you make on your honey business, per bee?."

Reprinted From *The Joys Of Beekeeping*

I have discovered a curious fact about beekeeping – if anyone pursues the craft then, in the eyes of his fellows, he forthwith ceases to pursue any other. No one seems able to picture a beekeeper in any other role. Perhaps the strangeness of the image in their minds, the image of someone keeping company with bees, simply overwhelms every other possible association.

I am a beekeeper, but I have in fact had other interests along the way, and even a few accomplishments. Yet these, though they may be known, are never the subject of comment when I enter a gathering. The question is always, "How are the bees?" There is nothing else to ask. I do not know exactly how it should be answered, if put seriously. What can one say? I do have an answer, intended more to halt further inquiry than to satisfy curiosity: "They're waxing." But it usually does not halt further inquiry. The questions that follow are likely to be more pointless than the first, even when concocted in the minds of persons learned, witty and scholarly. The next question, for instance, is usually, "Do you ever get bit?" To which the answer is, of course, that I never have yet. Sometimes it is worth adding that I receive my share of stings, but so far no bites. But usually I prefer to add no qualification that might remove the look of incredulity from my questioner's face.

Another question constantly asked, for reasons I have never fathomed, is, "What do the bees do in the Winter?" And the answer to this it that they languish, like myself. And that seems to me not a purely flippant response. It fairly well describes what the bees actually do. A similarly common question of the same order, "Who looks after the bees in the Winter?" I could say "No one," but the more positive response is "The Almighty." It seems somehow to put everything in a better perspective.

Sometimes serious questions are no easier to answer. I do not know what to say, for example, in response to the question of whether my honey is "organic." Any answer that does not include a disquisition on the foraging behavior of bees is almost certain to mislead. The same is true with respect to the question of whether my honey has been "cooked." If I restore granulated honey to liquid by warming it, do I thereby cook it? The question arises from the practice of some honey-packing companies of adding the word "uncooked" to their labels – which makes as much sense as describing bananas as "boneless."

A beekeeper friend of mine was once asked how often a bee dies. This was evidently a way of asking how long a bee lives, which is a perfectly good question. But upon hearing this question, my friend was so seized by giggles that he had to withdraw and pull himself together before emerging to reply: "Just once!" It is seldom that I collect a swarm without having some bystander ask how many bees are in it. I generally produce an arbitrary answer to this – something like "seventeen thousand three hundred and sixty-two. Strangely enough, I have never been asked how I know. One of the more memorable questions I've been asked came from a lady who had for years been putting up with a nest of honey bees in the siding of her house. Her question was whether she might be able to rid herself of them by putting a dish of honey out in the yard and then, when all the bees were out drinking honey, plugging their entrance behind them. Perhaps one needs to be a beekeeper to appreciate this naiveté.

It remained, however, for my sister-in-law to ask the greatest bee question of all time. She asked me (I swear), "How much do you make on your honey business, per bee?" Now I suppose I could take an estimated average population of a hive, multiply this figure by the number of colonies I have, divide this into my net profit for a year (or would it be the other way around?) and get some sort of figure having maybe 15 or 20 zeroes following the decimal point. But I do not think I ever will. I somehow feel that my life was made richer by my having received such a question, reminding me that the ways of men are sometimes, like those of God, wondrous indeed.

People, in addition to being a fertile source of questions, are also the consumers of my honey crops, so I could hardly do without them. Nor would I wish to, for I have formed many friendships among this class. For years I sold virtually my entire honey crop by mail, and even now I have customers I have never seen but whom I have come to know well from years of this association. I know their idiosyncrasies and preferences. One, for example, who orders huge quantities of honey eats nothing but raw food. He therefore telephones each year for my renewed assurance that the honey I send him has not been warmed at all at any stage. He is even unhappy that my uncapping knife is warmed, although I have persuaded him to live with this fact.

