FIRE ANTS CAUSE ALMOND WOES . 57

JAN 1999

Bee Culture

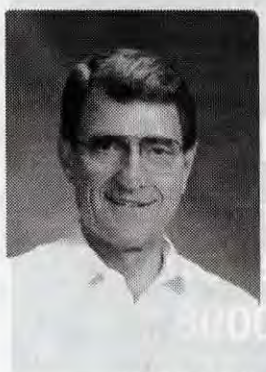
START THE NEW YEAR RIGHT

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

JANUARY 1999 VOLUME 127 NUMBER 1

FEATURES



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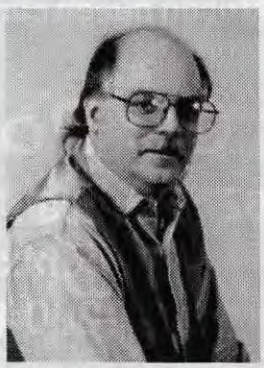

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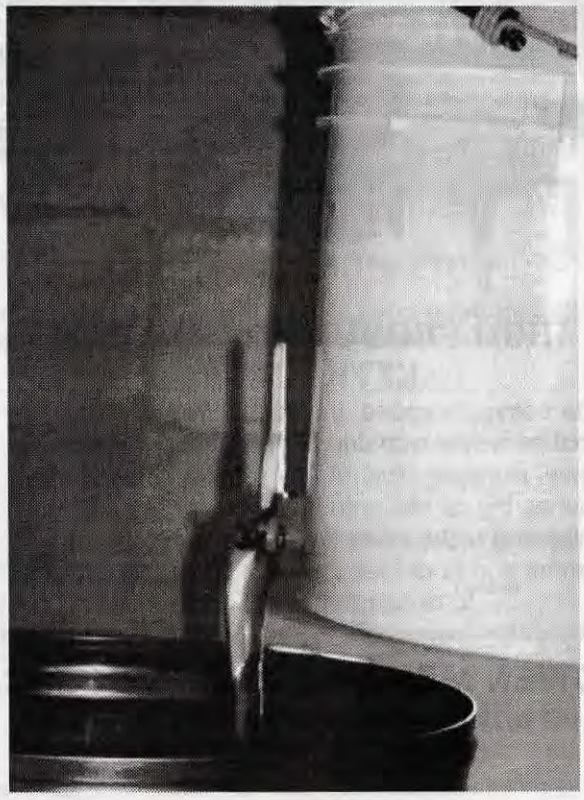

COVER
Extracting, storing and bottling honey takes up space. More than first expected for most of us. Our feature story this month examines that problem and offers some clever solutions.
photo by Kim Flottum

Bee Culture
THE MAGAZINE OF AMERICAN BEEKEEPING

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INNER COVER

This is going to be one right smart exciting year. Maybe the most exciting in a long time. Not that the past 10 or 12 haven't caused your blood pressure to move too far in the wrong direction too many times.

Let's see. Mites resistant to Apistan will be confronted with two, maybe three newly approved compounds. Trials, tribulations, politics and money – lots of money – will play a role in this new game. Ultimately, mites will die, bees will live and beekeepers' costs will go up. But there will be bees, and beekeepers.

The National Honey Board referendum comes to a head this year. Rumors, innuendo and outright misrepresentation are rife in what has become a dog fight between honey producers, packers and importers. Then, throw in a bit of government intervention, at least three tribes in the producer camp, maybe more in the packer's corner, and who knows what else or who else will become involved before the referendum, and it promises to be fireworks for months.

Labor, if you're big enough to require more than your family, will continue to be troublesome to locate but not become critical, at least for a while. However, this is the year to prepare for less help. Mechanization, and the resulting capital investment is one solution, but leaner markets and reduced profits will curtail this for many.

To get work done, then, means as many or maybe more people needed on the payroll. Where's the source for additional or replacement employees? Low unemployment, McDonald's jobs for the taking and difficult but intelligent work, work against success. You have heard this before and will again: An emerging source of seasonal and permanent labor will bring you into direct and intimate contact with the Immigration and Naturalization Service. So how's your Spanish?

Apimondia comes to North America this year. Already it is certain to be the social, scientific, marketing, beekeeping and international mingling extravaganza of 1999 for the beekeeping world.

The program covers the entire spectrum of the honey bee's fraternity: Economics, other bees, rural development, breeding, marketing, education, mite management, mead, apitherapy, pollination, commercial beekeeping, honey, wax and international trade, honey bee research, bee biology, races of bees, bee nutrition, IPM, regulation, business management, African honey bees, and certainly a word from those of us who write of all these things on a regular basis. For the full program and updates check out the Apimondia Logo on our web page. If you can swing a trip to British Columbia in September, your year and your life will be better.

The evolution of pest control techniques will continue this year. Those sponsored by conglomerates were mentioned earlier, and even small businesses are getting in on the act with the formic solution. But, finally, this year some practical information on essential oils will be available. Already in common use, with mixed results, these mostly home-made concoctions should become more efficient, and less dangerous when the latest multi-state results become available this year.

Producers of bees – both queens and package bees – will, or had better, take a closer look at their product this year. Extreme attention has been directed towards queen quality, or lack thereof, diseases and parasites in the production arena and sent to consumers (more common than you suspect), and the other problems discussed this past year. The handwriting is on the wall so to speak and these businesses are under more scrutiny than ever.

But questions about bees in the mail stream, and the mail stream itself are still being raised. This year should bring more attention from concerned producers or it will only get worse.

More will happen this year certainly. There will be surprises, and some things won't happen at all. But, at the very, very end of this year, your business, your home and your life will be affected by that (what may seem way over-blown problem) Y2K bug. You just *think* this won't affect your bees, or your business, but I assure you it will. Guaranteed.

Like I said, it's going to be one right smart exciting year.

•

Most of the above is mostly out of any one person's control. Of course, some people have more than the rest of us, but it's still pretty random. Your best bet is to get as much information as you can, stay alert, stay flexible and look for daylight.

We here can keep you interested and you can stay flexible if you've got as much information as possible for decision making. We can address that, over the next several months though. For instance . . .

Already mentioned, labor – that is keeping what you have, finding new, and keeping your employers competitive with other employers – will become keenly important this year. We've got some basics, and some not so basics when dealing with the INS (absolutely scary the first time), and how-tos for creating, or improving a good work environment for everybody who works.

Looking for alternatives to

Continued on Page 54

Grand Expectations, and Come Home Bill

KEEP IN TOUCH

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

MAILBOX

Not Quite Right

Please inform Clarence Collison that he's not quite right in asserting that bees have four parts to the thorax. The problem is found in the wording of the question.

The answer is clearly "false." But, the answer may then go to explain that in the Order Hymentoptera the first segment of the abdomen, the propodeum, is contiguous with the thoracic structure and may give the appearance of four segments.

Snodgrass (1956) makes this abundantly clear and I refer Mr. Collison to the many diagrams on the thorax and abdomen notably those on pages 84 (Fig. 30), 136 (Fig. 51A) and 141 (Fig. 54A). Yes, on page 83 Snodgrass does say, ". . . but it includes a fourth segment which is the first abdominal segment. . . ." But this should not be taken as a categoric statement that the thorax has four segments. After all, bees are first and evolutionarily foremost insects and if we start messing around with the anatomy of just a few of the over 100,000 genera goodness knows where we will end up!

R.B. Guilliford
Maitland, Australia

Looking Ahead

I'd like to suggest a topic for a future *Bee Culture* article. I would like to see the different varieties of bees commercially available to beekeepers cataloged, described, and compared like a "consumer report" article. With a "buyer's guide." It would be easier to choose among the available bees on the market. I would like to try something other than Italians, but lack the knowledge to make an intelligent choice!

Keep the cartoon's coming – they're great. My wife and I laugh till we cry at some of them!

Doug Heffner
Northumberland, PA

Editor's Note: *See* Bottom Board *for the next few months.*

Richard, Still A Hit

I very much enjoyed Richard Taylor's article in which he expressed his opinion of the New Testament. I have enjoyed every article and book Dr. Taylor has written, his profound thoughts and wisdom are to be cherished. Often I show my wife these writing since she also enjoys the words of an honest man of unquestionable integrity. Please keep Richard's ideas, thoughts and words coming (especially the personal life stories)

Brad Booth
Pleasant Garden, NC

•

I have been a subscriber to *Bee Culture* for about two years, and I can say that out of all the regular columns, Richard Taylor's "Bee Talk" is one of the best.

His articles deal not only with beekeeping, but also with other topics that express a common philosophy of simplicity, thoughtfulness, and honesty. I think it is a great disservice to Richard as a writer, to say that he needs to be put "out to pasture." Although I did find Richard's opinion rather obstinate and sad to me as a Christian, his personal beliefs should have no reflection on whether or not he should retire, and I still remain an avid fan.

Speaking for myself, it will be a great disappointment to read through *Bee Culture* and not have his article to greet me, encourage me, or just make me smile.

Keep up the good work Richard, *in whatever you choose to do!*

Dan Umbel
Friendsville, MD

Thanks, Richard

It makes me sad to contemplate *Bee Culture* without Richard Taylor's calm wisdom and his approach to keeping bees by letting bees be bees!

I have thoroughly enjoyed his articles for many years as well as his auto-biographical sketch in the last issues. I have gained in bee knowledge as well as philosophically from his writings and I wish him the very best in his re-retirement.

A hearty well done sir, to Dr. Taylor.

Henry G. Cole
Cliff, NM

Last Rights

In reference to Mr. Frank Chamberlin's letter in Mailbox last month, I too join him in expressing great disappointment in Mr. Taylor's September article.

Comments contained in Mr. Taylor's article belie the very tolerance which he so quickly seeks shelter in. Also, though I could argue adinfinitum regarding the true founding principles of our nation, I do not perceive this as the forum for it.

Finally, while I do not seek spiritual insights in a secular publication, I do resent the fact that comments such as Mr. Taylor's are allowed by you. Anything which does not fit the purpose for which you print, should be cut out and discarded, regardless of the prestige or persona of the writer.

John Clark
Harrisburg, PA

Editor's Note: *Richard's comments simply expressed his opinion and interpretation of the world, and, though not strictly in the beekeeping theme, fit well in the article he was writing.*

New Honey Use

Robitussen recently introduced a honey cough syrup. The cough syrup is, as I understand it, about 30% honey.

MAILBOX

Robitussen understands the fact that consumers believe honey is a healthy, good for you product. Folk medicine has been using honey in cough and throat remedies for centuries. The cough syrup, using honey, blends modern medicine with powerful traditional perceptions. We will soon see how successful this new product is. The best way to gauge this will be to see how many other manufacturers also introduce a honey cough syrup. This adds value to honey.

How much value is added to honey? Here is a simple analysis. The cough syrup at my store was $4.70 for four ounces. Cost per ounce is about $1.17. 128 ounces to gallon X $1.17 totals $150 a gallon for cough syrup. If the syrup is 30% honey, the value of the honey is now about $45 for 30% of a gallon; a little under four pounds. Using this thumb nail arithmetic, the value of the honey is about $12 per pound.

I do not begrudge Robitussen adding value to honey's good name. I welcome it. I welcome a new product introduction fusing modern medicine with traditional uses. Honey producers will see more products using honey to promote health. Scientists and universities are today documenting the functional uses of honey to promote health and well being. Consumers are taking steps, active purchasing steps to enhance their health and well being as never before. By taking advantage of honey's 'healthy, good for you' image, honey producers are well positioned to sell more honey for more money.

Good science backs up the message.

John Miller
Newcastle, CA

Dangerous Methods

Well aware that many readers will find what I have to say positively medieval and perhaps heretical too, I forge ahead in response to James E. Tew's column on the state of the industry.

I believe that modern animal husbandry methods are essentially dangerous. The aim has been cost-effective production of milk, meat, eggs... you name it. But the cost of cost-effectiveness has been in the health problems, both for the animals and for the human feeding on the animal products. Domestic animals no longer live in circumstances even marginally resembling their natural situation. In every case, the increasingly-used advanced methods of raising animals produce environmental problems with their waste, as well as serious quality-of-life problems for anyone unfortunate enough to live within 5 miles of the feedlots.

This is a technologically and scientifically more adept way than the way our grandparents raised their animals. But should we then necessarily call it progress? Why, with the experience of "factory" management of domesticated animals around us, would one clamor for more intensive ways of managing honey bees? Much more is at stake than honey production. And money is not a good enough excuse.

(1) Vitamins for bees?! The reason vitamin supplements have BECOME necessary for many people and animals is that many people and most domesticated animals no longer eat an evolutionarily reasonable diet. If we don't screw around excessively with the way bees live, there will be no reason to provide them with anything like vitamin supplements. (Let's distinguish this from, e.g., pollen substitutes used to overcome "temporary" dearth of pollen resources.)

(2) The Langstroth hive is already a system geared to a machine world. The fact that it uses materials which are not eternal (wood) is probably a blessing for the same reasons that the death and decay of the human body is ultimately to the good of the larger population.

(3) The un-recreated hive smoker might possibly be improved upon. True. But why? It works as it is. And you can be guaranteed that any research-and-grant-supported new way will cost much more, both to buy and to operate.

(4) The "mega-hive having several million bees with multiple queens" idea which Tew tosses off would mean that every non-genetic health problem affecting one colony automatically affects the entire mega-operation.

The multiqueened fire ants Tew mentions arrived at their multiqueen system in natural response to their own evolutionary pressures. Tew's suggestion to create the same result in honeybees is a suggestion to override evolution's wisdom in favor of human convenience. In my opinion, that is ill advised. And not a little arrogant. To date, the best advances in apiculture have resulted from better understanding of functional bee biology rather than from attempting to change it.

Let's use our research dollar to increase our understanding of natural processes, not to recreate nature's processes in our own perverse image.

Paul Kent Oakley
Ava, Illinois 62907

Editor's Note: *Interesting comments on the definition of progress, and certainly worthy of note. Interestingly, your message arrived via email, which, all things considered is probably less damaging to the environment than regular mail, but definitely requiring modern advancement.*

Questions!

I've been reading extensively on beekeeping and the only thing exhausted is my literature resources.

Where can I obtain literature on honey plants, contributing factors to their nectar/pollen secretion and how can their dates of bloom be anticipated? This is probably the hardest question. I'm exploring the Old Farmer's Almanac and their resources.

My next question. If I have a hive with outstanding performance relative to adjacent and surrounding hives, what would be an effective means to preserve these traits? Maybe use the existing queen to start a nuc hive and let the bees rear a new queen from the old queen's eggs?

Finally, I've looked far and wide and have yet to find any

Continued on Next Page

MAILBOX

information as to the pros and cons of various strains of honey bees, besides the obvious. I did read one article on carniolans that was interesting. But comparatively speaking, there's the Buckfast, Carniolan, Italian, Caucasians and other hybrids. What factors, conditions, climates, geography, plants, weather patterns, etc. make one stand out over the other?

Bert Clayton
North Charleston, SC

Editor's Note: *Information on honey plants can be obtained from* ABC & XYZ *or* The Hive and The Honey Bee. *Articles also appear, from time to time in the journals. You will, however, have difficulty in finding all the information you want in one place. Seldom, if ever, is all of the agronomic information you want in once place, so be prepared to dig.*

Second, queen rearing requires a fair understanding of bee biology. There are several good books on the subject, and for starters I recommend the book Queen Management *published by the A.I. Root Company. It is inexpensive and very comprehensive.*

Information on races of bees can be found in any of the major references, or stay tuned to Bee Culture *this year for several articles on each of the races.*

Fence Gone

Yesterday my helper, Brian Mingus, and I went to one of my beeyards located in the Dragon Mountains of South Eastern Arizona. This yard is on private deed land surrounded by the Coronado Forest. All seemed well with all hives standing. But, when we stepped out of the truck it was a mystery to behold. All of the wire – I think it is called polychrome, black and yellow with fine wires interlaced among the fabric – all gone. They did not touch the battery nor the red devil control unit which was inside a bee box with a lid. It was apparent they used a rock to separate the ground wire and wire to the fence which came from where the bees normally use as an entrance rather than reaching inside and disconnecting the battery. This is bear country and a fence is required. I call this a Powers fence as Powers was the one who taught me how to build it. Drive ½" rebar into the ground leaving approximately 12" above ground. Drill four or five holes in ½" I.D. water pipe-plastic, put one end over the rebar and then thread the wire through the holes. As this fence was approximately 800 feet round it meant that someone spent some time cutting and unthreading this wire from the plastic posts. This was a five-wire fence. Only one or two of these plastic posts were on the ground. As this plastic pipe is very flexible it would have meant some care was exercised in its removal. I called the rancher who was as surprised as we were as his is posted and the bees are behind a small hill in a thicket of Mesquite far removed from the normal traveled road that leads from Pearce to Tombstone – all dirt. None of this wire was found anywhere – all gone. What, who, and why? We will return and replace the wire. This is rather sad as it is quite possible the beehives could have been destroyed overnight. It is 80 miles to the nearest store that caries wire with an additional 30 miles to the yard. Expense, and time, and why?

M.B. Putman
Cochise, AZ

The Ostrich Speaks

I've been receiving your magazine for a year now and am generally pleased with its tone and clarity. However, I'm very displeased with your ostrich-like and parochial attitude regarding research into miticides. Finally, as BetterBee gets closer to marketing gelled formic acid, Mark Winston is allowed to mention that the two miticides in widespread use in north America are Apistan and formic acid. What upsets me has been your editorial policy that you won't write about it unless you can endorse it and it is legal. Therefore you have ignored the rest of the world's research and especially practice. It seems to me absurd that your magazine can mention in the latest issue that the mites in Europe are already largely resistant to Apistan but that your magazine has not had a single article on how those beekeepers are managing to keep bees. Likewise in this country, many different beekeepers are taking many different approaches with formic acid, oxalic acid, lactic acid, and various essential oils, but you refuse to share these people's experience. You don't have to endorse a practice to report on it, any more than the New York Times endorses our president's private life.

Bee Culture, explore the wide world of beekeeping. Stretch a little away from your university-employed, government funded researchers and see what lone individuals are doing. I know a beekeeper who lost 168 of 170 hives three years ago to the mites because he refused apistan. He learned a tough lesson about his organic attitude. Nonetheless he has now built his apiary back to 30 hives using essential oils following Amrine's work. REPORT THESE EXPERIENCES.

Stu Summer
Hillsdale, NY

Editor's Note: *Do I also report on the large number of beekeepers who have had disastrous results using essential oils, or more commonly, lost far more colonies than they'll admit. Do I report on the cost, in time and materials that these people don't, or won't admit, too. How do I report on work that can't be duplicated, because the 'model' they used keeps changing, and controls aren't used?*

I can't report what I don't know goes on, and I won't report (nor will any good journalist) information I can't stand behind.

Right now, the best essential oil research shows 50-70% control of Varroa *– not good enough to sustain an apiary. Moreover, the results up north aren't as good as down south, sometimes. And the compounds keep changing.*

If individuals have good information on the use of essential oils, with replicated studies, standardized application techniques and amounts, control colonies, and data that can, and will stand up to the scrutiny of others, let them come forward.

Until someone does, until results

Continued on Page 13

THE WISE GUY

Some times you do not need to step in it to smell it and I believe I smell a huge problem! How come each honey buyer that calls me is offering me the same price for my product? Are they fixing the price among themselves? Can they all have the same costs that they all offer the same price? Is the cost of labor the same for each one? Are transportation costs the same to each one? Do they have the same cost to market their product?

Most farm products will have price differences between buyers. The ones with a transportation advantage pay the producer more. The buyers with an advantage in long term contracts pay more, but the honey business seems to be a cozy agreement between packers to set the purchase price.

When beekeeping organizations hold meetings the information is for the public and includes honey buyers. When honey buyers hold their meetings they are closed to the public. There is a feeling of secrecy among honey buyers. They seem to not want to share information that benefits the industry. They only want to benefit from the producers' misery.

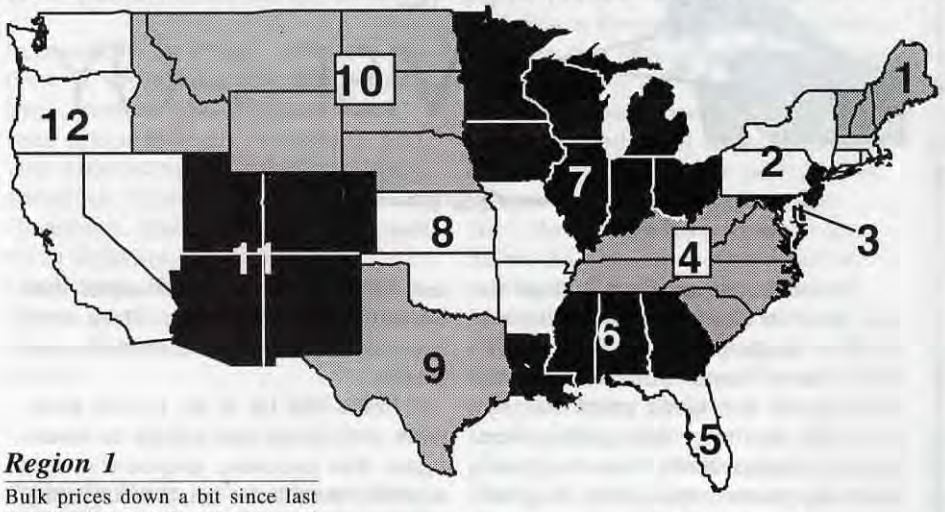
Folks the fix is on in our business and some one needs to investigate this problem. Maybe it's time a probe was done on this industry to see how honey buyers arrive at a purchase price for bulk honey.

Do you suppose when a buyer purchases imported honey he asks for 60 day to 90 day terms to pay for that product? This is another area we need to address. We are honey producers, not bankers. I wonder if they purchase vehicles and not pay for 60 to 90 days. If you are selling this way you better get a written agreement on the terms.

With everything going on today in our business the trust factor is at an all time low. Everyone is talking about Quality Assurance. I believe we need Character Assurance from the other side of our business.

Wise Guy

JANUARY – REGIONAL HONEY PRICE REPORT



Region 1

Bulk prices down a bit since last month, while wholesale and retail steady. 60# pail white down 14% from one year ago. Few plan to expand next year with some downsizing expected. Labor and age cited most often.

Region 2

Bulk and wholesale prices steady, but some decline in retail prices since last month. Few plan to expand this year, but most plan no downsizing. Low prices and time most often cited as why. 60# pail white 11% drop in one year.

Region 3

Prices steady across the board since last month. 60# pail white actually up 13% from last year. Expansion plans mixed for next year, but age and labor cited most often for not.

Region 4

Bulk and retail prices down since last month, but wholesale up. 60# pail down 5% since last year. Expansion plans popular for next year, but conservative moves dominate. Prices and time limiting factors.

Region 5

Bulk and retail steady to a bit lower, but wholesale up quite a bit. 60# pail white dead even with last January. Expansion plans mixed due to many uncertainties – prices, beetles, mites. . . .

Region 6

Mixed up prices since last month. Some bulk up, some down, same for retail and wholesale. 60# pail white dead even with last year. Expansion plans good for next year, with packing equipment leading the list.

Region 7

Prices steady across the board since last month, but bulk prices are unstable, and volatile. 60# white pail down 30% from January '98. More plan to expand than not next year, but just barely more. Labor, age and increased costs with low prices cited for cut backs. Storage and bottling equipment most often being bought.

Region 8

Prices steady in the midsection. Expansion plans mixed with high prices and increasing costs most often cited. 60# pail white down 27% since last January.

Region 9

Wholesale and bulk prices steady, but retail down this month from last. 60# pail white actually up, however, from a year ago by 10%. Expansion plans for next year mixed, but more seem to want to grow than not. Honey processing equipment high on many lists.

Region 10

Prices fairly stable across all levels this month. 60# white pail down 9% from last January. Expansion mixed, but most say low prices will slow, or stop growth.