Another of my customers, formerly a stock broker, has gained fame by achieving total economic independence for himself, his wife and

his two children through tilling a mere five acres. I have never met him, but I read about him from time to time, and we correspond each Fall when he orders the year's supply of honey. Another customer is a musician and composer of fame who does his vast Christmas shopping each year by telephoning to me a long list of names and addresses.

For years honey customers were driving past my door by the hundreds, and I was not bothering to sell them honey because I did not know they were honey customers. The light began to dawn when the youngster across the road set up a card table in his driveway to offer surplus produce from his garden and, before long, from mine. Eventually, jars of my honey were set out, and I was astonished by the result. Here, it finally dawned on me, was a good outlet for honey.

Scrounging some sawhorses, wide boards and scrap lumber, and half of a Ping-Pong table for a roof, I was on my way to assembling a honey stand. My only purchases were four lengths of pipe and flanges to support the roof, a can of paint, and a tarpaulin. Altogether I spent $12.09 on this crude but serviceable stand. With the other half of the Ping-Pong table I made a roadside sign, then found another large scrap to make a second one. Using the honor system of letting people leave payment and make their own change, I stocked the stand and awaited results.

No sooner did I get the first roadside sign erected than the next driver stopped for a purchase, while I watched with interest from behind the shrubs. He will never know that he was the first of a long line of happy customers. In no time my dear wife was busy keeping the stand supplied and the honor box emptied. Since then the business has grown steadily as old customers have returned and new ones have been added. The honor system still prevails, with seldom any significant discrepancies.

The stand has also been a rich source of friendships and of a unique status for its proprietor. Upon entering many gatherings I need only to mention the honey stand to be instantly identified, even by persons living some distance away. The roadside signs, which have grown in both number and size, mark my location in the world. Four large colleges are fairly nearby, so my stand draws great numbers of students who offer me their assessments of the world's ills. Somehow they seem sure that anyone who raises bees will certainly share their appraisals of the world, and its problems and they are almost entirely correct in this. Some have dreams of keeping bees themselves, a vocation that evidently seems to them in keeping with the nobility of their thinking, which they hope to sustain through their lives. It is my own fervent hope that they will sustain these ideals, and perhaps in some cases unite them with beekeeping.

Not everyone can be a beekeeper. The tiny but pesky sting will always keep the membership in this strange class to a proper number. But for one who can see beyond this, it is an enviable life, opening one's eyes not only to nature, to philosophy, to that life of the spirit that is basic to religion, but also to the warmth and idealism that dwell in so many of the people who are brought within one's association. BC

Richard Taylor is a philosopher and lifelong beekeeper who lives in the Finger Lakes region of New York. He is the author of The Joys of Beekeeping.

GLEANINGS

DECEMBER, 2000 • ALL THE NEWS THAT FITS

FUND FOR JAMES BAXTER

The Florida State Beekeepers are starting a fund in honor of James Baxter, a research scientist from the Weslaco Bee Group. This is in recognition of all his hard work in getting us a treatment for the mites and also something to treat the Small Hive Beetle. He was also very instrumental in getting the tolerance set for coumophos in honey and beeswax. James Baxter was injured in an accident in late September. The prognosis at this time does not appear good for him ever returning to work. We, as beekeepers, need to help him now as he has helped us.

Donations can be mailed to Charlotte Randall, 389 S. Central Avenue, Umatilla, FL 32784.

RESEARCHER NEEDED IN NJ

The Rutgers Blueberry and Cranberry Research and Extension Center, Chatsworth, NJ has an immediate opening for a Post-doctoral Fellow to work on various aspects of IPM of parasitic mites of honey bees, pollination ecology in blueberries and cranberries, American Foulbrood disease management, and ecology of small hive beetle. It is anticipated that the funding for this position may continue beyond the initial three-year period. Salary $32,000 per year plus benefits.

Contact Dr. Sridhar Polavarapu, Rutgers University Blueberry and Cranberry Research Center, Chatsworth, NJ 08019, by email polavarapu@aesop.rutgers.edu, via fax 609.726.1593, 609.726.1590, ext. 12.