Region 11

Prices again steady this month, compared to last. 60# pail white down 14% from January '98. Expansion plans are minimal for next year, with prices and pests most often cited, but labor a problem.

Region 12

Prices fairly steady across the board since last month. 60# pail white down 18% from a year ago. Some plan to expand in '99, but most just hope to keep up.

	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	56.89	62.00	58.00	68.33	65.00	54.00	46.05	57.18	64.00	57.18	60.33	54.67	36.00-76.00	59.55	57.72	67.55
60# Amber	55.37	60.00	65.00	60.20	59.00	52.50	37.55	62.50	63.00	55.82	56.30	52.00	35.00-75.00	57.45	56.21	64.24
55 gal. Light	0.66	0.75	0.78	0.71	0.70	0.80	0.65	0.80	0.81	0.70	0.77	0.70	0.60-1.50	0.67	0.68	0.87
55 gal. Amber	0.62	0.73	0.70	0.71	0.62	0.72	0.59	0.81	0.70	0.61	0.68	0.66	0.50-1.50	0.62	0.63	0.81
Wholesale - Case Lots																
1/2# 24's	28.97	27.18	30.83	31.51	30.83	28.40	28.42	30.83	30.00	30.83	28.25	42.00	20.40-42.00	30.08	28.94	29.11
1# 24's	42.71	41.46	43.20	44.09	44.07	41.50	43.45	39.44	45.00	47.00	41.53	48.90	30.00-58.50	43.72	42.33	43.09
2# 12's	37.66	36.45	42.60	43.25	37.12	38.30	36.35	38.33	40.00	36.00	33.80	39.00	20.00-52.58	38.78	39.02	37.39
12 oz. Plas. 24's	36.13	35.80	40.80	37.08	37.11	35.40	36.62	36.19	36.60	33.60	39.13	37.60	26.40-48.00	36.93	36.71	35.44
5# 6's	40.90	43.21	48.00	47.83	46.47	41.00	37.87	40.50	48.00	46.47	34.78	40.50	30.00-67.50	41.91	41.10	41.22
Retail Honey Prices																
1/2#	1.78	1.51	2.83	2.17	1.19	1.70	1.78	1.74	2.50	1.59	2.68	1.93	1.19-3.50	1.80	1.85	1.76
12 oz. Plastic	2.21	2.09	2.35	2.10	1.79	2.19	2.09	2.23	2.55	2.36	2.76	2.25	1.59-3.20	2.25	2.21	2.22
1 lb. Glass	2.78	2.47	2.60	2.93	2.29	2.80	2.62	2.67	3.67	2.55	3.40	3.04	1.94-4.00	2.83	2.72	2.67
2 lb. Glass	4.74	4.28	4.55	5.20	3.99	4.69	4.27	4.44	6.04	4.02	4.23	4.78	3.24-8.00	4.81	4.53	4.42
3 lb. Glass	6.36	6.75	7.50	6.47	6.68	6.52	6.54	6.35	6.38	5.77	6.63	6.35	5.50-8.00	6.53	6.27	6.08
4 lb. Glass	7.42	6.85	8.34	7.84	8.34	7.98	7.80	8.34	7.00	8.34	8.34	8.34	6.69-10.50	7.84	7.89	7.74
5 lb. Glass	9.39	10.42	9.80	9.70	10.75	10.00	8.90	10.00	9.00	7.90	9.33	9.00	7.69-15.00	9.57	9.21	9.06
1# Cream	3.50	3.23	4.76	3.41	4.76	2.63	3.70	3.26	5.50	4.78	3.83	3.26	2.19-8.59	3.49	3.32	3.13
1# Comb	4.10	4.06	3.50	4.04	4.20	4.25	3.64	3.60	6.00	4.20	5.35	5.17	1.95-6.40	4.25	4.21	4.19
Round Plastic	3.62	3.13	3.50	3.75	3.69	4.50	3.16	3.83	5.50	1.30	4.75	4.10	1.30-6.00	3.76	3.65	3.86
Wax (Light)	2.85	3.92	3.00	1.65	3.36	3.10	2.22	2.37	5.00	1.20	3.00	3.00	1.20-6.00	2.89	2.36	3.04
Wax (Dark)	2.45	3.00	2.23	1.39	2.96	2.80	1.76	1.83	4.00	2.96	2.53	3.00	0.90-5.50	2.48	2.09	2.62
Poll. Fee/Col.	35.68	39.00	31.50	33.75	37.24	36.50	36.33	37.50	20.00	37.24	55.00	35.00	20.00-55.00	36.71	37.96	34.03

MAILBOX

are published, until ongoing studies are completed, I will not give false hope nor bad advice. But I will be first in line when I can say, use this or that in this manner and your bees will live.

AFB SOURCE?

I did this quite a number of times years ago and never had a single instance where AFB recurred.

I haven't seen AFB in a colony for over 17 years, except for one about five years ago that had it just beginning to develop, evidently from a source up in a mountain. That was eliminated and I have kept them protected.

Years back I took a double bodied hive that had died and was absolutely polluted and put a strong force of bees in it, added two extender patties and a lot of syrup for food and shut it up. Ten days later I called an inspector and told him that I thought I had a foulbrood problem and would like him to stop by. He came three days later and that hive looked beautiful. It was full of healthy brood, a lot of it capped and there was no sign of AFB. He told me that there had never been anything wrong with that hive. I repeated that four times with the same result. There was never sign of recurrence in those colonies and that was years ago.

The inspector from Iowa told me that he had never seen any proof that if any colony cleared with Terramycin had the disease recur it did not get from an outside source the same as it did in the first place.

Clifford F. Beckwith

Pesticides in NJ

I read with great interest the article by Kim Naas, *No More Bee Kill* which appeared in the October issue.

Here in New Jersey we have an entrenched Secretary of Agriculture that I am convinced wouldn't know a bee from a yellow jacket. He probably thinks that the only function of a honey bee is to sting everyone and anyone.

In a letter to him in 1995, I described losing several colonies in successive years to Sevin. I received a telephone call from someone on his behalf who told me that the tremendous sum received from sweet corn in New Jersey far outweighed the sum received from honey. When I protested that my father raised sweet corn without Sevin and I have done likewise, he suggested to me that if I wanted to pursue my hobby of raising bees, I should move, preferably out of the state.

This attitude is typical of all of the bureaucrats we have in this state. There have been no "new pesticides, delivery systems and management strategies" and Sevin continues to kill bees and the kill is both indiscriminate and discriminate. Can you imagine . . . "it is not currently recommended by Rutgers University . . ." But: "The currently recommended pesticides can present equally serious difficulties for honey bees." Hence, these bums will recommend killing bees one way or another.

It is my good fortune to have a beekeeping acquaintance who has furnished me a place to have one colony along with his. Beekeepers are nice people, as I am sure you know. But ignorant politicians and bureaucrats will do us all in if they can. Hopefully your efforts to stop the bee kill will be far more successful than mine.

John Abbotts
Crosswicks, NJ

Small Cell Update

We believe deeply in traditional beekeeping methods and keeping our honey bees in harmony with the environment. We do not believe in oversized honeycomb cell size produced over the past several decades that have induced mite invasions and brood disease.

Since the June article was published we managed to get our small-sized foundation on. In doing so we were forced to cull one out of four frames that were drawn wrong. Culling is important, 1) to force acclimatizing, and 2) contain secondary diseases, and last 3) trigger worker bees to clean drone brood for mites. Foundation drawn properly becomes the seed frames for starting hives.

We are now three and four deep with plenty of pollen and honey stores for Winter. We are carrying less than 1% disease and workers now clean drone brood for mites. We are supered for early Spring startup with fourth and fifth boxes in place for January 1999 here in Southern Arizona. This early supering will allow us to wire supers and mount more foundation for next year, buying time for woodenware maintenance.

We have had straight hive increase in numbers since February 1998 and NO CRASH season since sizing down and making our initial cut/shakedown. We will close out our first year figures in February 1999 and at that time hope to start the new year with around 400 colonies and 1200 newly wired and mounted supers ready to go. Yes, we made a honey crop and we will let the national honey Board keep track of those figures with their experts so beekeepers later can see the ratcheting down and ratcheting up as one goes through a system changeover back onto a natural system of beekeeping.

We are keeping notes as to the various field management changes required. So far, nothing is hard, only slight variations of management skills and tools of trade is required. Those every beekeeper has access to.

Concerning the Thermal/cell size map pictured on page 25, of our article in June. The thermal zones were given but the cell conversion chart to the old world sizes was left out. Many have asked us about the reference in print but weren't able to find it. We will gladly send the conversion chart for those wishing a copy who want their bees back on a natural system.

Will keep you and your readers posted as we attempt this coming 1999 to get back to over 600 colonies or better, all drawn out, filled-up, and disease free.

Dee Lusby
Tucson, AZ

Bee Culture's Summary of 1998 Honey Prices

Last year was a mixed bag for everyone who sells honey, at every level. Most volatile were the bulk prices, which are at the interface of domestic production and imports. Wholesale prices, and definitely retail prices were far less affected by the global market forces acting on bulk honey. In fact, if you look at the monthly prices for each region (Figs. 1-12), you'll note that, although bulk prices – the price per pound for honey in barrels, and the cost of 60 pound pails – follow a downward trend as the year progressed, both wholesale and retail prices fluctuate little.

This discrepancy is easily, if unfortunately explained. In 1997 the world's honey supply was pretty much dedicated to markets other than the U.S. Honey committed down the line by packers must come from somewhere, and the available domestic supply, short that season, was squeezed, and the price went up.

Passing along the price increase to wholesalers, then retailers, those prices rose. They have changed little. Meanwhile the global supply, essentially the same in 1998 as 1997, shifted to the higher U.S. market, eventually flooding it. Prices for domestic honey plummeted to meet the redistributed world price by the end of the year. That, and a good U.S. crop created a glut and prices have remained low. But consumers are still paying the higher, year old price, which continued to climb albeit less rapidly than a year ago.

Some cautions regarding the data presented here are in order. By far the greatest quantity of honey sold is produced by commercial operators, at the truck load of barrels level.

However, by far the greatest number of sellers have smaller operations and are somewhat insulated from dramatic price swings of global markets. These sellers, generally, supply local markets, either at wholesale or direct retail prices.

The data presented here tends to favor the reports of medium and even small-sized distributors in the wholesale and retail areas, as most of our reports are from them. While commercial sized operations command the attention of huge honey users, there are far fewer of them, thus far fewer reports. Averages are not weighted by quantity of honey sold. However, the prices reflect, for the most part, the trends in price movement.

The first 12 tables depict the average price for each commodity (i.e. 60 lb. Pail, white; 2 lb. Jar retail) for all 12 regions represented on

REGION ONE

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 65.79	$ 67.75	$ 60.29	$ 61.36	$ 58.11	$ 58.57	$ 58.88	$ 56.50	$ 56.30	$ 53.12	$ 58.76	$ 55.84	$ 59.27
60lbs ELA	$ 61.97	$ 64.74	$ 59.74	$ 57.87	$ 54.32	$ 56.60	$ 54.77	$ 54.57	$ 55.25	$ 53.60	$ 55.07	$ 54.74	$ 56.94
55gal White	$ 0.88	$ 0.88	$ 0.75	$ 0.80	$ 0.70	$ 0.69	$ 0.69	$ 0.61	$ 0.67	$ 0.67	$ 0.68	$ 0.74	$ 0.73
55gal ELA	$ 0.83	$ 0.80	$ 0.72	$ 0.78	$ 0.65	$ 0.66	$ 0.66	$ 0.58	$ 0.65	$ 0.64	$ 0.65	$ 0.72	$ 0.70
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 28.51	$ 28.46	$ 28.92	$ 28.46	$ 28.27	$ 26.89	$ 28.73	$ 28.56	$ 29.78	$ 29.18	$ 30.23	$ 28.06	$ 28.67
1lb per cs/24	$ 42.83	$ 42.78	$ 43.91	$ 42.90	$ 41.72	$ 40.88	$ 42.05	$ 43.63	$ 43.30	$ 43.13	$ 43.35	$ 41.19	$ 42.64
2lb per cs/12	$ 38.09	$ 37.66	$ 41.20	$ 38.67	$ 37.49	$ 37.31	$ 39.09	$ 39.14	$ 40.50	$ 39.75	$ 39.28	$ 38.07	$ 38.85
12oz plastic /24	$ 36.45	$ 34.92	$ 35.81	$ 36.23	$ 35.10	$ 35.58	$ 34.26	$ 36.10	$ 36.49	$ 35.39	$ 36.90	$ 36.07	$ 35.78
5lb per cs/6	$ 40.02	$ 40.11	$ 43.89	$ 41.19	$ 39.63	$ 38.78	$ 39.97	$ 41.71	$ 41.88	$ 40.71	$ 42.13	$ 39.97	$ 40.83
PRICES													
1/2 lb	$ 1.93	$ 1.78	$ 1.79	$ 1.81	$ 1.79	$ 1.80	$ 1.86	$ 1.68	$ 1.78	$ 1.83	$ 1.98	$ 1.83	$ 1.82
12 oz plastic/bottle	$ 2.22	$ 2.18	$ 2.21	$ 2.18	$ 2.22	$ 2.16	$ 2.22	$ 2.17	$ 2.23	$ 2.20	$ 2.24	$ 2.18	$ 2.20
1 lb.	$ 2.75	$ 2.66	$ 2.60	$ 2.65	$ 2.67	$ 2.75	$ 2.70	$ 2.74	$ 2.74	$ 2.79	$ 2.80	$ 2.69	$ 2.71
2 lb.	$ 4.40	$ 4.32	$ 4.39	$ 4.46	$ 4.32	$ 4.59	$ 4.45	$ 4.54	$ 4.80	$ 4.52	$ 4.50	$ 4.44	$ 4.48
3 lb.	$ 6.10	$ 6.08	$ 6.20	$ 6.19	$ 6.00	$ 6.36	$ 6.01	$ 5.99	$ 6.37	$ 6.37	$ 6.45	$ 6.12	$ 6.19
4 lb.	$ 7.75	$ 7.72	$ 8.36	$ 7.35	$ 7.57	$ 7.36	$ 6.79	$ 6.95	$ 7.59	$ 7.93	$ 7.45	$ 7.51	$ 7.53
5 lb.	$ 9.96	$ 8.99	$ 8.78	$ 9.33	$ 9.21	$ 8.84	$ 8.99	$ 8.88	$ 9.09	$ 9.35	$ 9.27	$ 9.01	$ 9.14
1lb. creamed	$ 3.22	$ 3.18	$ 3.22	$ 3.20	$ 3.12	$ 3.05	$ 3.26	$ 3.36	$ 3.32	$ 3.33	$ 3.25	$ 3.26	$ 3.23
Lb. comb(bxd)	$ 3.76	$ 3.94	$ 3.95	$ 4.03	$ 4.01	$ 3.80	$ 3.99	$ 3.84	$ 4.00	$ 4.11	$ 4.00	$ 4.11	$ 3.96
Round plastic comb	$ 3.67	$ 3.59	$ 3.67	$ 3.44	$ 3.57	$ 3.43	$ 3.55	$ 3.81	$ 3.75	$ 3.76	$ 3.57	$ 3.55	$ 3.61
Bswx lgt. w/p	$ 2.68	$ 2.66	$ 2.56	$ 2.59	$ 1.83	$ 2.15	$ 2.58	$ 2.61	$ 2.49	$ 2.82	$ 2.68	$ 2.36	$ 2.50
Bswx drk. w/p	$ 4.16	$ 2.36	$ 2.66	$ 2.24	$ 1.51	$ 1.50	$ 2.23	$ 2.33	$ 2.16	$ 2.47	$ 2.40	$ 2.12	$ 2.35
Pollination fee avg. per colony	$ 35.59	$ 35.04	$ 35.85	$ 36.64	$ 37.43	$ 37.39	$ 36.27	$ 35.88	$ 36.38	$ 34.96	$ 36.32	$ 37.07	$ 36.24

REGION TWO

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 69.60	$ 77.83	$ 70.25	$ 69.00	$ 63.20	$ 68.00	$ 64.50	$ 51.00	$ 59.33	$ 56.00	$ 55.50	$ 61.33	$ 63.80
60lbs ELA	$ 64.68	$ 69.46	$ 64.75	$ 62.43	$ 56.99	$ 65.94	$ 63.44	$ 51.67	$ 60.00	$ 57.00	$ 45.75	$ 60.80	$ 60.24
55gal White	$ 0.88	$ 0.87	$ 0.74	$ 0.79	$ 0.80	$ 0.69	$ 0.84	$ 0.65	$ 0.68	$ 0.68	$ 0.67	$ 0.75	$ 0.75
55gal ELA	$ 0.81	$ 0.80	$ 0.71	$ 0.71	$ 0.75	$ 0.65	$ 0.77	$ 0.58	$ 0.65	$ 0.68	$ 0.65	$ 0.73	$ 0.71
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 26.39	$ 26.39	$ 28.38	$ 28.31	$ 26.39	$ 25.58	$ 26.98	$ 26.19	$ 29.72	$ 27.24	$ 30.58	$ 28.09	$ 27.52
1lb per cs/24	$ 43.34	$ 41.31	$ 39.04	$ 43.53	$ 39.99	$ 41.82	$ 40.66	$ 40.85	$ 44.28	$ 42.28	$ 42.79	$ 42.75	$ 41.89
2lb per cs/12	$ 33.23	$ 36.35	$ 38.78	$ 39.39	$ 36.35	$ 33.63	$ 34.78	$ 33.44	$ 37.56	$ 38.09	$ 38.09	$ 37.09	$ 36.40
12oz plastic /24	$ 38.24	$ 35.01	$ 34.82	$ 37.66	$ 36.14	$ 36.98	$ 30.42	$ 34.24	$ 37.72	$ 36.01	$ 37.26	$ 37.89	$ 36.03
5lb per cs/6	$ 38.38	$ 42.00	$ 43.28	$ 43.99	$ 42.59	$ 39.11	$ 37.36	$ 36.91	$ 45.11	$ 43.39	$ 45.24	$ 39.29	$ 41.39
PRICES													
1/2 lb	$ 1.47	$ 1.50	$ 1.57	$ 1.64	$ 1.55	$ 1.49	$ 1.85	$ 1.60	$ 1.65	$ 1.57	$ 1.61	$ 1.63	$ 1.59
12 oz plastic/bottle	$ 2.17	$ 2.20	$ 2.34	$ 2.21	$ 2.39	$ 2.20	$ 2.47	$ 2.22	$ 2.33	$ 2.27	$ 2.24	$ 2.35	$ 2.28
1 lb.	$ 2.64	$ 2.58	$ 2.64	$ 2.70	$ 2.75	$ 2.51	$ 3.02	$ 2.62	$ 2.80	$ 2.85	$ 2.45	$ 2.69	$ 2.69
2 lb.	$ 4.78	$ 4.46	$ 4.36	$ 4.76	$ 4.41	$ 4.34	$ 4.55	$ 4.22	$ 4.93	$ 4.85	$ 3.98	$ 4.61	$ 4.52
3 lb.	$ 6.39	$ 6.62	$ 6.87	$ 7.36	$ 6.91	$ 6.35	$ 6.90	$ 6.50	$ 7.29	$ 6.83	$ 6.87	$ 7.07	$ 6.83
4 lb.	$ 7.98	$ 6.85	$ 6.85	$ 7.55	$ 7.55	$ 7.55	$ 7.23	$ 5.48	$ 6.85	$ 6.85	$ 7.00	$ 7.55	$ 7.11
5 lb.	$ 10.17	$ 9.34	$ 10.04	$ 10.40	$ 9.83	$ 9.24	$ 10.05	$ 9.38	$ 10.31	$ 10.64	$ 10.42	$ 10.10	$ 9.99
1lb. creamed	$ 2.96	$ 3.06	$ 3.34	$ 3.38	$ 3.18	$ 3.15	$ 3.62	$ 3.12	$ 3.59	$ 3.51	$ 3.23	$ 3.33	$ 3.29
Lb. comb(bxd)	$ 3.70	$ 4.24	$ 3.85	$ 4.21	$ 4.15	$ 4.48	$ 3.85	$ 3.85	$ 4.68	$ 4.02	$ 4.56	$ 4.61	$ 4.18
Round plastic comb	$ 2.99	$ 3.14	$ 3.22	$ 3.11	$ 3.23	$ 3.36	$ 3.22	$ 3.11	$ 3.58	$ 3.64	$ 3.15	$ 3.11	$ 3.24
Bswx lgt. w/p	$ 3.13	$ 3.28	$ 3.18	$ 3.52	$ 2.60	$ 2.13	$ 3.09	$ 4.09	$ 3.46	$ 3.89	$ 2.74	$ 2.47	$ 3.13
Bswx drk. w/p	$ 3.37	$ 3.10	$ 2.70	$ 3.10	$ 2.10	$ 1.57	$ 2.58	$ 3.36	$ 2.90	$ 3.06	$ 2.17	$ 2.81	$ 2.74
Pollination fee avg. per colony	$ 41.50	$ 36.67	$ 38.50	$ 40.29	$ 40.56	$ 38.86	$ 37.83	$ 39.83	$ 39.50	$ 39.50	$ 38.00	$ 40.33	$ 39.28

REGION THREE

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 51.00	$ 69.82	$ 58.00	$ 48.00	$ 48.00	$ 59.20	$ 50.40	$ 52.20	$ 54.00	$ 57.00	$ 60.00	$ 58.00	$ 55.47
60lbs ELA	$ 51.00	$ 68.74	$ 50.40	$ 50.40	$ 50.40	$ 51.00	$ 51.00	$ 53.40	$ 55.00	$ 55.00	$ 65.00	$ 75.00	$ 56.36
55gal White	$ 0.88	$ 0.97	$ 0.72	$ 0.72	$ 0.72	$ 0.69	$ 0.70	$ 0.68	$ 0.69	$ 0.69	$ 0.67	$ 0.78	$ 0.74
55gal ELA	$ 0.82	$ 0.90	$ 0.87	$ 0.67	$ 0.67	$ 0.67	$ 0.69	$ 0.60	$ 0.64	$ 0.64	$ 0.68	$ 0.60	$ 0.70
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 29.08	$ 29.07	$ 30.39	$ 29.40	$ 30.13	$ 27.83	$ 30.75	$ 29.26	$ 32.51	$ 31.25	$ 32.66	$ 29.51	$ 30.15
1lb per cs/24	$ 38.40	$ 47.32	$ 43.20	$ 43.20	$ 43.20	$ 43.20	$ 43.20	$ 43.20	$ 43.20	$ 43.20	$ 43.20	$ 43.20	$ 43.14
2lb per cs/12	$ 40.20	$ 40.63	$ 40.20	$ 40.20	$ 40.20	$ 42.60	$ 42.60	$ 42.60	$ 42.60	$ 42.60	$ 42.60	$ 42.60	$ 41.64
12oz plastic /24	$ 38.40	$ 35.23	$ 40.80	$ 42.00	$ 40.80	$ 40.80	$ 40.80	$ 40.80	$ 40.80	$ 40.80	$ 40.80	$ 40.80	$ 40.24
5lb per cs/6	$ 46.50	$ 44.16	$ 46.50	$ 46.50	$ 46.50	$ 38.00	$ 48.00	$ 48.00	$ 48.00	$ 48.00	$ 48.00	$ 48.00	$ 46.35
PRICES													
1/2 lb	$ 2.83	$ 2.83	$ 1.83	$ 2.83	$ 2.83	$ 2.83	$ 2.83	$ 2.83	$ 2.83	$ 2.83	$ 2.83	$ 2.83	$ 2.75
12 oz plastic/bottle	$ 2.25	$ 2.35	$ 2.25	$ 2.25	$ 2.25	$ 2.25	$ 2.25	$ 2.35	$ 2.35	$ 2.35	$ 2.35	$ 2.35	$ 2.30
1 lb.	$ 2.50	$ 2.99	$ 2.50	$ 2.50	$ 2.50	$ 2.55	$ 2.55	$ 2.60	$ 2.60	$ 2.60	$ 2.60	$ 2.60	$ 2.59
2 lb.	$ 4.50	$ 4.27	$ 4.50	$ 4.50	$ 4.50	$ 4.50	$ 4.50	$ 4.55	$ 4.55	$ 4.55	$ 4.55	$ 4.55	$ 4.50
3 lb.	$ 6.50	$ 6.56	$ 6.50	$ 6.50	$ 6.50	$ 6.50	$ 6.50	$ 5.75	$ 6.75	$ 6.75	$ 6.75	$ 6.75	$ 6.53
4 lb.	$ 8.60	$ 8.80	$ 10.92	$ 7.97	$ 8.14	$ 8.25	$ 6.68	$ 6.90	$ 8.15	$ 9.26	$ 8.18	$ 8.11	$ 8.33
5 lb.	$ 9.75	$ 10.21	$ 9.75	$ 9.75	$ 9.75	$ 9.75	$ 9.75	$ 9.80	$ 9.80	$ 9.80	$ 9.80	$ 9.80	$ 9.81
1lb. creamed	$ 3.84	$ 3.72	$ 3.76	$ 3.75	$ 3.70	$ 3.18	$ 3.76	$ 4.22	$ 3.87	$ 3.72	$ 3.63	$ 3.62	$ 3.73
Lb. comb(bxd)	$ 3.94	$ 4.01	$ 4.02	$ 4.03	$ 4.04	$ 3.65	$ 4.03	$ 3.98	$ 3.50	$ 3.50	$ 3.50	$ 3.50	$ 3.81
Round plastic comb	$ 3.50	$ 4.06	$ 3.50	$ 3.50	$ 3.50	$ 3.50	$ 3.50	$ 3.50	$ 3.50	$ 3.50	$ 3.50	$ 3.50	$ 3.55
Bswx lgt. w/p	$ 2.50	$ 2.00	$ 2.50	$ 2.50	$ 2.10	$ 2.18	$ 2.38	$ 2.38	$ 2.08	$ 2.30	$ 2.35	$ 2.35	$ 2.30
Bswx drk. w/p	$ 2.50	$ 2.99	$ 2.25	$ 2.50	$ 2.00	$ 1.38	$ 2.23	$ 2.25	$ 2.05	$ 3.08	$ 2.13	$ 2.13	$ 2.29
Pollination fee avg. per colony	$ 26.74	$ 25.00	$ 31.00	$ 30.00	$ 35.00	$ 31.50	$ 31.50	$ 31.50	$ 31.50	$ 30.00	$ 31.50	$ 30.00	$ 30.44