ITC FAVORS U.S. HONEY

In a unanimous 6-0 vote, the six commissioners of the U.S. International Trade Commission, Chairman Stephen Koplan, Vice Chairman Deanna Tanner Okun, Commissioners Lynn Bragg, Marcia Miller, Jennifer Hillman and Thelma Askey, ruled November 12 preliminarily that imports of honey from Argentina and China injured or threatened injury to the U.S. honey industry.

The ITC injury decision in the unfair trade case filed on September 29, 2000 by the American Honey Producers Association (AHPA) and the Sioux Honey Association (SHA) jumpstarts the Department of Commerce to proceed with a dumping investigation of honey imports from the named countries. Additionally, Commerce will investigate a charge of unfair government subsidization on imports from Argentina. Commerce is responsible for determiniing the amount of dumping and countervailing duties on imports of unfairly traded product. These duties are intended to bring the U.S. price of these imports to a fair level, thereby eliminating the unfair pricing advantage these imports have enjoyed over domestically-produced honey.

Commerce is scheduled to announce its preliminary determination on the unfair subsidy case against Argentina in late December. Preliminary determinations in the antidumping investigations against Argentina and China are currently due in mid-March, 2001.

OBITUARY

Dr. Don Peer died October 4, 2000 at his home in Nipawin, Saskatchewan. Don was born October 19, 1927 in Toronto, Ontario.

Don's connection with beekeeping covered the scientific and commercial sides. He graduated with a Bachelor of Science in Agriculture from the Ontario Agricultural College at Guelph and went on to obtain a Masters degree and a Ph.D. from the University of Wisconsin. He also spent periods of time as a researcher for both Agriculture Canada and the U.S. Department of Agriculture. During this period he did significant research on the mating of honey bee queens.

In 1960 Don moved to Nipawin and started a commercial beekeeping operation that he maintained until retirement in 1995. Don and a group of commercial beekeepers around Nipawin made some significant progress in developing methods of wintering honey bees on the Canadian prairies.

Don served as mayor of Nipawin in 1967 and 1968. He also served as President of the Saskatchewan Beekeepers Association and President of the Canadian Honey Council.

Don is survived by wife Ruth, daughter Holly and granddaughter Madeline.

from Alberta Bee News

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Christmas Greetings

To Our Many Friends and Customers . . .

We take this opportunity to thank you for your patronage and support during the past year and all the years before. It is you, our faithful, loyal customers who have allowed us to remain in business and complete our 76th year serving beekeepers. We are deeply grateful to each and every one of you and want you to know you are appreciated. We wish, for all of you, the most joyous of holiday seasons and a peaceful and prosperous New Year. We look forward to serving you in the year 2001 and far into the future.

Sincerely , Sarah Manion, Earl King, and the entire staff of

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National Honey Board Referendum Fails

The nation's honey producers, producer-packers, handlers, and importers have voted against amending the honey research and promotion program. The vote was taken in a referendum conducted by the USDA AMS Sept. 5 - 29, 2000.

Statistics handed out by AMS were sketchy, but *Bee Culture* has determined (as nearly as possible at press time) that a total of 1596 people voted in the referendum. Of these, 484 (30.33%) voted yes, while 1112 (69.7%) voted no. Those yes votes amounted to 51.26% of the total honey voted however. The amendments needed the approval of a majority of the votes cast and those votes must have represented 50 percent or more of the pounds of honey of those who voted.

By category: 1295 honey producers voted, with 400 voting in favor of the amendments, (30.9%), while 895 voted no (69.1%), opposing the changes. Total amount of honey voting yes was 52,660,342 pounds, or only 23.8% of the honey voted.

For handlers, 193 voted, and of those only 54, or 28.0% voted yes. This amounted to 115,398,445 pounds of honey voted, which is 34.7%.