REGION FOUR

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 70.90	$ 71.00	$ 68.33	$ 69.80	$ 66.50	$ 62.25	$ 68.67	$ 63.67	$ 70.38	$ 69.00	$ 70.00	$ 67.00	$ 68.13
60lbs ELA	$ 61.20	$ 66.40	$ 64.36	$ 62.92	$ 57.80	$ 62.25	$ 60.10	$ 58.20	$ 61.00	$ 66.33	$ 60.00	$ 62.40	$ 61.91
55gal White	$ 0.87	$ 0.88	$ 0.73	$ 0.74	$ 0.70	$ 0.69	$ 0.77	$ 0.67	$ 0.69	$ 0.68	$ 0.66	$ 0.68	$ 0.73
55gal ELA	$ 0.83	$ 0.83	$ 0.73	$ 0.70	$ 0.64	$ 0.65	$ 0.72	$ 0.64	$ 0.62	$ 0.66	$ 0.68	$ 0.66	$ 0.70
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 32.79	$ 33.30	$ 32.80	$ 31.71	$ 32.07	$ 32.10	$ 31.48	$ 32.11	$ 30.31	$ 31.89	$ 32.20	$ 31.46	$ 32.02
1lb per cs/24	$ 45.52	$ 44.27	$ 43.65	$ 43.51	$ 43.13	$ 43.16	$ 44.51	$ 45.44	$ 44.02	$ 43.77	$ 45.77	$ 43.78	$ 44.21
2lb per cs/12	$ 44.58	$ 42.85	$ 42.81	$ 41.61	$ 42.58	$ 43.93	$ 45.33	$ 44.53	$ 49.13	$ 43.90	$ 45.87	$ 42.47	$ 44.13
12oz plastic /24	$ 38.53	$ 37.28	$ 38.49	$ 37.61	$ 38.85	$ 37.68	$ 38.77	$ 39.23	$ 36.59	$ 37.01	$ 37.02	$ 35.42	$ 37.71
5lb per cs/6	$ 46.13	$ 45.80	$ 44.80	$ 47.00	$ 42.67	$ 41.08	$ 45.83	$ 46.25	$ 46.83	$ 49.00	$ 48.50	$ 47.83	$ 45.98
PRICES													
1/2 lb	$ 2.17	$ 2.17	$ 2.17	$ 2.17	$ 2.17	$ 2.17	$ 2.17	$ 2.17	$ 2.17	$ 2.17	$ 2.17	$ 2.17	$ 2.17
12 oz plastic/bottle	$ 2.28	$ 2.35	$ 2.28	$ 2.30	$ 2.26	$ 2.16	$ 2.22	$ 2.45	$ 2.31	$ 2.33	$ 2.38	$ 2.09	$ 2.28
1 lb.	$ 2.79	$ 2.79	$ 2.62	$ 2.72	$ 2.78	$ 3.04	$ 2.80	$ 3.10	$ 2.95	$ 2.90	$ 3.07	$ 2.89	$ 2.87
2 lb.	$ 4.65	$ 5.18	$ 4.63	$ 4.84	$ 4.79	$ 5.06	$ 4.96	$ 4.25	$ 5.24	$ 5.03	$ 5.28	$ 4.19	$ 4.84
3 lb.	$ 6.57	$ 7.19	$ 6.27	$ 6.37	$ 6.31	$ 6.35	$ 6.75	$ 6.25	$ 6.66	$ 6.35	$ 6.91	$ 6.92	$ 6.58
4 lb.	$ 8.32	$ 9.29	$ 7.85	$ 8.00	$ 7.81	$ 7.73	$ 8.25	$ 8.16	$ 8.00	$ 8.18	$ 7.92	$ 8.63	$ 8.18
5 lb.	$ 9.80	$ 10.74	$ 9.26	$ 9.40	$ 9.50	$ 9.31	$ 9.75	$ 10.75	$ 9.25	$ 9.82	$ 9.35	$ 9.87	$ 9.73
1lb. creamed	$ 3.48	$ 3.80	$ 3.45	$ 3.59	$ 3.48	$ 3.69	$ 3.84	$ 3.86	$ 3.43	$ 3.73	$ 3.25	$ 3.82	$ 3.62
Lb. comb(bxd)	$ 3.72	$ 3.99	$ 3.50	$ 4.14	$ 4.05	$ 4.11	$ 4.16	$ 4.24	$ 3.80	$ 4.25	$ 3.95	$ 4.19	$ 4.01
Round plastic comb	$ 3.85	$ 4.00	$ 3.66	$ 3.81	$ 3.83	$ 3.88	$ 3.81	$ 3.91	$ 3.94	$ 4.08	$ 3.75	$ 3.75	$ 3.86
Bswx lgt. w/p	$ 1.88	$ 1.62	$ 1.68	$ 1.58	$ 2.09	$ 1.83	$ 1.63	$ 2.55	$ 1.70	$ 2.24	$ 1.73	$ 1.55	$ 1.84
Bswx drk. w/p	$ 1.72	$ 1.43	$ 1.48	$ 1.37	$ 2.06	$ 1.60	$ 1.43	$ 1.37	$ 1.51	$ 1.88	$ 1.49	$ 1.40	$ 1.56
Pollination fee avg. per colony	$ 38.60	$ 40.00	$ 41.00	$ 39.17	$ 40.67	$ 37.86	$ 39.00	$ 35.00	$ 37.88	$ 32.40	$ 37.94	$ 35.00	$ 37.88

REGION FIVE

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 64.50	$ 75.00	$ 64.50	$ 64.50	$ 60.92	$ 65.00	$ 65.00	$ 65.00	$ 57.08	$ 55.33	$ 58.77	$ 75.00	$ 64.22
60lbs ELA	$ 57.00	$ 54.00	$ 62.40	$ 60.00	$ 54.58	$ 62.00	$ 64.00	$ 54.00	$ 56.00	$ 51.00	$ 54.19	$ 69.00	$ 58.18
55gal White	$ 0.79	$ 0.80	$ 0.79	$ 0.70	$ 0.62	$ 0.73	$ 0.70	$ 0.62	$ 0.74	$ 0.66	$ 0.77	$ 0.70	$ 0.72
55gal ELA	$ 0.75	$ 0.70	$ 0.74	$ 0.64	$ 0.61	$ 0.65	$ 0.69	$ 0.60	$ 0.74	$ 0.58	$ 0.74	$ 0.60	$ 0.67
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 29.08	$ 29.07	$ 30.39	$ 29.40	$ 22.30	$ 20.20	$ 30.00	$ 21.00	$ 32.51	$ 31.25	$ 32.66	$ 22.40	$ 27.52
1lb per cs/24	$ 40.80	$ 44.00	$ 40.80	$ 40.80	$ 36.00	$ 38.50	$ 42.50	$ 54.00	$ 45.52	$ 42.00	$ 45.49	$ 37.00	$ 42.28
2lb per cs/12	$ 36.00	$ 37.00	$ 36.10	$ 36.00	$ 33.60	$ 34.60	$ 41.30	$ 33.60	$ 49.95	$ 53.25	$ 40.85	$ 34.60	$ 38.90
12oz plastic /24	$ 36.00	$ 30.50	$ 37.00	$ 36.00	$ 31.00	$ 36.22	$ 40.50	$ 40.00	$ 37.24	$ 33.59	$ 37.45	$ 39.04	$ 36.21
5lb per cs/6	$ 39.00	$ 37.38	$ 39.00	$ 39.00	$ 42.55	$ 42.08	$ 50.00	$ 48.00	$ 47.09	$ 46.35	$ 47.46	$ 36.50	$ 42.87
PRICES													
1/2 lb	$ 1.29	$ 1.29	$ 1.29	$ 1.29	$ 1.15	$ 1.07	$ 1.75	$ 1.07	$ 2.83	$ 1.38	$ 2.83	$ 1.25	$ 1.54
12 oz plastic/bottle	$ 2.25	$ 2.08	$ 2.20	$ 2.15	$ 1.84	$ 1.69	$ 2.32	$ 1.79	$ 2.32	$ 2.10	$ 2.39	$ 1.79	$ 2.08
1 lb.	$ 2.18	$ 2.08	$ 2.00	$ 2.00	$ 1.99	$ 2.05	$ 2.33	$ 2.90	$ 2.00	$ 2.53	$ 3.17	$ 2.00	$ 2.27
2 lb.	$ 3.88	$ 3.46	$ 4.02	$ 4.02	$ 3.59	$ 3.75	$ 4.45	$ 4.38	$ 3.50	$ 3.49	$ 4.47	$ 3.99	$ 3.92
3 lb.	$ 5.15	$ 5.40	$ 5.15	$ 5.15	$ 5.76	$ 4.79	$ 6.40	$ 4.10	$ 6.84	$ 7.30	$ 6.87	$ 5.25	$ 5.68
4 lb.	$ 7.50	$ 8.80	$ 7.50	$ 7.50	$ 8.14	$ 8.25	$ 6.68	$ 6.90	$ 8.15	$ 9.26	$ 8.18	$ 8.11	$ 7.91
5 lb.	$ 7.88	$ 6.88	$ 8.50	$ 8.50	$ 7.50	$ 9.04	$ 7.00	$ 8.23	$ 9.00	$ 10.51	$ 10.50	$ 9.74	$ 8.61
1lb. creamed	$ 3.84	$ 3.72	$ 3.76	$ 3.75	$ 3.70	$ 3.18	$ 3.76	$ 4.22	$ 3.87	$ 3.72	$ 3.63	$ 3.62	$ 3.73
Lb. comb(bxd)	$ 3.94	$ 4.01	$ 4.02	$ 4.03	$ 4.04	$ 3.65	$ 4.03	$ 3.98	$ 4.41	$ 4.20	$ 4.04	$ 4.55	$ 4.06
Round plastic comb	$ 4.24	$ 4.06	$ 4.13	$ 3.20	$ 4.06	$ 3.69	$ 3.89	$ 4.75	$ 4.12	$ 4.10	$ 3.91	$ 3.88	$ 4.00
Bswx lgt. w/p	$ 1.95	$ 1.55	$ 2.25	$ 2.25	$ 2.00	$ 1.60	$ 1.70	$ 2.48	$ 1.70	$ 1.45	$ 3.17	$ 1.70	$ 1.98
Bswx drk. w/p	$ 1.50	$ 1.15	$ 2.00	$ 2.00	$ 1.75	$ 1.40	$ 1.40	$ 1.40	$ 1.30	$ 1.13	$ 2.93	$ 1.40	$ 1.61
Pollination fee avg. per colony	$ 25.00	$ 25.00	$ 25.35	$ 25.00	$ 32.50	$ 30.00	$ 25.00	$ 30.00	$ 30.00	$ 25.00	$ 39.13	$ 30.00	$ 28.50

REGION SIX

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 64.50	$ 68.50	$ 67.90	$ 57.00	$ 51.50	$ 57.33	$ 51.00	$ 52.20	$ 56.00	$ 42.00	$ 58.77	$ 49.00	$ 56.31
60lbs ELA	$ 58.00	$ 62.00	$ 63.00	$ 53.00	$ 53.67	$ 54.50	$ 46.13	$ 50.40	$ 54.50	$ 40.20	$ 54.19	$ 50.33	$ 53.33
55gal White	$ 0.87	$ 0.89	$ 0.77	$ 0.71	$ 0.66	$ 0.75	$ 0.65	$ 0.60	$ 0.71	$ 0.71	$ 0.67	$ 0.68	$ 0.72
55gal ELA	$ 0.81	$ 0.86	$ 0.70	$ 0.69	$ 0.61	$ 0.69	$ 0.60	$ 0.54	$ 0.68	$ 0.69	$ 0.64	$ 0.63	$ 0.68
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 28.07	$ 29.90	$ 29.67	$ 29.67	$ 32.00	$ 32.00	$ 28.00	$ 27.50	$ 27.83	$ 27.40	$ 26.00	$ 27.92	$ 28.83
1lb per cs/24	$ 42.50	$ 42.50	$ 40.33	$ 42.50	$ 41.50	$ 41.50	$ 41.50	$ 41.50	$ 41.58	$ 41.50	$ 45.49	$ 31.25	$ 41.14
2lb per cs/12	$ 38.30	$ 38.00	$ 38.30	$ 38.30	$ 38.30	$ 38.30	$ 38.30	$ 38.30	$ 38.50	$ 38.30	$ 40.85	$ 38.30	$ 38.50
12oz plastic /24	$ 34.60	$ 27.00	$ 28.13	$ 27.45	$ 27.20	$ 35.40	$ 35.40	$ 35.40	$ 35.50	$ 27.20	$ 37.45	$ 35.40	$ 32.18
5lb per cs/6	$ 41.04	$ 41.04	$ 40.36	$ 41.00	$ 41.04	$ 41.04	$ 41.04	$ 40.58	$ 43.59	$ 40.00	$ 47.46	$ 35.13	$ 41.11
PRICES													
1/2 lb	$ 1.80	$ 1.82	$ 1.85	$ 1.86	$ 1.82	$ 1.65	$ 1.63	$ 1.71	$ 1.82	$ 1.76	$ 1.75	$ 1.80	$ 1.77
12 oz plastic/bottle	$ 2.23	$ 2.23	$ 2.23	$ 2.25	$ 2.20	$ 2.25	$ 2.16	$ 2.15	$ 2.16	$ 2.26	$ 2.39	$ 2.47	$ 2.25
1 lb.	$ 2.72	$ 2.77	$ 2.71	$ 2.79	$ 2.64	$ 2.68	$ 2.58	$ 2.58	$ 2.87	$ 2.66	$ 2.53	$ 2.62	$ 2.68
2 lb.	$ 4.24	$ 4.68	$ 4.74	$ 4.74	$ 4.16	$ 4.68	$ 4.48	$ 4.71	$ 5.18	$ 4.59	$ 4.28	$ 4.29	$ 4.56
3 lb.	$ 6.35	$ 5.95	$ 6.28	$ 6.10	$ 6.18	$ 5.87	$ 6.18	$ 6.18	$ 6.18	$ 6.37	$ 6.36	$ 6.18	$ 6.18
4 lb.	$ 7.13	$ 6.80	$ 6.63	$ 6.63	$ 6.95	$ 6.70	$ 6.53	$ 7.53	$ 7.53	$ 7.34	$ 8.18	$ 6.86	$ 7.07
5 lb.	$ 8.50	$ 7.50	$ 8.17	$ 8.00	$ 8.50	$ 8.25	$ 8.08	$ 8.00	$ 8.00	$ 8.80	$ 10.50	$ 8.20	$ 8.38
1lb. creamed	$ 3.13	$ 3.03	$ 3.51	$ 3.48	$ 3.38	$ 3.03	$ 2.98	$ 3.07	$ 2.88	$ 2.63	$ 2.75	$ 2.40	$ 3.02
Lb. comb(bxd)	$ 4.00	$ 4.00	$ 4.00	$ 4.00	$ 4.25	$ 4.38	$ 4.00	$ 4.00	$ 4.00	$ 4.00	$ 4.04	$ 4.00	$ 4.06
Round plastic comb	$ 4.00	$ 4.00	$ 4.00	$ 4.00	$ 4.00	$ 4.50	$ 4.50	$ 4.50	$ 4.50	$ 4.50	$ 3.91	$ 4.50	$ 4.24
Bswx lgt. w/p	$ 2.68	$ 3.19	$ 2.50	$ 1.90	$ 1.55	$ 1.90	$ 2.44	$ 2.68	$ 2.88	$ 3.83	$ 2.70	$ 2.41	$ 2.56
Bswx drk. w/p	$ 2.39	$ 2.83	$ 2.26	$ 1.68	$ 1.34	$ 1.46	$ 2.28	$ 2.48	$ 2.65	$ 3.50	$ 2.65	$ 2.24	$ 2.31
Pollination fee avg. per colony	$ 35.67	$ 38.50	$ 38.00	$ 38.50	$ 37.33	$ 39.00	$ 34.00	$ 38.00	$ 33.00	$ 33.17	$ 30.00	$ 37.33	$ 36.04

REGION SEVEN

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 65.69	$ 67.10	$ 61.20	$ 53.40	$ 52.44	$ 47.82	$ 51.20	$ 55.00	$ 51.23	$ 43.23	$ 46.53	$ 47.20	$ 53.50
60lbs ELA	$ 63.50	$ 64.00	$ 58.68	$ 51.72	$ 49.94	$ 42.82	$ 49.80	$ 52.33	$ 49.89	$ 42.80	$ 46.00	$ 44.71	$ 51.33
55gal White	$ 0.86	$ 0.83	$ 0.82	$ 0.78	$ 0.67	$ 0.70	$ 0.80	$ 0.69	$ 0.73	$ 0.62	$ 0.62	$ 0.68	$ 0.73
55gal ELA	$ 0.82	$ 0.81	$ 0.79	$ 0.75	$ 0.65	$ 0.69	$ 0.76	$ 0.64	$ 0.70	$ 0.60	$ 0.67	$ 0.66	$ 0.71
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 29.22	$ 28.51	$ 28.04	$ 27.51	$ 28.53	$ 28.28	$ 31.92	$ 31.08	$ 31.47	$ 29.89	$ 30.96	$ 29.55	$ 29.58
1lb per cs/24	$ 42.67	$ 42.32	$ 47.82	$ 42.57	$ 41.64	$ 42.75	$ 44.82	$ 41.60	$ 44.10	$ 43.09	$ 43.89	$ 43.04	$ 43.36
2lb per cs/12	$ 38.54	$ 37.96	$ 45.21	$ 37.76	$ 37.50	$ 39.35	$ 38.01	$ 39.80	$ 40.38	$ 38.72	$ 38.85	$ 38.59	$ 39.22
12oz plastic /24	$ 36.83	$ 35.19	$ 36.39	$ 35.95	$ 34.58	$ 36.54	$ 33.58	$ 35.42	$ 37.34	$ 36.37	$ 37.40	$ 36.21	$ 35.98
5lb per cs/6	$ 38.38	$ 36.93	$ 45.22	$ 37.99	$ 38.35	$ 38.77	$ 37.56	$ 38.67	$ 40.39	$ 38.55	$ 39.95	$ 39.86	$ 39.05
PRICES													
1/2 lb	$ 2.33	$ 1.70	$ 1.74	$ 1.78	$ 1.86	$ 1.71	$ 1.96	$ 1.75	$ 1.85	$ 1.84	$ 1.83	$ 1.78	$ 1.84
12 oz plastic/bottle	$ 2.22	$ 1.98	$ 2.16	$ 2.04	$ 2.02	$ 2.25	$ 2.16	$ 2.10	$ 2.25	$ 2.04	$ 2.04	$ 1.99	$ 2.10
1 lb.	$ 2.72	$ 2.45	$ 2.52	$ 2.47	$ 2.54	$ 2.90	$ 2.46	$ 2.60	$ 2.65	$ 2.57	$ 2.54	$ 2.41	$ 2.57
2 lb.	$ 4.09	$ 4.10	$ 4.26	$ 4.11	$ 4.32	$ 4.97	$ 4.15	$ 4.18	$ 4.65	$ 4.39	$ 4.33	$ 4.20	$ 4.31
3 lb.	$ 6.26	$ 5.59	$ 6.97	$ 6.20	$ 6.15	$ 6.94	$ 6.50	$ 5.37	$ 6.53	$ 6.79	$ 6.16	$ 6.04	$ 6.29
4 lb.	$ 8.35	$ 8.35	$ 13.48	$ 8.55	$ 9.25	$ 8.72	$ 6.43	$ 7.80	$ 8.68	$ 9.50	$ 8.30	$ 7.93	$ 8.78
5 lb.	$ 10.94	$ 8.54	$ 7.87	$ 8.91	$ 9.86	$ 8.45	$ 10.68	$ 8.55	$ 8.97	$ 8.50	$ 8.66	$ 8.26	$ 9.02
1lb. creamed	$ 3.13	$ 2.59	$ 2.97	$ 2.56	$ 2.70	$ 2.60	$ 3.31	$ 3.30	$ 2.99	$ 2.75	$ 3.11	$ 2.88	$ 2.89
Lb. comb(bxd)	$ 3.83	$ 3.54	$ 4.25	$ 3.76	$ 3.72	$ 3.46	$ 3.80	$ 3.38	$ 3.81	$ 3.60	$ 3.40	$ 3.74	$ 3.69
Round plastic comb	$ 3.51	$ 2.94	$ 3.06	$ 2.77	$ 3.88	$ 2.94	$ 3.24	$ 3.61	$ 3.46	$ 3.23	$ 2.93	$ 3.01	$ 3.22
Bswx lgt. w/p	$ 2.46	$ 2.16	$ 2.13	$ 2.00	$ 1.81	$ 1.79	$ 3.25	$ 3.10	$ 2.00	$ 2.18	$ 2.31	$ 1.78	$ 2.25
Bswx drk. w/p	$ 2.13	$ 1.90	$ 3.27	$ 2.08	$ 1.56	$ 1.38	$ 2.20	$ 1.99	$ 1.70	$ 2.27	$ 1.82	$ 1.44	$ 1.96
Pollination fee avg. per colony	$ 35.83	$ 33.00	$ 35.71	$ 37.69	$ 39.29	$ 38.64	$ 37.57	$ 36.63	$ 37.88	$ 36.86	$ 36.60	$ 36.86	$ 36.88

REGION EIGHT

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 78.00	$ 78.00	$ 74.39	$ 78.00	$ 60.92	$ 62.56	$ 63.00	$ 65.00	$ 57.08	$ 55.33	$ 58.77	$ 56.24	$ 65.61
60lbs ELA	$ 73.33	$ 73.33	$ 69.70	$ 62.20	$ 59.50	$ 60.00	$ 58.00	$ 59.93	$ 54.90	$ 54.90	$ 59.39	$ 60.40	$ 62.13
55gal White	$ 0.90	$ 0.81	$ 0.81	$ 0.80	$ 0.72	$ 0.75	$ 0.78	$ 0.70	$ 0.74	$ 0.76	$ 0.67	$ 0.70	$ 0.76
55gal ELA	$ 0.85	$ 0.75	$ 0.75	$ 0.78	$ 0.65	$ 0.70	$ 0.70	$ 0.68	$ 0.70	$ 0.67	$ 0.64	$ 0.63	$ 0.71
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 29.08	$ 29.07	$ 30.39	$ 29.40	$ 30.13	$ 28.95	$ 30.75	$ 35.00	$ 32.51	$ 31.25	$ 32.66	$ 29.51	$ 30.73
1lb per cs/24	$ 39.36	$ 39.36	$ 41.26	$ 41.27	$ 39.36	$ 37.67	$ 41.19	$ 46.19	$ 38.67	$ 39.44	$ 39.00	$ 39.92	$ 40.22
2lb per cs/12	$ 39.20	$ 39.20	$ 41.90	$ 40.26	$ 39.80	$ 38.53	$ 40.07	$ 40.07	$ 38.33	$ 38.39	$ 40.10	$ 40.20	$ 39.67
12oz plastic /24	$ 33.60	$ 33.70	$ 32.64	$ 35.66	$ 35.28	$ 29.44	$ 34.74	$ 38.06	$ 35.44	$ 34.74	$ 37.20	$ 36.24	$ 34.73
5lb per cs/6	$ 39.00	$ 39.50	$ 57.17	$ 41.50	$ 39.00	$ 34.50	$ 41.50	$ 42.00	$ 40.50	$ 40.50	$ 39.00	$ 39.00	$ 41.10
PRICES													$ -
1/2 lb	$ 1.76	$ 1.82	$ 1.84	$ 1.82	$ 1.89	$ 1.82	$ 1.85	$ 1.77	$ 1.74	$ 1.76	$ 1.89	$ 1.72	$ 1.81
12 oz plastic/bottle	$ 2.24	$ 2.26	$ 2.23	$ 2.28	$ 2.45	$ 2.13	$ 2.30	$ 2.18	$ 2.33	$ 2.26	$ 2.24	$ 2.21	$ 2.26
1 lb.	$ 2.68	$ 2.75	$ 2.73	$ 2.67	$ 2.90	$ 2.42	$ 2.78	$ 2.60	$ 2.60	$ 2.77	$ 2.73	$ 2.60	$ 2.69
2 lb.	$ 4.54	$ 4.32	$ 4.37	$ 4.44	$ 4.56	$ 4.08	$ 4.71	$ 4.64	$ 4.82	$ 4.35	$ 5.07	$ 4.24	$ 4.51
3 lb.	$ 6.20	$ 5.81	$ 5.78	$ 6.11	$ 6.10	$ 5.56	$ 6.28	$ 6.64	$ 6.37	$ 6.24	$ 6.59	$ 6.57	$ 6.19
4 lb.	$ 8.31	$ 8.29	$ 7.95	$ 6.99	$ 7.91	$ 8.20	$ 7.83	$ 7.17	$ 7.14	$ 9.26	$ 8.18	$ 8.34	$ 7.96
5 lb.	$ 9.17	$ 9.15	$ 9.28	$ 9.53	$ 9.09	$ 9.00	$ 10.38	$ 10.25	$ 10.09	$ 10.00	$ 10.99	$ 10.58	$ 9.79
1lb. creamed	$ 3.30	$ 3.18	$ 2.99	$ 3.02	$ 3.44	$ 2.97	$ 3.14	$ 3.43	$ 3.63	$ 3.19	$ 3.27	$ 3.13	$ 3.22
Lb. comb(bxd)	$ 2.88	$ 4.15	$ 3.48	$ 3.80	$ 3.69	$ 3.83	$ 3.98	$ 3.45	$ 3.87	$ 3.66	$ 3.99	$ 3.65	$ 3.70
Round plastic comb	$ 3.26	$ 3.14	$ 4.50	$ 3.41	$ 3.59	$ 3.50	$ 3.73	$ 3.50	$ 3.63	$ 3.50	$ 3.66	$ 3.66	$ 3.59
Bswx lgt. w/p	$ 2.60	$ 2.34	$ 2.50	$ 3.63	$ 1.45	$ 1.75	$ 2.48	$ 2.35	$ 2.00	$ 2.42	$ 2.38	$ 2.38	$ 2.36
Bswx drk. w/p	$ 2.25	$ 1.98	$ 2.00	$ 3.06	$ 1.05	$ 1.15	$ 1.75	$ 1.75	$ 1.63	$ 1.90	$ 1.85	$ 1.85	$ 1.85
Pollination fee avg. per colony	$ 40.00	$ 38.25	$ 38.50	$ 36.75	$ 39.00	$ 37.50	$ 40.00	$ 40.00	$ 37.67	$ 37.50	$ 40.00	$ 39.50	$ 38.72

REGION NINE

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 58.00	$ 54.00	$ 54.00	$ 54.00	$ 54.00	$ 54.19	$ 54.00	$ 54.00	$ 54.00	$ 56.00	$ 54.00	$ 54.00	$ 54.52
60lbs ELA	$ 54.00	$ 52.00	$ 52.00	$ 52.00	$ 52.00	$ 50.25	$ 52.00	$ 52.00	$ 53.00	$ 54.00	$ 54.00	$ 54.00	$ 52.60
55gal White	$ 0.83	$ 0.81	$ 0.88	$ 0.85	$ 0.75	$ 0.79	$ 0.85	$ 0.75	$ 0.70	$ 0.79	$ 0.70	$ 0.70	$ 0.78
55gal ELA	$ 0.80	$ 0.79	$ 0.85	$ 0.79	$ 0.66	$ 0.72	$ 0.80	$ 0.70	$ 0.65	$ 0.70	$ 0.70	$ 0.65	$ 0.73
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 30.00	$ 30.00	$ 30.00	$ 30.00	$ 30.00	$ 27.83	$ 30.00	$ 30.00	$ 30.00	$ 30.00	$ 30.00	$ 30.00	$ 29.82
1lb per cs/24	$ 49.00	$ 49.00	$ 48.00	$ 48.00	$ 48.00	$ 40.20	$ 48.00	$ 48.00	$ 48.00	$ 38.00	$ 48.00	$ 48.00	$ 46.68
2lb per cs/12	$ 41.00	$ 42.00	$ 42.33	$ 40.00	$ 40.00	$ 38.36	$ 42.00	$ 42.00	$ 42.00	$ 42.00	$ 42.00	$ 42.00	$ 41.31
12oz plastic /24	$ 42.00	$ 42.00	$ 41.25	$ 38.00	$ 35.00	$ 36.22	$ 36.00	$ 36.00	$ 36.00	$ 35.00	$ 36.00	$ 36.00	$ 37.46
5lb per cs/6	$ 46.00	$ 45.00	$ 45.00	$ 45.00	$ 45.00	$ 42.08	$ 45.00	$ 48.00	$ 48.00	$ 40.16	$ 48.00	$ 48.00	$ 45.44
PRICES													
1/2 lb	$ 1.95	$ 1.95	$ 1.95	$ 2.95	$ 2.15	$ 2.83	$ 2.50	$ 2.50	$ 2.50	$ 2.00	$ 2.50	$ 2.50	$ 2.36
12 oz plastic/bottle	$ 2.95	$ 2.95	$ 2.95	$ 2.72	$ 2.62	$ 2.31	$ 2.75	$ 2.75	$ 2.50	$ 2.50	$ 2.50	$ 2.50	$ 2.67
1 lb.	$ 3.50	$ 2.50	$ 3.50	$ 2.98	$ 2.96	$ 3.54	$ 3.50	$ 3.10	$ 3.00	$ 3.00	$ 4.00	$ 4.00	$ 3.30
2 lb.	$ 4.75	$ 4.50	$ 4.45	$ 4.42	$ 4.37	$ 5.95	$ 4.45	$ 4.95	$ 4.50	$ 4.50	$ 4.50	$ 4.50	$ 4.65
3 lb.	$ 6.25	$ 6.25	$ 6.25	$ 6.25	$ 6.25	$ 7.81	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.00	$ 6.26
4 lb.	$ 7.00	$ 6.95	$ 6.90	$ 7.65	$ 7.65	$ 8.25	$ 7.00	$ 7.00	$ 7.00	$ 7.50	$ 7.00	$ 7.00	$ 7.24
5 lb.	$ 10.00	$ 9.95	$ 9.95	$ 9.95	$ 9.95	$ 9.95	$ 9.95	$ 9.95	$ 9.95	$ 9.25	$ 9.00	$ 9.00	$ 9.74
1lb. creamed	$ 5.75	$ 4.75	$ 3.75	$ 5.75	$ 4.75	$ 3.18	$ 5.50	$ 4.75	$ 5.75	$ 3.50	$ 5.50	$ 5.50	$ 4.87
Lb. comb(bxd)	$ 6.00	$ 4.20	$ 6.00	$ 6.00	$ 6.00	$ 3.65	$ 5.25	$ 5.00	$ 6.00	$ 5.75	$ 6.00	$ 5.00	$ 5.40
Round plastic comb	$ 3.00	$ 3.00	$ 3.00	$ 3.00	$ 3.00	$ 3.69	$ 3.00	$ 4.19	$ 3.00	$ 3.95	$ 3.00	$ 3.00	$ 3.24
Bswx lgt. w/p	$ 2.25	$ 3.25	$ 2.25	$ 2.25	$ 3.55	$ 2.74	$ 2.10	$ 4.00	$ 3.10	$ 2.00	$ 2.00	$ 2.00	$ 2.62
Bswx drk. w/p	$ 3.25	$ 2.25	$ 3.50	$ 3.50	$ 1.50	$ 3.41	$ 3.50	$ 3.50	$ 2.50	$ 1.50	$ 2.00	$ 1.50	$ 2.66
Pollination fee avg. per colony	$ 15.00	$ 25.00	$ 15.00	$ 15.00	$ 15.00	$ 41.06	$ 39.02	$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 20.00	$ 22.09

REGION TEN

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 61.50	$ 59.33	$ 63.00	$ 70.50	$ 63.00	$ 60.00	$ 60.30	$ 55.53	$ 57.08	$ 55.33	$ 58.77	$ 56.24	$ 60.05
60lbs ELA	$ 63.00	$ 63.00	$ 63.00	$ 63.00	$ 63.00	$ 59.25	$ 52.75	$ 58.33	$ 56.00	$ 54.22	$ 54.19	$ 55.40	$ 58.76
55gal White	$ 0.80	$ 0.78	$ 0.71	$ 0.78	$ 0.71	$ 0.74	$ 0.71	$ 0.75	$ 0.64	$ 0.65	$ 0.60	$ 0.64	$ 0.71
55gal ELA	$ 0.75	$ 0.73	$ 0.70	$ 0.73	$ 0.73	$ 0.70	$ 0.68	$ 0.69	$ 0.70	$ 0.64	$ 0.64	$ 0.61	$ 0.69
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 29.08	$ 29.07	$ 30.39	$ 29.40	$ 30.13	$ 27.83	$ 30.75	$ 29.26	$ 32.51	$ 31.25	$ 32.66	$ 29.51	$ 30.15
1lb per cs/24	$ 36.33	$ 41.10	$ 42.00	$ 44.00	$ 44.00	$ 42.00	$ 45.00	$ 42.00	$ 44.00	$ 44.00	$ 44.00	$ 42.00	$ 42.54
2lb per cs/12	$ 36.15	$ 36.90	$ 39.33	$ 41.00	$ 41.00	$ 36.00	$ 42.00	$ 37.50	$ 41.00	$ 41.00	$ 41.00	$ 36.00	$ 39.07
12oz plastic /24	$ 38.15	$ 35.00	$ 41.80	$ 40.80	$ 40.80	$ 38.19	$ 39.60	$ 34.80	$ 38.40	$ 38.40	$ 38.40	$ 33.60	$ 38.16
5lb per cs/6	$ 36.13	$ 37.50	$ 37.00	$ 41.25	$ 41.25	$ 41.18	$ 37.50	$ 45.00	$ 41.25	$ 41.25	$ 41.00	$ 42.45	$ 40.23
PRICES													
1/2 lb	$ 2.83	$ 1.83	$ 1.83	$ 2.83	$ 2.83	$ 1.93	$ 2.83	$ 2.83	$ 2.83	$ 1.83	$ 2.83	$ 2.83	$ 2.51
12 oz plastic/bottle	$ 2.14	$ 2.07	$ 2.25	$ 2.25	$ 2.25	$ 2.05	$ 2.33	$ 2.23	$ 2.30	$ 2.30	$ 2.30	$ 2.33	$ 2.23
1 lb.	$ 2.41	$ 2.50	$ 2.44	$ 2.37	$ 2.37	$ 2.22	$ 2.49	$ 2.29	$ 2.41	$ 2.41	$ 2.41	$ 2.49	$ 2.40
2 lb.	$ 4.15	$ 4.58	$ 4.68	$ 4.62	$ 4.62	$ 4.15	$ 4.67	$ 4.32	$ 4.61	$ 4.61	$ 4.61	$ 4.14	$ 4.48
3 lb.	$ 5.49	$ 5.49	$ 5.49	$ 5.49	$ 5.49	$ 5.49	$ 5.69	$ 5.69	$ 5.69	$ 6.69	$ 5.69	$ 5.69	$ 5.67
4 lb.	$ 8.60	$ 8.70	$ 10.92	$ 8.50	$ 8.50	$ 8.30	$ 6.68	$ 8.50	$ 8.50	$ 8.50	$ 8.50	$ 8.11	$ 8.53
5 lb.	$ 7.59	$ 7.90	$ 7.90	$ 8.60	$ 8.46	$ 7.89	$ 7.70	$ 6.25	$ 8.46	$ 8.46	$ 8.46	$ 7.70	$ 7.95
1lb. creamed	$ 2.51	$ 2.52	$ 2.52	$ 2.76	$ 3.76	$ 2.52	$ 3.76	$ 3.00	$ 3.00	$ 3.10	$ 3.00	$ 3.62	$ 3.01
Lb. comb(bxd)	$ 3.94	$ 4.01	$ 4.02	$ 4.03	$ 4.04	$ 3.65	$ 4.03	$ 3.98	$ 4.41	$ 4.20	$ 4.04	$ 4.55	$ 4.08
Round plastic comb	$ 4.24	$ 4.06	$ 4.13	$ 3.20	$ 4.06	$ 3.69	$ 3.89	$ 4.75	$ 4.12	$ 4.10	$ 3.91	$ 3.88	$ 4.00
Bswx lgt. w/p	$ 1.70	$ 1.75	$ 3.05	$ 3.53	$ 2.91	$ 2.00	$ 3.36	$ 3.71	$ 1.20	$ 1.20	$ 1.20	$ 1.30	$ 2.24
Bswx drk. w/p	$ 1.60	$ 1.60	$ 2.59	$ 3.06	$ 1.42	$ 1.41	$ 2.83	$ 3.09	$ 1.10	$ 1.10	$ 1.10	$ 1.20	$ 1.84
Pollination fee avg. per colony	$ 37.00	$ 36.98	$ 38.00	$ 37.51	$ 37.78	$ 41.06	$ 39.02	$ 37.26	$ 39.04	$ 36.94	$ 39.13	$ 39.32	$ 38.25

REGION ELEVEN													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 70.00	$ 79.00	$ 70.00	$ 71.33	$ 71.67	$ 65.00	$ 66.67	$ 71.67	$ 70.00	$ 64.25	$ 62.67	$ 62.70	$ 68.75
60lbs ELA	$ 59.33	$ 66.00	$ 66.50	$ 66.67	$ 60.50	$ 62.00	$ 61.67	$ 65.00	$ 65.00	$ 60.40	$ 60.33	$ 56.80	$ 62.68
55gal White	$ 0.86	$ 0.81	$ 0.82	$ 0.82	$ 0.78	$ 0.78	$ 0.74	$ 0.70	$ 0.72	$ 0.68	$ 0.67	$ 0.73	$ 0.76
55gal ELA	$ 0.83	$ 0.80	$ 0.78	$ 0.77	$ 0.70	$ 0.72	$ 0.68	$ 0.66	$ 0.70	$ 0.61	$ 0.60	$ 0.67	$ 0.71
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 27.75	$ 30.25	$ 28.57	$ 30.25	$ 27.75	$ 25.00	$ 27.75	$ 30.50	$ 30.50	$ 28.75	$ 29.25	$ 27.17	$ 28.62
1lb per cs/24	$ 49.53	$ 50.53	$ 42.78	$ 47.53	$ 42.65	$ 45.00	$ 36.20	$ 44.87	$ 50.30	$ 42.65	$ 44.20	$ 41.15	$ 44.78
2lb per cs/12	$ 44.30	$ 41.30	$ 42.70	$ 39.80	$ 33.80	$ 30.00	$ 33.80	$ 44.30	$ 37.60	$ 33.80	$ 34.80	$ 38.53	$ 37.89
12oz plastic /24	$ 46.70	$ 46.13	$ 41.30	$ 43.13	$ 39.13	$ 42.00	$ 31.80	$ 38.70	$ 43.70	$ 39.13	$ 39.80	$ 39.13	$ 40.89
5lb per cs/6	$ 43.78	$ 42.28	$ 43.35	$ 40.78	$ 34.78	$ 30.00	$ 34.78	$ 43.78	$ 39.55	$ 34.78	$ 35.78	$ 39.18	$ 38.57
PRICES													
1/2 lb	$ 1.85	$ 2.38	$ 2.11	$ 2.53	$ 2.53	$ 2.25	$ 2.55	$ 1.85	$ 1.87	$ 2.67	$ 2.75	$ 2.68	$ 2.34
12 oz plastic/bottle	$ 2.55	$ 2.70	$ 2.36	$ 2.70	$ 2.70	$ 3.00	$ 2.30	$ 2.55	$ 2.50	$ 2.76	$ 2.78	$ 2.76	$ 2.64
1 lb.	$ 3.58	$ 3.48	$ 2.86	$ 3.48	$ 3.32	$ 2.82	$ 2.73	$ 3.08	$ 3.37	$ 3.41	$ 3.61	$ 3.35	$ 3.26
2 lb.	$ 4.67	$ 5.05	$ 5.05	$ 4.98	$ 4.81	$ 5.00	$ 4.73	$ 4.47	$ 4.45	$ 4.82	$ 4.83	$ 4.73	$ 4.80
3 lb.	$ 6.50	$ 6.95	$ 6.40	$ 6.88	$ 6.52	$ 7.50	$ 6.03	$ 6.05	$ 6.45	$ 6.29	$ 7.00	$ 6.57	$ 6.60
4 lb.	$ 8.60	$ 8.91	$ 10.92	$ 7.97	$ 8.14	$ 8.00	$ 6.68	$ 6.90	$ 8.15	$ 9.26	$ 8.18	$ 8.11	$ 8.32
5 lb.	$ 9.07	$ 9.96	$ 9.21	$ 9.71	$ 9.38	$ 9.55	$ 8.71	$ 8.58	$ 9.02	$ 9.40	$ 9.51	$ 9.38	$ 9.29
1lb. creamed	$ 3.74	$ 3.74	$ 3.41	$ 3.49	$ 3.49	$ 3.62	$ 3.01	$ 3.79	$ 3.89	$ 4.34	$ 3.83	$ 3.87	$ 3.69
Lb. comb(bxd)	$ 4.75	$ 4.88	$ 4.92	$ 4.88	$ 4.73	$ 5.00	$ 4.88	$ 4.75	$ 4.75	$ 5.15	$ 5.25	$ 5.25	$ 4.93
Round plastic comb	$ 5.50	$ 4.75	$ 4.00	$ 4.25	$ 4.25	$ 4.50	$ 2.75	$ 4.98	$ 5.00	$ 4.75	$ 4.75	$ 3.88	$ 4.45
Bswx lgt. w/p	$ 3.42	$ 3.00	$ 2.38	$ 3.00	$ 1.40	$ 2.20	$ 2.08	$ 2.43	$ 2.00	$ 2.30	$ 2.17	$ 2.16	$ 2.38
Bswx drk. w/p	$ 3.33	$ 2.38	$ 2.22	$ 2.38	$ 1.41	$ 2.00	$ 1.88	$ 2.20	$ 1.83	$ 2.25	$ 2.05	$ 1.80	$ 2.14
Pollination fee avg. per colony	$ 37.19	$ 50.00	$ 50.00	$ 50.00	$ 50.00	$ 52.00	$ 50.00	$ 37.26	$ 39.04	$ 52.00	$ 55.00	$ 50.00	$ 47.71

REGION TWELVE													
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVG
BULK SALES													
60lbs White	$ 72.00	$ 59.40	$ 59.67	$ 57.45	$ 57.96	$ 66.00	$ 57.00	$ 57.00	$ 57.00	$ 53.00	$ 58.50	$ 57.40	$ 59.37
60lbs ELA	$ 65.00	$ 62.20	$ 62.00	$ 56.00	$ 51.80	$ 63.00	$ 56.00	$ 60.50	$ 55.33	$ 52.50	$ 66.00	$ 52.40	$ 58.56
55gal White	$ 0.87	$ 0.82	$ 0.82	$ 0.80	$ 0.79	$ 0.75	$ 0.80	$ 0.75	$ 0.78	$ 0.75	$ 0.65	$ 0.71	$ 0.77
55gal ELA	$ 0.82	$ 0.78	$ 0.78	$ 0.76	$ 0.70	$ 0.74	$ 0.77	$ 0.72	$ 0.76	$ 0.73	$ 0.70	$ 0.68	$ 0.75
CASE LOTS WHOLSALE													
1/2lb per cs/24	$ 28.08	$ 26.54	$ 30.39	$ 26.30	$ 31.53	$ 27.83	$ 26.30	$ 27.60	$ 31.87	$ 34.00	$ 36.60	$ 26.20	$ 29.44
1lb per cs/24	$ 46.40	$ 44.44	$ 47.20	$ 43.72	$ 45.43	$ 45.60	$ 43.72	$ 45.90	$ 45.12	$ 46.10	$ 49.47	$ 43.78	$ 45.57
2lb per cs/12	$ 39.48	$ 38.49	$ 39.18	$ 38.75	$ 36.13	$ 36.00	$ 37.63	$ 37.83	$ 36.50	$ 43.00	$ 42.00	$ 36.70	$ 38.31
12oz plastic /24	$ 29.20	$ 31.24	$ 36.80	$ 34.36	$ 34.38	$ 37.20	$ 34.96	$ 36.00	$ 34.60	$ 35.33	$ 37.20	$ 35.36	$ 34.72
5lb per cs/6	$ 38.91	$ 36.61	$ 39.00	$ 36.38	$ 36.38	$ 39.00	$ 36.38	$ 38.58	$ 37.55	$ 37.25	$ 40.50	$ 37.47	$ 37.83
PRICES													
1/2 lb	$ 1.75	$ 1.76	$ 1.75	$ 1.70	$ 1.76	$ 1.80	$ 1.74	$ 1.80	$ 1.88	$ 2.01	$ 1.83	$ 1.73	$ 1.79
12 oz plastic/bottle	$ 2.27	$ 2.11	$ 2.18	$ 2.10	$ 2.11	$ 2.15	$ 2.10	$ 2.13	$ 2.08	$ 1.95	$ 2.10	$ 2.08	$ 2.11
1 lb.	$ 2.96	$ 2.81	$ 2.83	$ 2.72	$ 2.75	$ 2.87	$ 2.74	$ 2.81	$ 2.84	$ 2.84	$ 3.05	$ 2.81	$ 2.84
2 lb.	$ 4.73	$ 4.39	$ 4.75	$ 4.45	$ 4.22	$ 4.70	$ 4.32	$ 4.46	$ 4.20	$ 4.63	$ 5.00	$ 4.69	$ 4.55
3 lb.	$ 6.20	$ 5.88	$ 5.70	$ 5.88	$ 5.58	$ 5.98	$ 5.57	$ 5.86	$ 5.56	$ 5.77	$ 5.99	$ 5.57	$ 5.78
4 lb.	$ 8.60	$ 8.69	$ 10.92	$ 6.00	$ 6.00	$ 7.95	$ 6.00	$ 6.90	$ 6.00	$ 6.00	$ 8.18	$ 5.95	$ 7.27
5 lb.	$ 10.25	$ 9.01	$ 9.25	$ 9.17	$ 8.33	$ 10.50	$ 8.17	$ 8.70	$ 8.56	$ 8.27	$ 9.29	$ 8.08	$ 8.97
1lb. creamed	$ 3.07	$ 3.26	$ 3.03	$ 3.27	$ 2.74	$ 3.53	$ 2.66	$ 2.86	$ 2.78	$ 2.93	$ 2.05	$ 3.07	$ 2.94
Lb. comb(bxd)	$ 4.00	$ 4.00	$ 4.73	$ 4.35	$ 4.40	$ 4.27	$ 4.38	$ 4.13	$ 3.98	$ 4.95	$ 4.25	$ 4.33	$ 4.31
Round plastic comb	$ 4.25	$ 4.19	$ 4.62	$ 4.25	$ 4.25	$ 3.88	$ 4.08	$ 5.20	$ 4.06	$ 4.22	$ 4.25	$ 4.07	$ 4.28
Bswx lgt. w/p	$ 2.98	$ 2.79	$ 3.00	$ 2.45	$ 1.43	$ 2.13	$ 2.34	$ 2.67	$ 3.00	$ 3.25	$ 3.00	$ 2.26	$ 2.61
Bswx drk. w/p	$ 1.75	$ 2.36	$ 2.75	$ 2.15	$ 1.21	$ 1.75	$ 2.26	$ 2.42	$ 2.20	$ 2.33	$ 2.75	$ 1.89	$ 2.15
Pollination fee avg. per colony	$ 35.50	$ 35.50	$ 32.67	$ 35.83	$ 34.71	$ 32.00	$ 34.60	$ 32.50	$ 38.00	$ 36.67	$ 36.50	$ 35.00	$ 34.96