One hundred seven importers voted in the referendum, and only 30 voted in favor of this action, with 77 voting against it. Those in favor control 378,217,746 pounds of honey, which represents fully 72.4% of the honey imported, a sizable portion. This group was, by the way, the only category that approved the amendments.

Voting by Producer Regions proved interesting, but similar to the aggregate result. Region 1, (WA, OR, ID, CA, NV, UT, AK, and HI) had a total of 228 votes. 79, or 34.7% voted yes, representing 12,563,764 pounds of honey. Gene Brandi, from California is the Director from that region.

Region 2, (MT, WY, NE, KS, CO, AZ, and NM), had 125 voters, with 35 voting in favor of the referendum. These represented 7,049,655 pounds of honey, only 22.9% of the honey voted. Don Smoot, from Montana is the Director.

Region 3, (ND, SD) had 120 voters, 83 of which voted no to the referendum. They amounted to 54,768,612 pounds of honey, which was 74.2% voted. Judy Gulleson, from South Dakota is the Director.

Region 4, (MN, IA, WI, and MI) had 260 voters, and only 87 (33.5%) voted in favor of the referendum. They amounted to 6,542,434 pounds of honey, which amounts to only 20.9% of the total voted. Dale Bauer, from Minnesota is the Director.

Region 5, (AL,AR, LA, MS, MO, OK, TN, and TX) had 145 voters. Only 22.1%, or 32 voted in favor of the action, amounting to 1,987,126 pounds of honey, which is only 7.9%. Sharon Gibbons, from Missouri is the Director.

Region 6, (FL, GA, PR) had 186 voters. 131 (70%) voted against the amendments, representing 70% (16,662,742 pounds) of the honey produced in that region. Fred Rossman is the Director.

Region 7 (CT, DE, DC, IL, ID, KY, ME, MA, MD, NH, NJ, NY, NC, OH, PA, RI, SC, VT, VA, and WV) had 230 voters. The 75 that voted in favor of the referendum represented only 27.6% (3,481,568 pounds) of the honey voted in that region. David Hackenberg, from Pennsylvania is the Director.

Failure of this referendum to pass means that producer and importer assessments will remain at the current one cent per pound, that a handler assessment will not be implemented, that mandatory purity standards and an inspection and monitoring system will not be authorized, and that the National Honey Board will not be required to spend eight percent of its funds on beekeeping and production research.

Several other amendments, not subject to the outcome of the vote, will be implemented by AMS in the near future, as soon as they can make a final rule. These amendments were put in place some time ago, but were to be put into action at the completion of this vote, no matter the outcome. They include changes in the size and composition of the Board, authorization of the board to develop a voluntary quality assurance program, and the elimination of the requirement for small companies to file for an exemption in order to avoid paying assessments.

More importantly, the failure to pass these changes puts back in place the once-every-five-year continuing referendum vote for the Board in its entirety. This vote is scheduled to take place next year. The overwhelming response to this current vote sends the message that these changes were not wanted by the majority of producers and handlers. Importers, though favoring the changes by the amount of honey they voted (72.4%), did not favor it in terms of actual votes since 77 of 107 voted no.

Currently, other commodity boards are undergoing similar, or even more drastic changes and referendum votes. Moreover, there have been, and will probably continue to be challenges to commodity boards in general relative to members' rights under the First Amendment. The Almond Board's case went only as far as the California State Supreme Court. But at least one other is now heading for the U.S. Supreme Court and the outcome, given the slant of the current court would seem to point to a ruling in favor of producers. The future of The National Honey Board, and commodity boards in general would seem to be uncertain.

Voters could throw out the Honey Board completely next year. But perhaps a wiser choice would be to use this year to restructure the Board to relfect the needs of a changing industry, and a changing world. Some of the Board's polices, and some of the Board's people have proved their value to the U.S. honey industry. And, of course, some haven't. Keep the good, get rid of the rest.

Kim Flottum