PRODUCT AVERAGES BY REGION												
	1	2	3	4	5	6	7	8	9	10	11	12
BULK SALES												
60lbs White	$ 59.27	$ 63.80	$ 55.47	$ 68.13	$ 64.22	$ 56.31	$ 53.50	$ 65.61	$ 54.52	$ 60.05	$ 68.75	$ 59.37
60lbs ELA	$ 56.94	$ 60.24	$ 56.36	$ 61.91	$ 58.18	$ 53.33	$ 51.33	$ 62.13	$ 52.60	$ 58.76	$ 62.68	$ 58.56
55gal White	$ 0.73	$ 0.75	$ 0.74	$ 0.73	$ 0.72	$ 0.72	$ 0.73	$ 0.76	$ 0.78	$ 0.71	$ 0.76	$ 0.77
55gal ELA	$ 0.70	$ 0.71	$ 0.70	$ 0.70	$ 0.67	$ 0.68	$ 0.71	$ 0.71	$ 0.73	$ 0.69	$ 0.71	$ 0.75
CASE LOTS WHOLSALE												
1/2lb per cs/24	$ 28.67	$ 27.52	$ 30.15	$ 32.02	$ 27.52	$ 28.83	$ 29.58	$ 30.73	$ 29.82	$ 30.15	$ 28.62	$ 29.44
1lb per cs/24	$ 42.64	$ 41.89	$ 43.14	$ 44.21	$ 42.28	$ 41.14	$ 43.36	$ 40.22	$ 46.68	$ 42.54	$ 44.78	$ 45.57
2lb per cs/12	$ 38.85	$ 36.40	$ 41.64	$ 44.13	$ 38.90	$ 38.50	$ 39.22	$ 39.67	$ 41.31	$ 39.07	$ 37.89	$ 38.31
12oz plastic /24	$ 35.78	$ 36.03	$ 40.24	$ 37.71	$ 36.21	$ 32.18	$ 35.98	$ 34.73	$ 37.46	$ 38.16	$ 40.89	$ 34.72
5lb per cs/6	$ 40.83	$ 41.39	$ 46.35	$ 45.98	$ 42.87	$ 41.11	$ 39.05	$ 41.10	$ 45.44	$ 40.23	$ 38.57	$ 37.83
RETAIL PRICES												
1/2 lb	$ 1.82	$ 1.59	$ 2.75	$ 2.17	$ 1.54	$ 1.77	$ 1.84	$ 1.81	$ 2.36	$ 2.51	$ 2.34	$ 1.79
12 oz plastic/bottle	$ 2.20	$ 2.28	$ 2.30	$ 2.28	$ 2.08	$ 2.25	$ 2.10	$ 2.26	$ 2.67	$ 2.23	$ 2.64	$ 2.11
1 lb.	$ 2.71	$ 2.69	$ 2.59	$ 2.87	$ 2.27	$ 2.68	$ 2.57	$ 2.69	$ 3.30	$ 2.40	$ 3.26	$ 2.84
2 lb.	$ 4.48	$ 4.52	$ 4.50	$ 4.84	$ 3.92	$ 4.56	$ 4.31	$ 4.51	$ 4.65	$ 4.48	$ 4.80	$ 4.55
3 lb.	$ 6.19	$ 6.83	$ 6.53	$ 6.58	$ 5.68	$ 6.16	$ 6.29	$ 6.19	$ 6.26	$ 5.67	$ 6.60	$ 5.78
4 lb.	$ 7.53	$ 7.11	$ 8.33	$ 8.18	$ 7.91	$ 7.07	$ 8.78	$ 7.96	$ 7.24	$ 8.53	$ 8.32	$ 7.27
5 lb.	$ 9.14	$ 9.99	$ 9.81	$ 9.73	$ 8.61	$ 8.38	$ 9.02	$ 9.79	$ 9.74	$ 7.95	$ 9.29	$ 8.97
1lb. creamed	$ 3.23	$ 3.29	$ 3.73	$ 3.62	$ 3.73	$ 3.02	$ 2.89	$ 3.22	$ 4.87	$ 3.01	$ 3.69	$ 2.94
Lb. comb(bxd)	$ 3.96	$ 4.18	$ 3.81	$ 4.01	$ 4.08	$ 4.06	$ 3.69	$ 3.70	$ 5.40	$ 4.08	$ 4.93	$ 4.31
Round plastic comb	$ 3.61	$ 3.24	$ 3.55	$ 3.86	$ 4.00	$ 4.24	$ 3.22	$ 3.59	$ 3.24	$ 4.00	$ 4.45	$ 4.28
Bswx lgt. w/p	$ 2.50	$ 3.13	$ 2.30	$ 1.84	$ 1.96	$ 2.56	$ 2.25	$ 2.36	$ 2.52	$ 2.24	$ 2.38	$ 2.61
Bswx drk. w/p	$ 2.35	$ 2.74	$ 2.29	$ 1.56	$ 1.61	$ 2.31	$ 1.98	$ 1.85	$ 2.68	$ 1.84	$ 2.14	$ 2.15
Pollination fee avg. per colony	$ 36.24	$ 39.26	$ 30.44	$ 37.88	$ 28.50	$ 36.04	$ 36.88	$ 38.72	$ 22.09	$ 38.25	$ 47.71	$ 34.96

Figure 13

Figure 14

AVERAGE HONEY PRICES BY MONTH												
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
BULK SALES												
60lbs White	$ 67.55	$ 69.45	$ 63.18	$ 63.15	$ 59.76	$ 57.55	$ 60.91	$ 67.55	$ 58.23	$ 54.98	$ 61.70	$ 57.72
60lbs ELA	$ 64.24	$ 66.21	$ 62.07	$ 59.29	$ 55.73	$ 54.24	$ 56.86	$ 64.24	$ 57.01	$ 55.27	$ 57.57	$ 56.21
55gal White	$ 0.87	$ 0.89	$ 0.78	$ 0.84	$ 0.72	$ 0.74	$ 0.81	$ 0.73	$ 0.78	$ 0.78	$ 0.70	$ 0.68
55gal ELA	$ 0.81	$ 0.84	$ 0.74	$ 0.79	$ 0.66	$ 0.71	$ 0.77	$ 0.71	$ 0.76	$ 0.75	$ 0.66	$ 0.63
CASE LOTS WHOLSALE												
1/2lb per cs/24	$ 29.11	$ 29.62	$ 29.98	$ 29.41	$ 29.18	$ 29.11	$ 29.86	$ 29.11	$ 30.68	$ 30.14	$ 31.50	$ 28.94
1lb per cs/24	$ 43.09	$ 43.45	$ 44.18	$ 43.64	$ 42.49	$ 43.09	$ 43.06	$ 43.09	$ 44.15	$ 43.74	$ 44.47	$ 42.33
2lb per cs/12	$ 37.39	$ 38.48	$ 41.61	$ 39.49	$ 38.31	$ 37.39	$ 39.91	$ 37.39	$ 40.84	$ 40.25	$ 40.56	$ 39.02
12oz plastic /24	$ 35.44	$ 35.68	$ 36.98	$ 37.09	$ 35.99	$ 35.44	$ 35.15	$ 35.44	$ 37.33	$ 36.38	$ 37.94	$ 36.71
5lb per cs/6	$ 41.22	$ 40.98	$ 44.02	$ 41.90	$ 42.02	$ 41.22	$ 41.08	$ 41.22	$ 42.76	$ 41.56	$ 43.37	$ 41.10
RETAIL PRICES												
1/2 lb	$ 1.76	$ 1.81	$ 1.81	$ 1.84	$ 1.82	$ 1.76	$ 1.90	$ 1.76	$ 1.83	$ 1.85	$ 2.01	$ 1.85
12 oz plastic/bottle	$ 2.22	$ 2.21	$ 2.25	$ 2.23	$ 2.26	$ 2.22	$ 2.26	$ 2.22	$ 2.28	$ 2.24	$ 2.30	$ 2.21
1 lb.	$ 2.67	$ 2.69	$ 2.65	$ 2.68	$ 2.70	$ 2.67	$ 2.72	$ 2.67	$ 2.79	$ 2.82	$ 2.84	$ 2.72
2 lb.	$ 4.42	$ 4.43	$ 4.49	$ 4.53	$ 4.40	$ 4.42	$ 4.54	$ 4.42	$ 4.84	$ 4.60	$ 4.65	$ 4.53
3 lb.	$ 6.08	$ 6.21	$ 6.30	$ 6.32	$ 6.14	$ 6.06	$ 6.18	$ 6.08	$ 6.52	$ 6.47	$ 6.66	$ 6.27
4 lb.	$ 7.74	$ 8.10	$ 8.40	$ 7.68	$ 7.91	$ 7.74	$ 7.30	$ 7.74	$ 7.96	$ 8.19	$ 8.03	$ 7.89
5 lb.	$ 9.06	$ 9.14	$ 9.00	$ 9.48	$ 9.38	$ 9.06	$ 9.18	$ 9.06	$ 9.36	$ 9.53	$ 9.49	$ 9.21
1lb. creamed	$ 3.13	$ 3.22	$ 3.27	$ 3.24	$ 3.17	$ 3.13	$ 3.34	$ 3.13	$ 3.37	$ 3.40	$ 3.35	$ 3.32
Lb. comb(bxd)	$ 4.19	$ 4.08	$ 4.10	$ 4.15	$ 4.16	$ 4.19	$ 4.14	$ 4.19	$ 4.10	$ 4.25	$ 4.17	$ 4.21
Round plastic comb	$ 3.86	$ 3.69	$ 3.80	$ 3.59	$ 3.67	$ 3.86	$ 3.66	$ 3.86	$ 3.85	$ 3.87	$ 3.72	$ 3.65
Bswx lgt. w/p	$ 3.04	$ 2.89	$ 2.59	$ 2.58	$ 1.82	$ 1.81	$ 2.59	$ 3.04	$ 2.51	$ 2.82	$ 2.72	$ 2.36
Bswx drk. w/p	$ 2.62	$ 2.37	$ 2.56	$ 2.23	$ 1.50	$ 1.62	$ 2.23	$ 2.62	$ 2.16	$ 2.47	$ 2.44	$ 2.09
Pollination fee avg. per colony	$ 34.03	$ 35.93	$ 36.80	$ 37.54	$ 38.34	$ 34.03	$ 37.07	$ 34.03	$ 37.13	$ 35.81	$ 37.39	$ 37.96

Continued on Page 55

Roger Morse

Research Review

"Understanding swarming behavior and biology."

It is out of season to write about swarming, but since preventing your colonies from swarming is one of the most important aspects of honey production, it is a good time to think about it. The paper I review below has no immediate practical application except, perhaps, to emphasize that swarming (colony division) in a honey bee colony is an orderly process that will occur in every colony every year if things are normal. If you do not take steps to prevent swarming, your bees will take to the woods, so to speak, and be lost insofar as you are concerned.

However, it isn't just the fact that you lose your bees when they swarm, but also the fact that the bees in a colony about to swarm change their whole behavior starting eight to 10 days before the swarm emerges from the hive.

1. During this period of time, the queen loses weight so that she can fly, for otherwise she is too heavy to do so. This means that she lays fewer eggs.
2. The worker bees start to engorge so that the day the swarm emerges about 70 to 80 percent of the bees are full of food that they will need to start the new home. Engorged bees do not forage.
3. The wax glands in most of the worker bees enlarge and secrete wax so that the day the colony swarms the bees are carrying the wax they will need to build comb in the new home. Wax producers do not forage or process nectar.
4. At the same time, the scout bees search for a new home.

The bees do not gather food while house hunting. In other words, during these several days before the bees swarm they are not working for you but for themselves! They are not gathering honey or growing more bees to keep up the colony population.

During the past several decades a number of studies of the swarming process have been made, and we are gaining a better grasp of the basic biology involved. The paper I review below asks, "Who are the scouts that search for a new home?".

To answer this question, several two-frame (one frame above the other) observation hives, each with about 2,000 bees and a queen were established. Every third day thereafter, a group of 100 bees less than one day old was introduced into each hive. Each of these bees had a colored, numbered disc glued to her thorax (between her wings) so that she could be identified. These young bees were obtained by placing a comb of brood about to hatch in an incubator for about 18 hours and marking those bees that emerged during this time. The addition of marked bees continued for a period that ranged from about five to 11 weeks prior to the time the swarms emerged. As a result of this marking, about 10 percent of the bees in each swarm were marked and their ages known. It was by observing these marked bees that conclusions about the behavior of bees of all ages in the swarm were made.

The colonies grew in population because both of the added bees and the brood they themselves were rearing. Since these were small hives, they were quickly congested, and all of them swarmed as might be predicted under these circumstances.

These observation hives were watched closely for signs of swarming. Earlier research has shown that the bees will try to swarm usually about a day after the first queen cells are capped. When the bees were starting to swarm, an effort was made, usually successfully, to capture and cage the queen as she emerged from the observation hive. If she was not captured at this time the swarm was allowed to settle wherever it desired, and then a search was made for the queen and she was caged when found. The queen cage, with the queen within, was then tied to a stake where the activities of the bees could be observed. Scout bees that find a new home dance on the surface of the cluster where they can be easily seen. A jar of sugar syrup on which the bees could feed was attached to the stake so that the bees did not need to search for food and the scouts could devote themselves exclusively to searching for a home site.

Results

The age distribution of the bees in the swarm does not match the age distribution of the bees left in the parent colony. The swarm bees are of all ages, but on average are younger.

"The nest-site scouts were mostly middle-aged and older bees," and they are the oldest bees in the swarm. In the first swarm to emerge from its hive, they were 15 to 37 days old, but the last swarm to emerge, several weeks later, had home-site scouts as young as eight days and as old as 47 days. The nestsite scouts were slightly younger than the foragers. BC

Gilley, D. C. *The identity of nest-site scouts in honey bee swarms.* Apidologie 29: 229-240. 1998.

Good Stuff!!

The Art of The Sting: Bee Venom Therapy. A three-part video series, produced by James Higgins, 3801 US 50, Hillsboro, OH 45133, (513) 364-2331 and Visual Productions, 50 North High St., Dublin, OH 43017. Available from several outlets or Jim Higgins for $49.95US, U.S. Postage included.

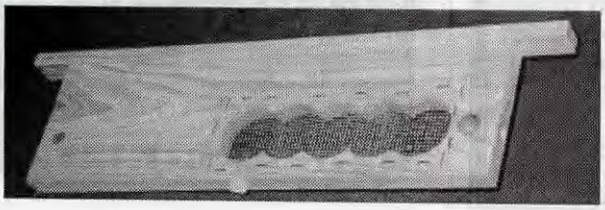
I've known Jim Higgins for about a decade. For most of that time I knew he was involved with apitherapy, but I wasn't aware of his devotion to the art, and science of the craft.

When you view his video series you'll find what I did about Jim, and about apitherapy. In this three-part video he explains three aspects of the art – how to sting, where to sting, and how to manage bees for apitherapy. His knowledge is obvious, but he supports this with background information and direct audience (in the studio) participation.

If you are involved in apitherapy – from either the giving or receiving aspect – you'll come away with two truths: First, everyone is different, with different responses to this alternative treatment; and second, and most important I think, illness is not the final answer.

Kim Flottum

Queen Introduction Frame. The thought that more of a good thing should be better is what led Phillip O'Brien to develop this piece of equipment. The concept – lots of exposure to a new queen will enhance acceptance makes sense. Conversely, the increased area of exposure aids in disseminating the new queen presence more rapidly than the traditional cages makes sense, too. And, according to O'Brien it works better than cages. To use, replace a broodless frame in the colony with the cage, insert candy in appropriate holes and let the bees do the rest.



Cost? $11 + $5 shipping in U.S. One queen saved, says O'Brien pays for the unit. Phillip O'Brien, 211 Westview Circle, McComb, MS 39648.

Kim Flottum

Easy Bee Rig. Designed in Israel, this unit's creators claim several management advances when in use. The bottom of the frame contains the brood box, or four brood boxes, actually, for four individual colonies. Each side of the unit (two colonies/side, and two sides), sits on a moveable rail system that can be pulled out to examine the box.

Honey supers above remain, unlifted by the beekeeper, on an independent platform. At rest, honey supers sit directly on brood boxes, when in use, an easy-to-use lifting mechanism separates the 'bottom' from the 'top.' Easy is correct, too, as very, very little effort is required to lift, or to pull drawers.

Sturdily built, perhaps too sturdy, this unit weighs about 200 pounds, which is the drawback for commercial migratory use. The cost, too, even with improved labor and increased honey production must be examined.

However, when talking to their engineering people, a less sturdy unit, that would perhaps hold two deeps is possible, and ideal for a sideline operation. Easy to use would help and easier to get into colonies would be ideal for the small scale operation.

Contact them directly by phone at 972-6810055 or see their web page at www.bee-guard.co.il.

Kim Flottum

Instrumental Insemination of Honeybee Queens. 25 minute video. $49.95 from Sue Cobey, 1735 Neil Ave., Columbus, Oh 43201, or The A.I. Root Co.

The first thing you notice in the above information is the price – $50 for a 25 minute video. This should get your attention because it is priced far too low for what you get.

Several chapters make up the video – the various instruments available, raising drones and collecting semen, insemination, preparing the queen, semen storage and quality control.

The close ups under the scope are incredible, and the step-by-step techniques are easily seen, and followed.

Sue covers the whole process, showing the usual troubles encountered, and how to overcome them for every step. And of course you can stop, rewind and replay every step again and again.

I know how this sounds but Sue makes it look easy. And breeders need all the help they can get. If you already have the equipment, this will make you better. If you don't, now's the time to start.

Kim Flottum

Organic Pages, ISBN 1881427994, Annual Directory of Organic Industry Resources. 270 pages, over 770 organic companies and 530 organic farms indexed by industry sector (16) products and business activity. Web, email and mail order contacts listed. $44.95 + $6.00 P&H in North America. Contact Dan Pratt, OTA Press, P.O. Box 1078-R, Greenfield, MA 01302.

If you're interested in the industry (yes industry) of organic products, growing or supplying, this directory is essential. Published by the Organic Trade Association the contents, listed above, are immense and well organized. Several honey and bee product businesses are listed, but the organic status of honey is in question, but the rest seen legitimate. Nevertheless, if you want organic soybeans and live in Ohio, this book will tell you who grows them, and how to get ahold of them. Also listed are email and web sites, which help a great deal when exploring. Valuable, but expensive, this book is a great resource.

Kim Flottum

Mark Winston

So What's Left?

"Scientific wannabees should take heart and imagine where we might go rather than dwell on how much we already know."

I had an interesting encounter with a graduate student "wannabee" the other day, as in "Dr. Winston, I think you're the best thing since sliced bread and I wanna bee your student." All professors encourage applicants who seem motivated, intelligent and aware, while politely discouraging students who are on fishing expeditions for a life. This particular applicant was definitely fishing, and unusually uninvolved in his interview, considering he wanted me to support him for the next two or three years. Nevertheless, I was fairly polite until he asked me whether there was anything left to study about bees. Lack of imagination is another bad sign in a potential student, so I promptly showed him the door.

His question stuck with me, however, because I often get asked by nonbeekeepers whether there is anything left to know about bees. Perhaps this question isn't that surprising, since bees have been one of the most well-studied organisms in scientific research. There have been more books, papers and journals devoted to bees than to almost any other organism, and recorded knowledge about bees goes back to the earliest human musings on cave walls and in the tombs of Egyptian Pharaohs. Bee research has not been immune to the explosion in scientific knowledge in our current century, and the rapid technical advances in research techniques and new conceptual insights that characterize contemporary science have resulted in waves of new knowledge and understanding about bees.

What have we learned recently, and what's left to know? Even in my short time in the bee world, our conception of what's happening in a colony has changed dramatically, and tremendous opportunities remain for bright students to further change our understanding of what it means to be a honey bee. For example, when I began working with bees 24 years ago, a honey bee colony was viewed as a single entity of thousands of individuals functioning as one unit. While we have recognized for some time that a colony is made up of many subfamilies since queens mate with a dozen or so drones, it is only recently that we've learned how each subfamily within the hive behaves somewhat differently than the others. Some tend to forage more for pollen, others defend the colony more vigorously, and still others are more likely to clean the nest.

Taken together, these findings have radically altered our bee view from thinking of a colony as a single cohesive unit to viewing colonies as a collection of intertwined groups, dependent on each other but each distinct in what it has to offer for colony survival. Thus, a colony is like a small town, with everyone a citizen but with sub-guilds of individuals who specialize in food collecting, cleaning, and even undertaking more than other inhabitants. While bees (people) generally get along, each subfamily has a slightly different way of going about things, and conflicts between the colony's (town's) citizens do occur, and fights erupt occasionally.

This new view of colonies is not the end of the research road, however, and has raised more fundamental questions than it has answered. Why, for instance, have subfamilies at all? Why does the queen mate multiple times to provide this diversity, and what is the advantage for colony survival of having groups within the larger colony structure? One theory is that diversity protects colonies from parasites and diseases, since each subfamily may have a different degree of tolerance to various pests. Another theory is that diversity provides a flexible, resilient work force that can respond more successfully to sudden changes in colony conditions or resource availability. These theories remain just that – ideas that need to be tested, and that hold potential to further illuminate our understanding of the complex factors that have led to the colony structure we see today in honey bees.

Another outstanding question in honey bee biology that an energetic and clever student might address is why worker bees sacrifice their own reproduction and rarely lay eggs in colonies of most honey bee races, yet in the Cape honey bee from South Africa not only do workers frequently lay eggs, but the eggs often develop into other workers or even into new queens. While this behavior is well-known, we still don't understand the underlying factors that allow Cape workers to produce females when workers of other races will rarely do so, nor do we know why this trait is not more common among honey bees. This question requires the application of virtually every aspect of bee science, from ecology to behavior to physiology to genetics

Continued on Next Page

"Eventually, we should be able to link a particular genetic code to almost any behavior, and then fully understand how a signal can go from a gene through a hormone to a behavior, and result in one subfamily of bees being more likely to collect pollen and another more likely to clean out a cell."

and more, and also is of immense practical importance since the Cape bee has now been spread by beekeepers to most of South Africa and is causing considerable problems for beekeeping there. If I were a young bee student looking to ask the "big" questions I'd head to South Africa, because I doubt there are any research situations in which we could learn more about basic honey bee biology while doing work of considerable importance to the beekeeping industry.

Not all unsolved research problems with bees involve the big picture, at least to start with. There are some apparently small questions that may conceal bigger issues. For example, I was a co-author on a paper years ago (1992, L. Fergusson-Kolmes, S.A. Kolmes, and M.L. Winston, *Journal of the Kansas Entomological Society* 65:85-86) in which we reported that individual dancing bees have a statistically significant tendency to turn left or right following their waggle runs. This may be a statistical anomaly, but it raises some interesting bigger issues: Do insects in general have handedness, so that individuals prefer to turn left or right, and what might the adaptive advantage be for that behavior? For bees, why not alternate choices of left and right, or always go in one direction? Is this handedness simply coincidence, or does it provide insights into adaptive aspects of bee behavior? *Varroa* mites tent to turn left rather than right in the absence of other cues; again, statistical anomaly or a telling clue to an important aspect of *Varroa* biology?

Other questions about bees arise from considering scientific advances from outside the apicultural sphere. Take juvenile hormone for instance, a hormone produced by all insects that is involved in controlling insect growth from larval through adult stages, and in adult females is important in the initiation of ovary development and egg laying. This hormone was first discovered accidentally, when scientists doing work on insect development discovered that their study insects were no longer changing into adults, and eventually tracked the problem back to some new paper towels that turned out to have come from fir trees that contained compounds similar to juvenile hormone. Once the existence and identity of this set of hormones was known, a number of bee researchers began to look into its effects on honey bees, and discovered that this hormone in bees is involved in directing worker larvae to mature into queens, and in the change in adult worker behaviors from the in-hive tasks performed by young bees to the outside tasks like foraging that are the responsibility of older bees.

Yet, this is only the beginning of the story. New advances in molecular biology are now allowing bee researchers to identify the genes that control juvenile hormone, and to link these and other genes to particular behaviors. Eventually, we should be able to link a particular genetic code to almost any behavior, and then fully understand how a signal can go from a gene through a hormone to a behavior, and result in one subfamily of bees being more likely to collect pollen and another more likely to clean out a cell. Thus, the advances in our thinking that have led us to move from considering the colony as one happy family to thinking of it as a group of relatively happy but sometimes conflicting subfamilies are only the beginning. We are on the verge of another revolution in how we think of bee individuals and societies, a revolution based on moving to the next level of scientific progress.

These changes in how we consider bees may seem interesting, but perhaps insignificant in bee management. Not so; the new view of colonies as a mix of subfamilies with different characteristics has had some practical importance. For example, this diversity has been considered in programs to select disease- and parasite-resistant stock, and beekeepers involved in queen rearing now pay more attention to providing adequate sources of drones carrying appropriate and diverse genetic characteristics. Some of the recent findings concerning juvenile hormone and colony genetic diversity are important components in current research to solve the Cape bee problem. Our growing understanding of the link between genetic background and the expression of behaviors undoubtedly will prove important in developing more sophisticated ways to manage bees, such as the use of queen, brood and worker pheromones to manipulate colonies to our advantage. Designer bees matching colony characteristics to tasks such as pollination or environments such as cold Canada or tropical Brazil may not be far off.

And I have no doubt that will not be the end. We can look ahead a little bit to where scientific understanding might take us, but predicting beyond the next step is virtually impossible. There's an endless amount still to learn about bees, and scientific wannabees should take heart and imagine where we might go rather than dwell on how much we already know. BC

Mark Winston is a professor and researcher at Simon Fraser University, Burnaby, B.C. Canada. He is program director for Apimondia 1999.

?DO YOU KNOW?

New Pests

Clarence Collison
Mississippi State University

In recent years, several of the new beekeeping problems that we have to deal with now have been accidental/illegal introductions into North America. Today we have a global economy, with the distribution of goods and services around the world, which may facilitate the introduction of unwanted pests. Even though we have laws to keep unwanted problems from getting into the United States, new predators, parasites, and diseases seem to find their way in. How familiar are you with our most recent beekeeping pest introductions?

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

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

1. ___ All life stages of the small hive beetle are normally found within the hive or in stored beekeeping equipment.
2. ___ The small hive beetle is described as being as destructive as the wax moth.
3. ___ Small hive beetle adults and larvae feed on honey and pollen inthe beehive.
4. ___ Varroa mites in brood cells with dead pupae can stay alive for up to three weeks.
5. ___ The spread of Varroa mites within an apiary and between apiaries is partially a result of drifting honey bees. Flying drones carry more Varroa mites than foraging worker bees.
6. ___ The original host of the honey bee tracheal mite was the eastern honey bee, Apis cerana.
7. ___ Varroa mites can complete their development in worker, drone and queen cells.
8. ___ An adult female Varroa mite must have a blood meal from a honey bee larva before she can lay viable eggs.
9. ___ During the summer, individual adult Varroa mites produce more than one generation of brood.
10. ___ An adult Varroa female mite lays more eggs in drone cells than she does in worker cells.
11. ___ Male Varroa mites are produced from unfertilized eggs and female Varroa mites develop from fertilized eggs.
12. ___ Male and female tracheal mites migrate from one bee host to another.
13. ___ Male tracheal mites are larger than female mites.
14. ___ Honey bee tracheal mites will infest queens, drones, and workers.
15. ___ Adult tracheal mites lack eyes.
16. ___ Formic acid is equally effective against Varroa and tracheal mites.
17. ___ The ether roll technique is used to sample colonies for Varroa and tracheal mites.

Multiple Choice Questions (1 point each)

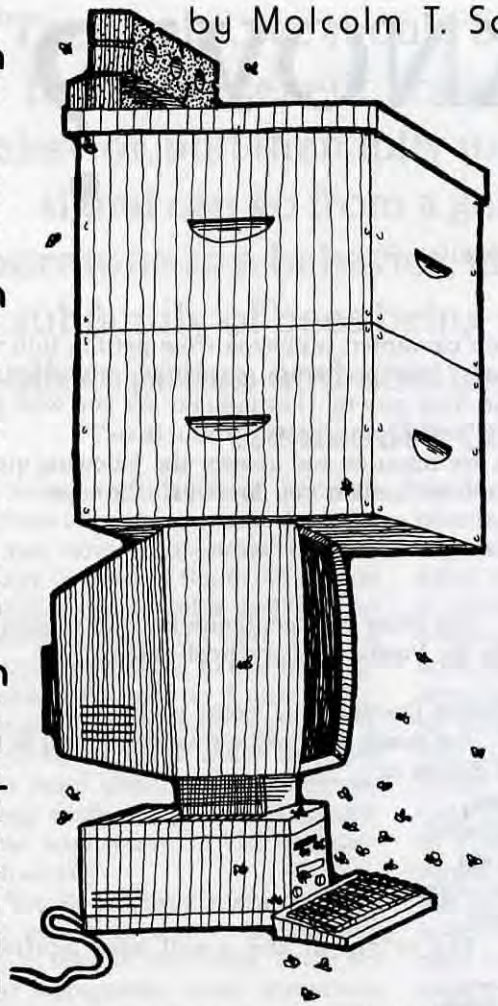
18. ___ The small hive beetle was first found in the United States in _____ .
    A. Texas
    B. California
    C. Florida
    D. New Jersey
    E. Maine
19. ___ The origin of the small hive beetle is _____ .
    A. Germany
    B. South Africa
    C. Honduras
    D. Japan
    E. Argentina
20. ___ Adult honey bees are most susceptible to tracheal mites when they are:
    A. 1-2 days old
    B. 5-6 days old
    C. 8-10 days old
    D. 12-14 days old
    E. 16-18 days old
21. ___ Female Varroa mites survive during broodless periods in the hive by:
    A. burrowing into pollen cells
    B. becoming inactive and going into diapause
    C. attaching themselves to worker honey bees and sucking blood.
    D. living off from internal nutrients that they have stored up
    E. feeding on honey stores found within the hive
22. Describe female Varroa mite feeding sites on adult honey bees. (1 point).
23. Name the three types of Apistan strips. (3 points).

ANSWERS ON PAGE 56

Beekeeping In The Digital Age

by Malcolm T. Sanford

The Largest Beekeeping Site



Arguably the largest single World Wide Web beekeeping site has been developed by Mr. Gilles Ratia, originally from Morocco and an ex-professional beekeeper who runs his Apiservices site from his 200-year-old farmhouse in France's Dordogne region. Although the original language of the site is French, it also is available in English and Spanish and soon will be translated into German. The site has three URLs:

http://www.apiservices.com
http://www.apiculture.com
http://beekeeping.org

Again, for those not familiar with terminology used here, I refer you to **back issues** of this column.

So far, Mr. Ratia has been able to do something that has eluded many. He has a World Wide Web beekeeping site that produces income. Although businesses initially were excited about the commercial opportunities of the Web, many have been disappointed. The possibilities continue, but mechanisms and traditions for payment by users have yet to be worked out to everyone's satisfaction. Thus, income from many sites is minimal to nil at present.

The large number of for-the-most-part "free" resources on the Web available to those in quest of information on almost any topic is one of the attractions of this technology. However, this has also created opportunity for many people to publish questionable material. In great part this has been the most controversial part of the World Wide Web and has gotten the lion's share of attention from traditional media. For example pornographic images, hate speech, bomb-making plans and the like are often the only kind described in newspapers or on radio and television. Little is reported about the vast majority of important and useful information one can get from the Web, including that related to beekeeping.

Although charging users continues to be problematic, Mr. Ratia has exploited the other side of the coin. He gets his income from those who want to establish a presence in cyberspace by hosting them on his **Apiservices** site. He also provides a wide range of other consulting services to the world beekeeping community.

To call **Apiservices** a "megasite" is not an exaggeration. At last count, it hosts over 37 entities, including a dozen journals the likes of ***Bee Biz*** (English), ***Abeille de France*** (French), ***Imkerei Technik*** (German), ***Vida Apícola*** (Spanish), ***O'Apicultor*** (Portuguese). Again, remember that words in bold-faced type are selectable using the computer and immediately transport one to that site. Also represented are ***Beekeeping and Development*** and ***Apidologie***. A wide array of products can also be found at the site, including Gilles Fert's book on **Queen Rearing**, a **CD-ROM** on honey bees, and bee-derived products for human health (**Apisélixirs** and **Chézelles**). In addition, Apiservices hosts one of Europe's largest equipment manufacturers (**Ets Thomas Fils**) and sellers of veterinary products for bees (**Biové** and **Swarm**).

The information associated with **Apimondia** on the Apiservices site is extensive. One cannot only see the venues of past meetings, but future ones as well. Also accessible is a comprehensive list of awards given at the last two conventions (**Lauzanne**, Switzerland 1995 and, **Antwerp**, Belgium, 1997). Data on the world honey market is present, as well as a list of museums that feature beekeeping themes. Finally, one can find out beekeeping information about many countries. As an example, this is what is displayed for **Israel**:

Date / source: 1997 / Ezra Manela

number of inhabitants / nombre d'habitants: 6,000,000
size in square kilometers / nombre de km²: 20,770
number of beekeepers / nombre d'apiculteurs: 480
number of beehives / nombre de ruches: 85,000
average production honey/beehive/year / production moyenne miel/ruche/an: 64 Kg
average honey prices wholesale/retail / prix moyens gros/détail: NA/NC
tons of exported honey / tonnes miel exportées: 150
tons of imported honey / tonnes miel importées: 200
addresses of national associations / coordonnées associations nationales:

The Israeli Beekeepers Association
56 Hamasger st
P.O.B. 57302
61 572 Tel-Aviv
Israel
Phone : (+972) 3-562 15 15
Fax : (+972) 3-562 36 36
address of relative government ministries / coordonnées responsable gouvernemental:
diverse: research centers, laboratories, annual congresses, WEB, etc. / divers:
centres de recherches, labs, congrès annuels, WEB, etc...:
Hebrew University of Jerusalem
Prof. Dan Isikovitch
Tel-Aviv
Agriculture Research Organization
Vocani Center
Veterinary Services and Animal Health
P.O.B. 12
50250 Beit Dogon

Mr. Ratia has also put up a lengthy report from the **Triwaks Honey Bee Laboratory**, Hebrew University of Jerusalem, Faculty of Agriculture in Rehovot, Israel. This document describes who is currently working at the facility and lists projects and papers over the last two decades, many of which are truly trendsetting bee research. It can be seen by selecting the following URL:

http://www.beekeeping.org/tbrc/

The **Apimondia** site also features information on the journal **Apiacta** and how to order the proceedings for most meetings as far back as 1967. That year was the last time this organization met in the United States (Maryland). Finally, the relevant parts of the **European Codex Alimentarius** F.A.O./O.M.S. have been extracted from the last revision (May 1993).

Several other organizations are also hosted by Apiservices. These include the **European Association for Apitherapy**, **European Documentation in Apiculture for Press and Information (EDAPI)**, and **The European Professional Beekeepers Association (EPBA)**. The latter organization was formed in October 1997 by beekeepers from Austria, Italy, France, Sweden and Germany. It plans to unite national professional beekeeping organizations so as to increase their effectiveness and power. EPBA's objective is to protect the future of professional beekeeping in Europe and to increase its influence on the new European Honey Directive (EU Directive 12.21) in order to improve the quality of European honey production. A recent addition is a long treatise on the history of **honey adulteration**, sponsored by the Syndicat des Producteurs de Miel de France.

Besides this wide range of information, the **Apiservices** site also has various tools, including: **dictionaries**, calculators (**polishes**, **weights**) and a **free notice board**. Unique to this site are interactive catalogs for **stamps**, **coins** and **postcards** that feature images of honey bees.

Apiservices engages in a long list of consulting services, including feasibility and market studies, supervision of development programs (**Vietnam**), advice on queen rearing and instrumental insemination, and help with computer programming, data collection and Web development. Finally, individual counseling in apicultural management is possible, if one still has questions after accessing the linked Web sites and/or subscribing to the electronic mailing lists. These lists have provided a new dimension in electronic information exchange. I will discuss them in my next column. BC

Malcolm T. Sanford is the Extension specialist in Apiculture for the state of Florida. He publishes the electronic and traditional newsletter, APIS: http://www.ifas.ufl.edu/~mts/apishtm/apis.htm

THIS YEAR, TRY A TRAILER

and save your back and your bees

Larry Goltz

One of the few advantages of getting older is that hopefully, it teaches us to become wiser. Also, often through necessity, it becomes more important to conserve our physical energy than when we were young. Those of us who keep bees on a moderate scale cannot afford modern machinery such as employed in the handling of hundreds or thousands of multiple-story hives during pollination or honey-producing manipulations or moves. Honey being what it is, a heavy substance stored initially in supers weighing up to 90 pounds (less in the three-quarter and half-depth supers) combined with one, two or three brood chambers, makes a formidable load for beekeepers to handle. An established apiary that was gradually built up from splits, package bees or nucs most likely becomes filled with hives unwieldy late in the season, particularly if it is necessary for any reason to move to another location.

Sooner or later a beekeeper is likely to be faced with the problem of moving heavy, established hives. Without mechanization, sometimes lacking even any form of two-wheeled handtruck, the hobbyist or beekeeper with a limited number of hives must manhandle colonies, hoping for help from sturdy sons, brothers-in-law or whoever is available for assistance. He or she finds soon that moving heavy hives can be a threatening task.

I have become wary of lifting excessive weight but don't want to give up beekeeping. Keeping colonies permanently mounted on a trailer may seem to be an unorthodox approach to solving a common problem, but over a period of several years it has worked out as a fairly practical practice for me.

My first experience with trailer-mounted bees began with the purchase of a used 16-foot dual-axle trailer. This trailer carried 20 hives fitted in two rows of 10 each, spaced closely side by side facing outward, allowing a walkway of about 24 inches in the center. Since I anticipated making at least several moves during the season on public roads, safety was of concern. I use three three-quarter depth hive bodies as brood chambers with supers of the same depth added as needed. Most of the moves are made carrying only the three hive bodies on each hive. Supers are usually removed after the Spring manzanita honey flow, here in California, before any pollinating moves, after any mid-season honey flows, and finally after the main nectar flow from yellow star thistle. The trailers remain parked at this final location throughout the Winter, such as we have in the upper Sacramento Valley.

My first trailer with its full load of bees mounted permanently on location at a strawberry plant nursery in northeastern California.

Hives are secured on the trailers by first fastening bottoms, first, second and third hive bodies together with staples or other fasteners. I began by using conventional wire staples as furnished by bee equipment suppliers, but as I am not satisfied with this hardware, I plan to switch to a homemade joiner. The basic hive, whether a one, two or three story unit is then mounted on the trailer, secured on the sides and back by 2" x 2" blocks nailed to the wooden floor of the trailer. The fronts of the hives are against a railing 12 to 18 inches high of angle iron, making up the sides of the trailer. There need be no front-end railing, but the back may be fitted with a tailgate or ramp if desired.

Moving an apiary, in this instance 20 hives, consists of nailing down the migratory covers and tying down the hives in some manner so as to secure the colonies against any possible movement. I know these preparations may seem unduly cautious to the uninitiated in moving bees on the highway on trailers, but I feel much more confident that I will arrive safely at my destination with a secure load. Sometimes moves are a number of miles on traveled roads and sometimes on not so smooth roads. Without such precautions, having hives slip their moorings can be as troublesome and perhaps as dangerous as having cargo shift in the hold of a ship during rough weather.

I usually make my moves in the evening, after the bees are in the hives. I move with open entrances; a good smoking or two before pulling out usually settles the bees in. In hot weather some clustering out can be expected at first, but I have never noticed an excessive bee loss

Trailer with hives ready to receive divides as soon as the colonies come from almonds. A light truck is usually sufficient to pull the utility trailers of eight or 10-foot length. The walkway is 18" wide, adequate for working the colonies.

The author placing the last of the grease patties after giving each colony a terramycin dusting and inserting Varroa *strips. This happened to be a rare sunny but cool day in northern California during a period that saw 14 inches of rain in January and 16 inches in February.*

because of it: The bees either retreat into the entrance or hold a tight cluster for the duration of the move. Beginning the move at dusk allows an emergency stop should one be necessary without bees leaving the hives. A safety rule is keep moving if at all possible to the destination.

The one objection to the first trailer I used as a permanent transport was that it was one with the platform built above the chassis and wheels giving it an appearance of having a high center of gravity when carrying 20 three-story hives. It towed satisfactorily, but I now prefer a shorter trailer with the bed lower, between the wheels and fenders. I now have eight- and 10-foot single-axle trailers, which are more manageable with the vehicle I now have. Braking is less of a problem on a smaller loaded trailer than on the longer ones with the larger number of hives. Usually it is not necessary to have braking arrangements on the small trailers due to the lighter loads. On the trailers I now have, with two hives on each side, those facing the wheels must be fitted with entrances in the covers, since a bottom entrance would be blocked by the wheel fenders. This apparently is not objectionable to the four colonies except that it is temporarily confusing to the field bees when I add supers and consequently elevate the entrance. Evidently they can "think" their way out of the predicament, "proving" that they have this capacity!

Several objections can be made to having hives permanently mounted on my trailers. One is the extra expense of the trailers, the initial cost and the licensing. This is a valid objection, but not having to lift hives, ever, and to have mobile apiaries available for immediate, easy moves to pollinate or to move to nectar sites is certainly a plus. Of course a trailer or two carrying 12 or 14 hives is satisfactory only for limited acreages, a market I have yet to fully exploit.

Having hives secured on a trailer limits the accessibility to the lower two units of my three-story brood chambers. From using this system I have found no pressing need to tamper with the lowest hive body; I like to think of it as a reserve space, useful mainly as a clustering space during our extremely hot Summers. I have observed few swarms from my three-story colonies, perhaps due in part to the extra space provided by the lower chamber. The second hive body from the bottom is utilized by strong colonies for brood and honey storage as needed, while the third or top body is where the most action is and is the brood chamber in which frames can be manipulated for inspections, medication and for drawing combs of brood and honey for making divides in the Spring.

Having hives spaced closely side by side seems to pose few problems with general drifting of field bees although I notice slightly higher numbers of bees in the end colonies, not an uncommon occurrence in any apiary. I have made no effort to differentiate hives by painting them different colors or by using symbols, things touted to be necessary to guide bees to their own residences. Give the little critters some credit for "intelligence" or whatever they possess that allows them to often outthink their keepers.

Having hives on trailers, I have found, virtually prevents skunk depredation, but does not prevent mice from reaching the hives via the wheels. No doubt bears investigate my mobile apiaries, but so far I have had only one instance when a couple of hives were wrenched from the end of a trailer even though they were stapled together and strapped down pending a move the next day. With my apiaries on small trailers I can place them in relatively bear-free locations or move them at the first hint of trouble from these omnivorous predators. I can move my bees almost immediately in the event of reported threats that may result from my having bees in proximity to humans. This is a problem nearly every beekeeper experiences at one time or another. I appreciate having the capability to move a group of bees at literally a moment's notice should an unscheduled insecticide application be imminent in the vicinity. I am no stranger to coming upon a carpet of dead bees in front of my hives and the surviving ones in a terrible stinging turmoil following an unexpected spray application. I could have moved the bees within an hour or less without effort had they been on trailers at the time.

I realize the limitations and the possible objections that could be voiced to having hives permanently mounted on trailers. Be that as it may, I like the idea and find it satisfactory in my circumstances. BC

Larry Goltz moves his bees from, and to his home in Redding, CA.

Status Of The Small Hive Beetle In The U.S.

P.J. Elzen, J.R. Baxter, D. Westervelt[1]
C. Randall[2], L. Cutts[1], W.T. Wilson,
F.A. Eischen, K.S. Delaplane[3], D.I. Hopkins[4]

Now In Four States, What's Next?

Nature

The small hive beetle, *Aethina tumida* Murray, is a new pest attacking honey bees (*Apis mellifera*) and hives in the Western Hemisphere. Its native range is sub-Saharan Africa; how and when *A. tumida* first was introduced into the U.S.A. is unknown. In South Africa, this pest is considered minor in its effects, attacking weakened colonies and combs in storage and treatment for its control is seldom deemed necessary. In contrast, some infestations seen in the U.S. have been of previously robust hives as well as weakened hives, and damage to honey and wax by beetles was so severe as to leave no doubt for the necessity of control measures.

Opening an infested hive reveals adult beetles congregating mostly on the bottom board and larvae, when present, dispersed throughout the frames and bottom board. There is a strong smell of fermenting honey. European bees do not appear to actively defend the hive against beetles and larvae. Stored honey in combs is contaminated by adult and larval feeding, resulting in fermentation of honey and subsequent un-harvestability.

Larvae crawl toward the light to the soil and pupate there. The predominant honey bee subspecies in the U.S.A., *apis mellifera ligustica and A. mellifera carnica*, do not exhibit defensive behavior in response to invasion of beetles into the colony. Once the colony has become heavily damaged by *A. tumida*, bees abandon the hive. Given the severity of damage seen in some U.S.A. hives there should be no doubt that this pest has the potential to greatly affect the honey bee industry in regions where it has been discovered.

Extent

The presence of *A. tumida* has been confirmed in four U.S.A. states since June 1998. Six counties in Florida have reported infested beehives. Cases of infestation have also been documented in Georgia, North Carolina and South Carolina. Movement of the small hive beetle into new areas is highly probable, given the migratory nature of beekeeping. Cooperators in Florida have also observed pest eggs attached to the backs of honey bees, therefore providing an additional means of colony infestation and beetle spread. The ability of *A. tumida* to withstand the colder temperatures of the northern U.S.A. in Winter, therefore increasing its chances of establishing in all regions of the U.S.A. and increasing in number, is unknown at this time.

Detection

No means of detecting the presence of *A. tumida* within a beeyard, other than direct observation of insects and damaged hives, is possible at this time. Other beetle species within the same family of *A. tumida* – the Nitidulidae – produce aggregation pheromones that attract flying adults to suitable hosts for mating and feeding purposes. Previous research has shown that these pheromones are highly species-specific and are produced only at initially low density of beetles. Samples of pheromones from these other nitidulids were tested in Florida as attractants for *A. tumida*, but no activity was seen. We have found that the small hive beetle is attracted to a combination of honey, pollen, and live adult bees: perhaps these can be used as trapping lures.

Control

The ARS Weslaco bee group has completed a laboratory study comparing the toxicities of several insecticide classes, impregnated in plastic strips, against *A. tumida*. Results were encouraging: all pyrethroids tested killed 100% of adults and larvae; two of three organophosphates tested gave equally good control. Two insecticides with novel modes of action provided little control. It must be realized, however, that these were laboratory findings only and these same chemicals might behave differently in beehives. The presence of Apistan strips, a pyrethroid, within infested hives did not control either adults or larvae of *A. tumida*. However, one of the organophosphates – coumaphos strips

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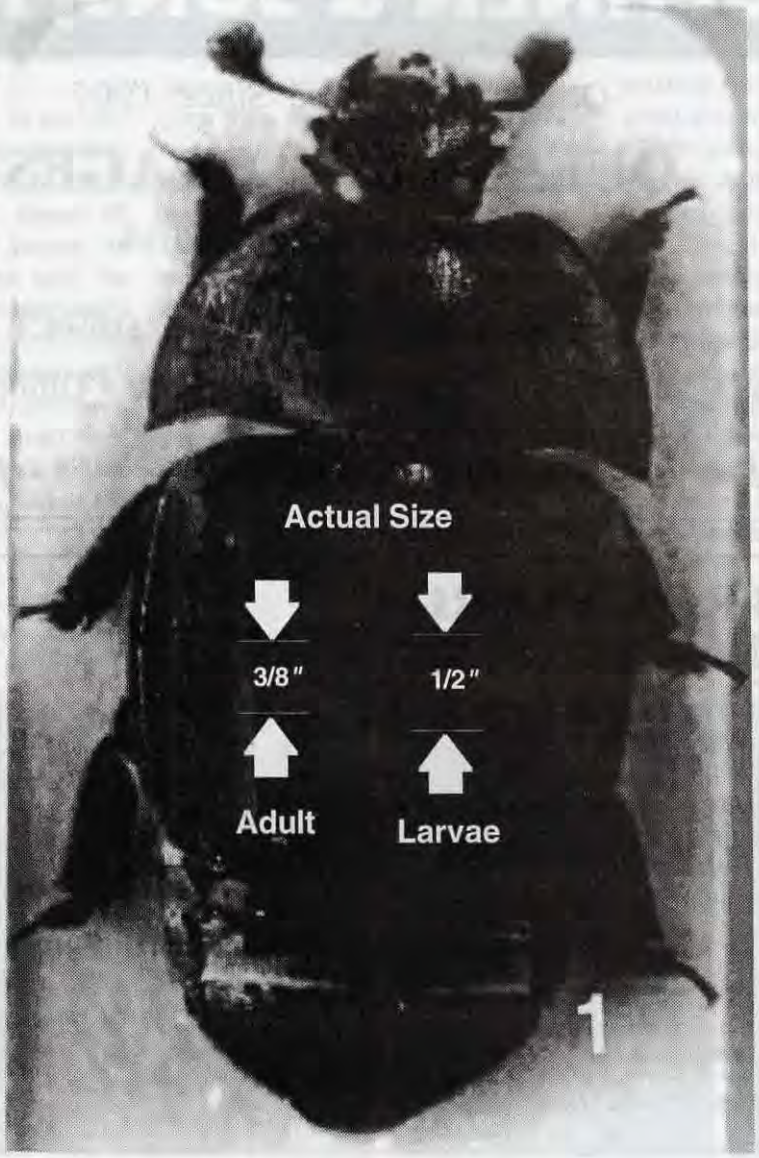
– has given excellent control of adults and larvae on hive bottom boards. When coumaphos strips are stapled to the underside of corrugated cardboard and placed face down on the hive bottom board, adults and some larvae are attracted to the cardboard as a hiding place and are then killed by contact with the coumaphos strip. It should be noted that many larvae remain in the frames, never reaching the cardboard trap, and thus avoid exposure. Coumaphos is currently undergoing the registration process for use as a varroacide. Use of a pyrethroid as a soil drench, currently registered for use on fire ants, also gave excellent control of larvae in the soil.

Research

Many questions remain as to beetle range, reproductive capacity, flight behavior, and host preference, to name a few. The need certainly exists for the full-time attention of one or more scientists to answer these questions. It is also curious why *A. tumida* has not developed as a serious pest in its native range of South Africa: are there natural parasites/predators/diseases that limit population growth, or do climatic factors play the predominant role? Is the damage to bee colonies in the U.S.A. amplified due to an absence of alternate hosts or host plants in North America? Cooperation of U.S.A. and South African researchers should be a priority issue. What are the factors behind beetle attraction to hive products plus bees? We have also observed that beetles feed on honey bee eggs; do they also feed on bee larvae and pupae? Casual observations suggest the answer is yes. Once control has been achieved, if possible, will the bees resume normal hive operations?

"No chemicals are currently available for small hive beetle control, yet, but hopefully coumaphos strips will be approved within the next few months."

The Beltsville ARS bee lab has done several experiments on the basic biology of the small hive beetle (Pettis, personal communication). They have found that most of the wandering larvae or pupae are found in the first 10 cm (4 inches) of soil and most commonly within 30 cm (12 inches) of the hive entrance or other major opening. Their studies on longevity of beetles without food indicated that beetles are able to go for several days without feeding, suggesting that movement of infested hives may further spread the small hive beetle. This also brings up the question as to how far adult beetles can fly; is this a major source of infestation between beeyards and in migratory situations?



Current Recommendations

If a beekeeper opens hives and sees the presence of foreign beetles within the hive, samples should be collected in alcohol and sent to the state bee-inspecting agency. No chemicals are currently available for small hive beetle control in the hives yet. Coumaphos available in other agricultural-use formulations should not be used in hives since these products are illegal to use and may result in unacceptable pesticide residues in hive products. We will continue to monitor and study the small hive beetle in order to make control recommendations as timely as possible. Hopefully, coumaphos strips will be approved within the next few months for *Varroa* mite and/or small hive beetle control. These strips will be produced and distributed by the Bayer Corporation. BC

SPACE ... THE FINAL FRONTIER

Every Beekeeper Needs A Little More Space

Kim Flottum

For most small scale beekeeping operations, the messiest, and most troublesome task is extracting. Few have a honey house or separate building to isolate the mess, the bees and equipment from everyday life. So the extraction, and often the bottling process consists of cleaning out the garage, a spot in the basement or even the kitchen to do this. Then, cleaning it all up again so life can resume its normal routine.

The ideal, of course, is an outbuilding, but ideals being what they are, are often not obtainable. Next best then is an isolated, closed off space in the garage or house, to keep the bees, the mess and the equipment out from under everyone's feet.

Bob Smith was confronted with the space problem in his new (new to him) house and like most beekeepers, became fairly innovative when it came to adapting what existed to his best purpose.

There was only one place Bob could make this work – the basement. In the basement was a small room, 13′ x 4½′ (58.5 sq. ft.) with a single door, cement floor, drywalled and a shower stall on one end. Just outside this room, in an area alongside and underneath the stairs from the first floor is another small area, 6′ x 6′. Total – 94.5 sq. ft.

To start, honey supers needed to get down to the basement. And honey supers are heavy. To get supers from the back of his van to the top of the basement entrance (Bob has an outside entrance to his basement), he places the supers on a small cart and wheels them to the steps. Then, one by one off the cart and onto the device pictured below. The super is set on a modified outer cover equipped with a large screw eye with a rope attached. The cover and super are then slid down the simple ramp, while Bob controls the decent. At the bottom, the super is placed on another cart and wheeled to the extraction room. Still, each super is handled several times, but not for great distances.

But, cleaning starts before all this happens. Walls and ceiling in Bob's 'space' are vacuumed and washed, and the floor is scrubbed. No drain is in the room (excluding the shower stall) and an outlet was made under the door jam so water could exit and drain in the next room. Equipment is all removed, washed with hot water outside, air dried and replaced.

Supers are stacked in the shower stall crosswise to allow good air flow and let any adhering bees exit. Supers are stored overnight while the heater, if needed, and the dehumidifier run. Bees are drawn to and through a crack in the door to a light outside.

Uncapping and extraction are straight forward. Supers are stacked next to the uncapping tub and frames are uncapped over the tub. A heated knife rests along side the tub

Continued on Next Page

Supers are set in a telescoping outer cover equipped with a screw eye and a rope.

The super and cover are then lowered down the steps on a ramp.

At the bottom the cover stops, and Bob comes down the steps. The cart is already at the bottom.

The super is loaded on the homemade cart and pushed to the extractor room.

The uncapping table. To the left, on the floor are the small space heater and dehumidifier. The uncapping tank is from Maxant. A heated knife sits between the tank and the home-made uncapped-frame holder. The table is made from 2x4s and plywood.

The hot knife sits in a pan protected from the surface, but always handy.

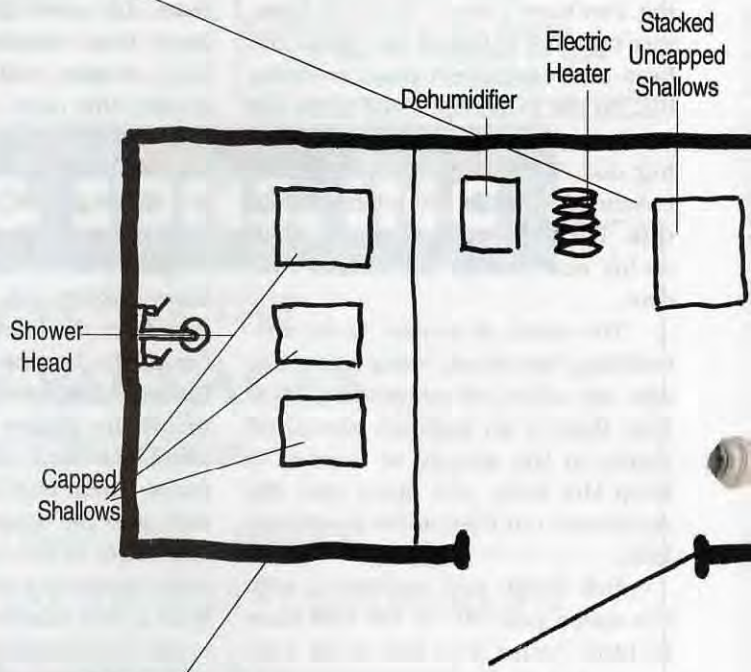
SPACE ... Cont. From pg. 31

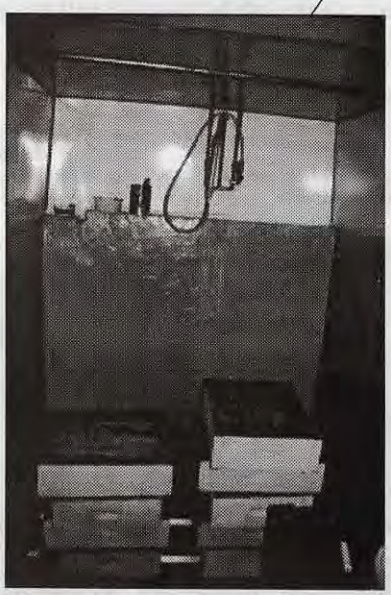
for easy use. Uncapped frames are hung in the home-made holding tank – simply a plastic tub with metal rods attached to hold the frames. Rubber gaskets keep the metal rods from sliding. The nylon mesh filter in the uncapping tank is a great labor saving device. The top of the tank has a metal grid to support cappings, but the nylon holds all the wax, and keeps it off the plastic and metal while honey drains to the tank below.

To clean the cloth after uncapping is complete, Bob first lets the cappings drain for a couple of days. Then, the cloth with the wax and any honey is put in a 60 and then to a solar wax melter. To keep cappings wax just as clean and light-colored as possible, the tray in the solar extractor is first lined with aluminum foil, then the nylon filter's contents emptied on that. Melted wax runs down the foil and into clean, plastic containers. A premium product is produced this way.

The bag is then left outside in a beeyard to be cleaned by foragers of any honey. Any remaining wax flakes in the bag are collected and the nearly clean nylon cloth is washed and reused.

When enough frames are uncapped, six frames (Bob uses only shallows) are loaded into his modified radial extractor. The extractor



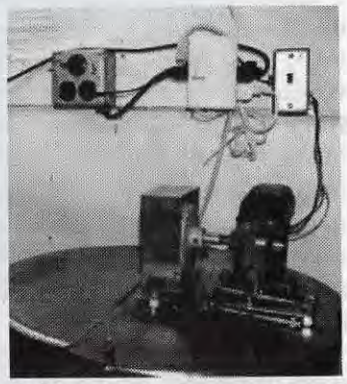


The remade shower stall. Supers are stacked in this area crosswise for air flow and bee escape. Water is available here.

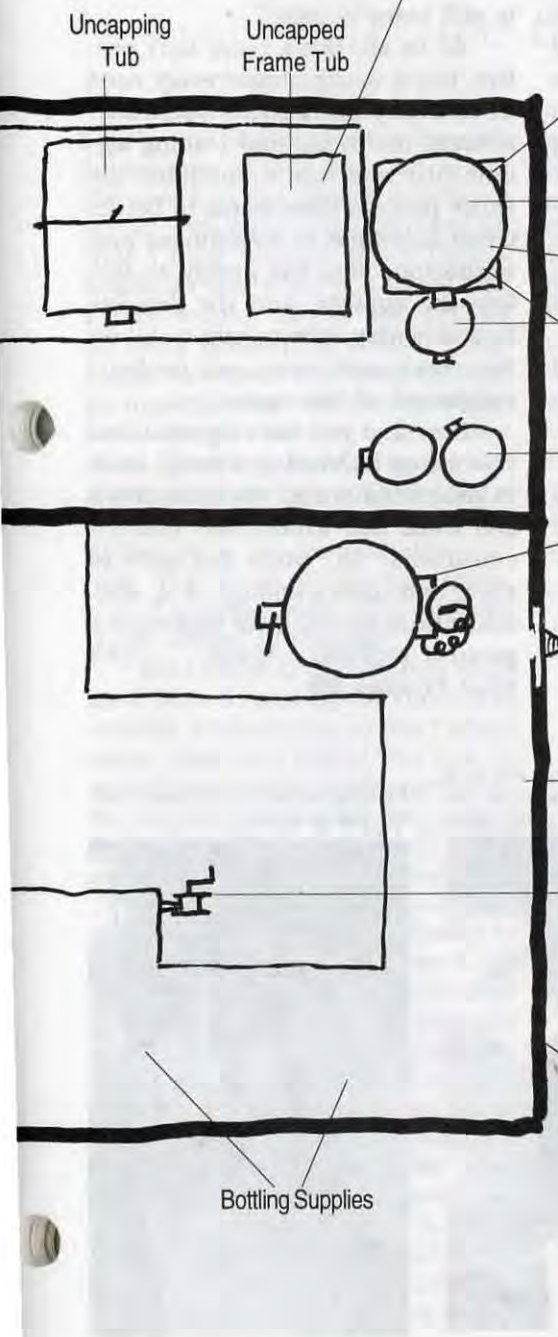
Uncapping in easy with the knife close-by and the draining tank made for the job.

The homemade frame holder supports uncapped frames and collects dripping honey.

Uncapped frames are loaded into the radial extractor.



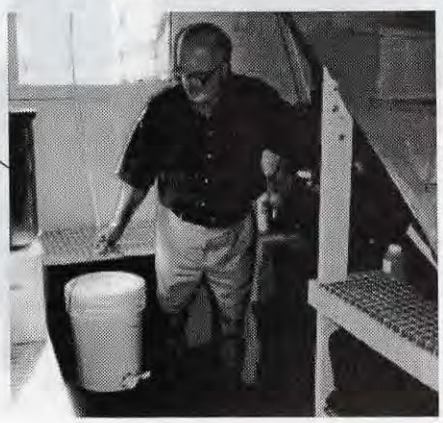
Bob's motorized extractor and electrical hook-ups, showing his added motor and hinge setup. The plastic gears that came with the unit are still used.



The extractor, when loaded, holds 6 shallow frames.

Bob purchased a variable speed, reversible motor from a local hardware store. He mounted the motor on a hinge because there was no clutch system. When disengaging the motor he lifts the motor so the gears no longer are in contact. The extractor spins much longer than the motor, so if left engaged the motor would burn out. Because it is reversible, he can reverse the motor to spin frames in the opposite direction, completely emptying cells of honey.

Extracted liquid honey is drained out of the extractor, through a double filter into 5 gal. pails equipped with another filter and a valve. When full the pails are stored or moved to the bottling area.



Just outside the extraction room is the bottling area. Pails are lifted to the top of the tank using a rope, 2 pulleys and a boat winch. Turn the handle, up comes the pail.

Continued on Next Page

SPACE ... Contr. From Pg. 33

originally had a hand crank. Too much work for Bob. A better arrangement was needed. An electric, reversible motor was bought and wired in. To attach this to the tank took a bit of thought. It was eventually mounted on a hinge, with the original gear from the manual handle attached to the motor's shaft. The gear on the tank shaft was left in place.

However, a direct and permanent placement would cause problems with the motor when power was cut because the frame holder inside the tank would want to spin, and the motor wouldn't – burning out the motor in no time. So, to 'clutch' the situation, the motor is simply lifted up on the hinge and the gears no longer mesh, allowing the frames to spin and the motor to stop.

When the frames top turning Bob usually reconnects the gears and reverses the motor's direction. A variable speed rheostat device is wired in so the motor can be started slow and then speeded up. Spinning in two directions, even in this radial removes a bit more honey, and the timing is just right because it takes that much time to move and uncap another six frames.

When it's time to drain the extractor, the honey flows through a double metal strainer and is collected in five gallon pails with valves attached. The pail itself has another filter – of fine mesh nylon – that stays with the bucket, and is held in place with a stretch cord so it doesn't drop far enough to plug the valve at the bottom of the pail. This filter is washed in the small basket, delicate wash cycle, with no soap, twice for cleaning. Full pails are then stored in the room, or the shower stall at room temperature (72°), or emptied into the grocer's tank just outside the room.

The bottling process is described in the photos, but the neatest part is using the winch, which enables you to lift a 60-pound pail head high with one hand. Of course ceiling height can be a limiting factor for this technique, no matter where it's used. Too often though, bottling tanks are situated low to the floor to make dumping a pail easier. Lifting a 60 shoulder high, and then holding it, or even setting it on a pail holder is a challenge for some. This winch system solves that problem.

Another problem is that the pail will roll once up there, and the attached bungie cords keep it steady, and level for worry free dumping.

Although this very efficient setup seemed ideal to me, Bob has, after a few seasons, found ways to improve the situation. First, the extractor. Now the stand it sits on is bolted to the floor, and the extractor is attached to the stand with the usual turnbuckles. These hold to extractor solidly, but when the extractor needs to be tipped to drain or removed to clean a better attachment device is needed. Bob is looking into a buckle setup, similar to what migratory people use to strap colonies together. Easy on – easy off.

Another as-yet-unsolved problem is the bottling valve assembly. When not bottling the valve remains full of honey, and basement temperatures are ideal for crystallization inside the pipe. Hand dryers and the like are being considered short-term, but a long term solution, at no cost, is still being sought.

All in all, Bob's room isn't perfect, but it meets almost every need for a hobby beekeeper's operation, reduces the lifting and loading significantly and has streamlined the entire process from frame to bottle. Great attention to cleanliness and sanitation, plus the ability to isolate the system, and the process from everyday activity help maintain the clean and neat and no-lost-equipment of this operation.

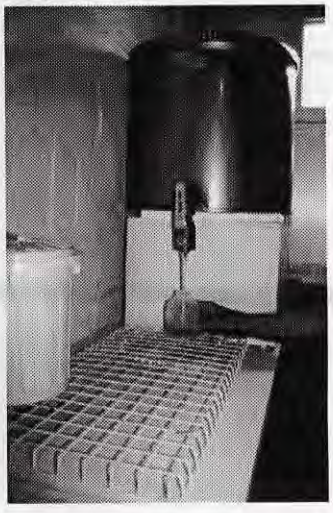
Now that you have finished this year's crop harvesting activity, fresh in your mind are all the bottlenecks and trials and tribulations you encountered. So, while the time is right, and there's enough of it, concentrate on solving most beekeeper's greatest problem – Space . . . The Final Frontier. BC

Temperature is regulated with a thermostat in the tank, but a watchful eye makes sure everything works.

Once up, an elastic cord is attached to both sides of the pail for stability.

To finish draining, the pail is tilted and rests on the tank, supported by the cord.

Finally, bottles are filled, and the job is done.



James E. Tew

Bee Culture's Beeyard

Welcome to the first Virtual Beeyard

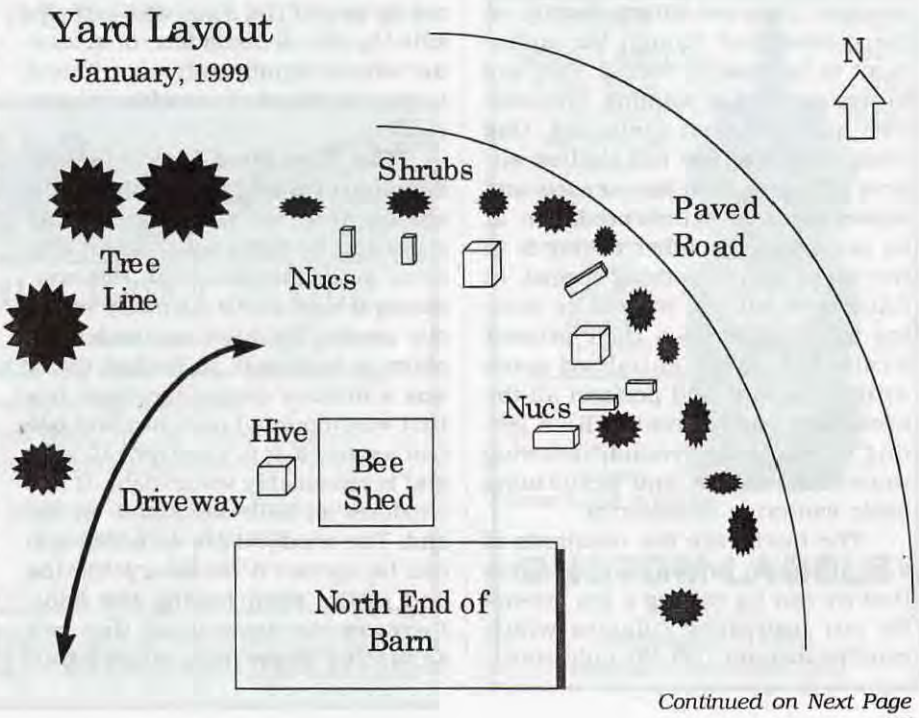
For reasons not important here, I have just finished going through back issues of both *Bee Culture* and the *American Bee Journal* in order to accumulate hard copies of every article I have written since 1976 – nearly 23 year's worth. I found that I have written almost 200 articles on every beekeeping subject imaginable. One point that came through all these articles very clearly is that beekeeping is not an exact procedure. There are very few topics that I have discussed through the years that were precise procedures but rather were recommendations at best. That's one of the characteristics of keeping bees - the outcome is not always predictable.

Bee Culture Editor Flottum and I have been discussing the concept of actually keeping bees in *Bee Culture* rather than just telling you how to become an accomplished apiculturist. In essence, we are attempting to "practice what we have been preaching" yea all these years.

Therefore, for the next few months, we would like to attempt to take you, monthly, to our yard, tell you what we are doing and what we plan to do to keep bees in a normally accepted fashion. Photos will subsidize our explanation of what is transpiring. There will be no super science and no unorthodox management procedures. Just solid basic beekeeping. We will have successes and we will certainly have failures, and we will dutifully report them both. Our budget is not unlimited and you will be kept abreast of how much we are investing in revitalizing this operation. Neither is our time unlimited as is yours also is not unlimited. Some things will get done properly while other procedures will be given promises. In doing this experiment, we hope that we will all learn beekeeping principles that work properly and also learn to deal with the vulgarities of beekeeping in general.

I have selected a bee yard location that is essentially neglected. There are a couple of hives and several four-frame nuclei that are in various stages of death and dying. We will deal with those, too. I have included a very formal diagram for you to see the current layout of the location and how the hives are currently positioned. It is as though you took over a small abandoned bee yard with a few unkept colonies that are in need of beekeeping love and attention.

The location The location is near my laboratory for my convenience. It is sheltered on all sides - more for the public's sake than the bee's. Note the nearby road in the diagram. There is a good driveway to the yard and it is always accessible



Continued on Next Page

A view of the beeyard if you were standing at 'Tree Line' on the diagram looking east.

The 'Box' that needs paint and some cleanup, but works O.K.

- never boggy, and we are secure here. Dependable water supplies for the bees are available nearby as are nectar and pollen sources. Currently, the grass is in desperate need of cutting and trimming. We have never suffered vandalism here nor have we had extensive pesticide kills. Essentially, the location has potential for being a good yard. The drawing at the head of this article and the rest of this series, is an artist's rendition of our yard, but it's close to what you'd see if you visit.

The hives The two hives that are presently here are decent colonies that did get *Varroa* mite treatments last year, but that is all that they got. They are sitting directly on the ground and though the equipment is reasonably sound, they are in serious need of painting. The colonies have not been winterized. One colony still has two full shallow supers of honey from last season and shows signs of skunk predation at its entrance. The other colony is in two deeps and is nothing special. In future procedures, we will be moving these hives from their present location to more centralized spots within the yard and perform all the necessary procedures such as getting them off the ground, removing unneeded supers and performing basic wintering procedures.

The nuclei are the remnants of a small queen production operation that we ran for raising a few queens for our university colonies which number around 150. We only anticipate having about five to ten colonies in this location and do not anticipate having significant numbers of nuclei next season. These hives will be numbered and records kept for your review.

Next spring, we will be splitting over-wintered hives and installing a few packages, and again, monitoring their development. Additionally, we will upgrade our equipment. You will be involved in all of these procedures.

The nuclei in the yard are in bad shape. In fact, only two or three are alive. We will be required to determine what the fate of the live ones should be. As with the two-story colony one of the nucs was actually killed by skunk predation - or at least the skunk significantly contributed to the kill. Wood chucks like it here, too.

The Yard Shed Typical for beekeeping ingenuity, our shed is a shelter that we scrounged many years ago. In fact, I wrote about it in detail in *Gleanings* in 1981. However, money is tight and it currently serves our needs. We have no immediate plans to replace it. In its first life, it was a military communications box that was mounted on a two and one half ton truck. It is wired for 110 volts and is reasonably water-tight. It has windows on both sides and on the end. The windows are screened and can be opened if necessary. On the end of the shed having the door, there are two heavy doors that lock securely. There is a nice, stout wooden floor.

Inside the shed there is a table, cabinets and a couple of chairs along with assorted neglected bee junk. Though I am currently writing to you from this shed, it is presently a mess and will require extensive cleaning - both inside and out. Additionally, as you may be able to tell from the photo, the outside needs painting and the windows need cleaning. A nice touch would be to plant a few nectar-producing plants around the shed for aesthetics only.

The Cyber Yard Editor Flottum and I are exploring putting the yard and its colonies on the web for your review. To the best of our electronic knowledge, this will be the first yard on the web. It would be great if we could arrange for you to open the various hives and nucs with your computer and look over our shoulders - as it were.

Mind-Numbing Detail Why have I subjected you to such mind-numbing detail about such a pitiful yard? We want you to be involved in this project. View it in the light of "This Old Yard" where a good, but neglected yard is brought back into useful production just as old houses are restored over a period of months on television. After all my years of writing about bees, I look forward to actually working bees with you - both in *Bee Culture* and on the web. I hope you enjoy our diary of this yard's restoration. BC

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

THE HISTORY OF BEE PLANTS

MIGNONETTE

Delicate, And Delicately Handled

B.A. Stringer

The fragrant flowers of Mignonette, *Reseda odorata*, are a source of both nectar and pollen. Mignonette was a popular favorite for some years in the 1880s, during which time many plots were sown and it was much discussed in the bee magazines. Julius Hoffman, inventor of the Hoffman brood frame, kept a colony of bees on a shelf outside his bedroom window during the four years he was in London. He said that between 1862 and 1866 the bees "gathered considerably honey from mignonette, which grew in the small gardens of the city."

In 1866, Moses Quinby wrote in his book *Mysteries of Beekeeping Explained*, "It is true that the Hollyhock, Mallows, Mignonette and many others yield honey, but of small account. A person who expects to have his hives filled from such a source, will be very likely to be disappointed, unless his number of stocks is very limited."

In 1868, J.M. Thorburg and Company of New York advertised mignonette and other bee plants for sale. One California bee man became so enthusiastic that he was certain "an acre would provide sufficient pasture for 100 colonies of bees."

Mr. William Thompson had high praise for Mignonette in 1878. "After being started under diligent cultivation, it was astonishing to see the rapid progress which they made. The plants soon covered the ground, where soil was good, and were out in blossom in a short time, and from that time forward the bees were working on them by the thousand from morning till late afternoon. I have seen them thick on it by 8 o'clock. The plants yield pollen as well as honey.

"When you give them this in addition to what they would otherwise

have, it will certainly secure an immense addition to the honey produced. There is no plant within the range of our knowledge as valuable for bee forage as Mignonette. It will bloom year after year if not disturbed by frost and gives a longer period of bloom than any other plant. It gives more blossoms in a given space and more forage than any plant we have ever seen. Honey from this plant has the most delicious fragrance of any we have ever tasted."

In late 1878, *Gleanings in Bee Culture* published reports of mignonette "humming with bees for months; and, as they work on it all day, it will prove valuable for keeping them busy during the Fall months."

Lane's seed and plant catalog of the era painted an idyllic picture of Mignonette's perfect pastures: "If cultivated to that extent that it might or ought to be, it would certainly furnish a rich pasturage for bees. A small patch of it will perfume the air for quite a distance; and were it cultivated by acres for bee pasturage alone, we should be favored with a fragrant atmosphere that would vie with the spicy breezes of Ceylon, and a honey that would outdo the famed honey of Hymettus for aromatic flavor." Who among beekeepers could resist claims such as these?

However, Professor Cook tested mignonette at his honey plant gardens at Michigan Agricultural College, with disappointing results. He reported, later in 1878, "I expected great things of this plant, as the bee papers were very high in their praise of its qualities . . . . (The bees) did not seem to take to it very readily, for on every occasion that I made observations, I found very few bees present. With us it proved a failure. Others have corroborated this statement . . . It is rather a delicate plant for this climate."

Further detractors reported failures with mignonette, particularly

with its poor germination. Mr. A. Fradenburg of Port Washington, Ohio, wrote to *Gleanings* in 1880 of his experiences in growing mignonette. "I became pretty thoroughly disgusted with mignonette last season. I planted a piece of the very finest of ground, about 150 square feet, but I had to plant it over three times . . . . I have found the seed the very hardest to germinate of anything I have ever tried . . . . Sometimes the bees seemed to work on it quite fairly, and at others scarcely at all." Mr. Fradenburg analyzed his costs with dissatisfaction; "My patch last season cost me, in ground, rent, seed and cultivation, at least $4, and I do not think I got $5 benefit from it."

The editors agreed with Mr. Fradenburg, commenting that their experience was similar. The plants did poorly, except for some small patches on very deep, fine soil. One reader from New Jersey, who must have had such conditions for his planting, wrote in 1882 that his mignonette grew luxuriantly and yielded lots of honey.

Despite the disappointing reviews, in 1882 an inquiry from A. Montrevil of Walkerville, Ontario, seems to indicate that mignonette still had a popular following: "What can I plant in my yard that my bees can feed on? I want something that will bloom the same season sown, and be ornamental at the same time." The editors suggested, "You can plant mammoth Mignonette, sweet basil and many other annuals with good ornamental effect and remunerative profit."

In the 1901 *ABC of Bee Culture*, Mr. A.I. Root gave the following advice to beekeepers. "To beginners I would say: Plant and sow all you can that will be sure to pay aside from the honey crop . . . but beware of investing much in seeds that are for plants producing nothing of value except honey . . . . Catnip, Mignonette, etc., I would at present handle rather sparingly. It should be borne in mind that we can hardly test a plant unless we have one or more acres of it in bloom, and that small patches do little more than demonstrate that the blossoms contain some honey, giving us very little clue to either quantity or quality."

The garden mignonette, native to Egypt, was brought to America by way of Europe. The genus contains about 55 species, of which four have been introduced into the U.S. and grow in waste places. Harvey Lovell states in his book *Honey Plants of North America*, "If more common they would be valuable." The plants are Summer annuals which grow best in rich soil with regular watering. The dense spikes of small greenish flowers become more open as the flowers mature, releasing the delightful scent associated with the flowers. Forms of the plant with longer, more colorful flower spikes are less fragrant than *Reseda odorta*. The botanical name of the plant is derived from the Latin *resedo*, to heal, as the plant was once used as a remedy for bruises. Mignonette, pronounced "minyonET," gets its common name from the French word for *dainty*, referring to the flowers.

Frank Pellett, reviewing Mignonette in 1938, stated: "Since such yields as would justify the planting of mignonette for bee pasture failed to materialize, it remained only a subject of curiosity to the industry." Extravagant claims have been made for this plant, but, Pellett says, "Perhaps it has never been given a fair test on a sufficiently large scale to demonstrate fully its value." BC

B.A. Stringer still grows, and writes about honey plants from her home in Blodgett, Oregon.

Eight Ways That Work
Selling Honey

You don't have to be big to be successful

Mary & Bill Weaver

With the high cost of keeping colonies alive these days, it behooves the beekeeper to get top dollar for every pound of his precious honey crop. For the smaller beekeeper this can be a problem. Prices of honey sold by the bucket or barrel to bigger packers are discouragingly low, considering the work and investment put into producing the honey.

Certainly it would pay the smaller beekeeper to bottle the honey himself. Middleman markups are quite good right now. But for many small producers, the question becomes, "Bottle it up in what sort of container? And sell it to whom?"

For this article, we've talked with about 40 beekeepers in six states, folks who are in about the 20-50 hive range, as well as folks who have started out as small producers, but have solved the marketing problem successfully enough to make it worthwhile to increase their colony numbers.

What a wealth of ideas we gleaned. I only wish there was enough space to report them all. This article will report a sampling of their ideas on selling bottled honey wholesale to retail markets. Next time we'll report the ideas of those beekeepers who sell direct to the consumer in a variety of ways, thus getting the full retail price for themselves.

1

Some of the successful marketers found good retail markets simply by going to stores that do not normally carry honey. Jack Tapp, for example, located near Chapel Hill, NC, developed his honey business by approaching a Southern State Ag Supply Store.

"I didn't call ahead," he says. "I simply showed up with samples." Sales were so good that now he's in all their stores. Jack bottles his honey in quart and pint jars – the Kerr glass ones that have a smooth side for a label – and designed his own label. He delivers to each store every two weeks because the stores have limited warehouse space and aren't able to keep a lot on hand.

Starting with one hive 10 years ago, Jack's hive numbers have been growing rapidly in recent years. Now he's up to 300 colonies. To sell his mushrooming crop, he also now sells in some natural food stores. In selling to these stores, he called ahead, came in with samples, and told the buyer what he could do.

Jack gives a word of caution to new beekeepers. Don't take on too many customers. You need a consistent supply of honey to keep most markets.

Southern States Ag Supply provided Jack with another source of income several years ago. The store chain lost their molasses vendor. They could get molasses only in barrels, and needed someone to bottle it for them. At first Jack was hesitant about taking on the job, but finally said he'd try it. He's glad he did. He now buys top grade table molasses in 55 gallon drums, bottles a barrel a month, and more than doubles his money.

Jack has also found a good market for his wax. A lot of people in the area are into arts and crafts, and he sells the raw wax from his home at $3.00 a pound. He has never advertised. Customers come by word of mouth. In addition to selling all his own wax this way, he buys wax from Dadant at the current low price to resell, and makes a nice profit.

Jack built a honey house this past year, a prefab A-shape Steelmaster, and uses Cowan equipment in extracting.

2

Another beekeeper using offbeat retail outlets to sell his honey is Leighton McKeithen, a North Carolinian. He and his wife Edna sell their honey in stores that don't particularly care if they have a year-round supply. When the McKeithens run out, that's O.K. The stores just put something else on the shelf until next extracting time. Edna and Leighton sell, for example, in two garden centers, and in a health food store. To sell, Edna told us, they just showed up one day with a nice basket filled with samples of each kind of container. In addition, a produce stand moves a lot of honey, according to Edna, a farm market helps out, and they also retail some of their crop from home. To attract customers to their home, they run an ad once in the season for two weeks in the local paper saying they have honey for sale at their house.

Edna and Leighton bottle in a variety of standard honey containers. Up to 60 colonies now, Leighton started beekeeping on a small scale

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SELLING ... Cont. From Pg. 41

12 years ago, just before he retired, (he had also kept bees as a young boy) and they've built up their colony numbers gradually.

Extracting is done in an attached garage, equipped with a triple sink, two holding tanks, a 20-frame extractor, and a plane uncapper. Husband and wife do all the work, bottling the whole crop as they extract.

Their honey sells well. "Last year," says Edna, "people called wanting to buy honey for Christmas gifts, but we were already sold out."

3

Grant Stiles, New Jersey State Apiarist, has this advice for beekeepers hoping to sell honey to off-beat retail outlets – or even to grocery stores. "I tell the buyer," says Grant, "that if the honey doesn't sell well, or if it crystallizes, I'll take it back. That way the store really has nothing to lose."

4

Bobbie Batchelor, who kept bees with her husband for a number of years, says the family bee business started small, with the purchase of one hive for her husband and son as a hobby.

The "hobby" gradually grew to 1600 hives, which Bobbie, an astute marketer, sold successfully to a variety of retail outlets. For specialty stores and gift baskets, Bobbie looked for unique bottles – a hex jar with gold foil and gold ribbons, for example, and jars shaped like little pumpkins from Berlin Packaging, as well as glass jars from Italy.

Grocery chains are notoriously difficult to get into. Bobbie made an appointment with the grocery buyer of Winn Dixie, showed up with samples, and asked for permission to "store vend" (also called "direct store delivery") for eight stores. "Store vending" meant that she would deliver the honey to each store on a regular schedule, price the honey, and put it on the shelf.

The Winn Dixie buyer gave permission, and Bobbie developed a 40 mile route covering eight Winn Dixie stores, and also sold to all the Mom and Pop groceries in between. She did in-store demos to give customers a chance to sample their honey.

"I'm not a particularly good sales person," Bobbie said, "but we enjoyed what we were doing, and came across that way."

Sales were so good at Winn Dixie that their honey was eventually taken into the chain warehouse, eliminating Bobbie's time on the road going from store to store, and as their colony numbers grew, she approached, and was accepted by, other chains in North and South Carolina and Virginia.

Bobbie developed a honey butter also. Today the Batchelors are no longer keeping bees, but they're still bottling and selling other people's honey, as well as Bar-B-Q sauces and chutneys.

5

PA beekeeper Max Griffie developed a good method of building a customer base whenever he took on a new grocery store. He arranged to have the PA honey queen in the store to give samples and hand out recipe leaflets, and brought along photos of his honey house and extracting and bottling operation to show to interested customers who wanted to stop and chat.

6

Use your ingenuity in discovering off-beat retail places to sell your bottled honey. Hugh Madison, for example, of North Carolina, is located near a campground, and supplies his bottled honey to the Camp Ground of America's General Store, mostly bottled in pints and a few plastic skeps. He's been keeping bees for four years and currently has 16 colonies. He also sells to a natural food store and a produce stand.

7

Joel Caldwell, of Centre County, PA started with three or four colonies 20 years ago, and is now up to 80. He sells the bulk of his honey in a local pharmacy. He asked an Amish man to build a 3-1/2 by seven foot cabinet to display his honey, and bottles in Golden Harvest pints and quarts and one pound Queenline jars. Creamed honey, which he makes himself, is packed in 12 ounce refrigerator rounds, which hold 17-18 ounces of honey.

Joel had no difficulty in getting into this particular pharmacy initially. He and his wife own it. He also sells in another pharmacy 20 miles away, a grocery store, at his bee club's annual Fall festival, and in the gift shop at Penn's Cave, a local tourist attraction. The observation hive at the Penn's Cave wildlife tour is his, and helps to call attention to his honey.

Joel saves his customers the cost of a honey jar by returning a deposit to them when they bring the empty jar back. To avoid having to soak labels off the returned jars, he simply puts the labels on the lids.

8

Ken Eastman, near Pittsburgh, PA, who works inspecting hives for the State Apiarist in the Summer, started keeping bees seven years ago, and currently has about 75 colonies. His early efforts at marketing his honey were frustrating. A major competitor had saturated the area with his own, very popular honey, and when Ken was able to succeed in getting his honey on the shelf, it just sat and crystallized.

It wasn't until a couple of years later that he discovered he had a ready-made niche market – for **dark** cut comb honey!

"Does anyone buy **dark** cut-comb honey," we asked in surprise.

"It's a great seller," Ken replied. The floral source is Japanese bamboo, a plant with cascades of white flowers that produce copious quantities of nectar making a dark, strong-tasting honey.

"We call it 'bloody bamboo," said Ken. "When you hold it up to the sun, it's absolutely gorgeous, almost a blood red." Who buys all this dark comb honey? It's very popular with local folks, but most goes to a Saudi Arabian buyer, who goes through the boxes of cut combs to pick out the darkest, believing they are more healthful – "Higher in antioxidants according to the Internet," as Ken puts it.

"Saudi Arabians love comb honey," says Ken, who gets $2.00 a comb wholesale and $2.50 retail. Another plus is that Japanese bamboo honey crystallizes very slowly. Ken also makes comb honey from Spring nectar sources, but these crystallize more quickly. In addition, Ken also sells honey by the bucket to a number of bakeries.

We've come across the Saudi Arabian love for comb honey before, and it's a customer base to consider if you're near a large city. A large commercial beekeeper in the Midwest that we've met sells all his comb honey seconds (those not completely capped or filled out, or heavily travel-stained) to a Saudi Arabian exporter by the bucket. The buyer tells him to smash all the combs together as much as possible to fill the buckets to capacity. Comb honey is so valuable in Saudi Arabia that the buckets of smooshed combs are taken on the plane as carry-on luggage by Saudi Arabians travelling home. This producer sells many, many buckets this way.

Comb honey can make a nice niche for the small producer. You don't need to purchase uncapping or extracting equipment, and need minimal space for packing your crop. And you get a very nice return on the honey you produce.

However, as Ken pointed out, comb honey production is not for the beekeeper who likes to visit his hives once at the start of the honey flow to plop on a lot of supers, and not see the bees again until Fall when it's time to take the honey off.

To produce nice comb honey, each super must be taken off as soon as it's filled to prevent the bees from "travel staining" the pure white wax. Comb honey production is for the beekeeper who really likes spending a lot of time in the beeyard. The midwestern commercial beekeeper we mentioned earlier, for example, told us that last year he paid 17 visits to each of his beeyards. But he produces beautiful comb honey, and his meticulous care pays off. His pristine, pure white comb honey sells for top dollar, and most years, he can't produce enough to meet the demand. BC

Mary and Bill Weaver are producer/packers from Pennsylvania.

CLUB CORNER

by Francois Verglas

Surveys

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

Taking the membership's pulse. Surveys are an effective way of determining the needs, wants and expectations of your club's membership. We have conducted surveys to evaluate the popularity of our guest speakers, and to solicit new ideas for upcoming meetings and special events. The goal is to get an answer to the question, "Is our club adding value to each of its members?".

But surveys are also useful in monitoring the health of honey bees in your region, and that will be the primary focus of this article.

As it relates to the health of our hives, the Back Yard Beekeepers Association is going into its third year of such surveys. This means that the cumulative data is just beginning to have some significance. We can start to see trends, and even draw a few useful conclusions from the information we collect.

How many members will respond? This year our club had a 40 percent response rate to the survey. That was a level of participation we deemed satisfactory. It was up slightly from the previous year. Obviously, we would like to attain an even greater number of responses, but it seems unlikely we will be able to get a 100% response rate.

How we started. At my first board meeting, our president listed the various projects we would be launching, and solicited volunteers for each. When the subject of "research" came up (which included conducting a survey and building a database), I sensed that was an area I could tackle. While I had never personally done a survey in my professional life (I am an executive in the magazine publishing industry), I knew I would enjoy using a computer and analyzing data. My hand shot up, and I had a new committee on my hands.

Designing the survey. The committee's first project was to redesign and implement a survey to determine the health of our members' hives (we had done something like this the year before). The main goal was to find out how many hives survived the Winter (overwintered) and what medical treatments (if any) had been applied in the Autumn to safeguard the bees. We also wanted to know a little more about our club's demographics (how many hives do members have; how many years of experience; how much honey was harvested?).

I created the revised questionnaire using a word processor. I made it a self-mailer with questions on one side of an 8 1/2" by 11" sheet of paper and a return address on the other side (my address).

To insure as candid a response as possible, we did not ask members to include their name on the survey. Surprisingly, we learned that some are reluctant to tell how long they have been beekeeping, how many hives they have, or whether they actually medicated as they were urged to. And so, the surveys would remain anonymous. The survey's design was kept simple and easy to complete in a couple of minutes. My first draft was reviewed and critiqued at the next board meeting. The board's feedback led to the final draft (see figure).

I reproduced 150 copies and gave them to the mem-

ber in charge of our newsletter. The surveys went out with the next newsletter mailing. We also distributed copies at the next general meeting of the club.

Every day I would check my mailbox with some anticipation and a feeling of excitement. Within a few days, bunches of surveys began to show up. After a couple of weeks, I had collected 55 responses. With all this fresh data, I could not wait to find out what discoveries I was about to make.

Analyzing the results. The data were entered into a spreadsheet program (using Lotus 1 2 3). A database program (such as Microsoft Access) might have been better, but I simply didn't have that software nor any experience in using such a program. I separated the surveys between those that indicated they had experienced loss of colonies and those that had no losses, and I began to slug away at the detail.

How scientific is the data? We don't pretend that the information we collect points to any scientific conclusions. Our data collection process is informal by statistical standards, and we have no Ph.D.s analyzing the information we collect. Nevertheless, the anecdotal information is useful to our membership, and perhaps even to others who are experimenting with ways to keep their bees healthy and productive. At minimum, it allows members to compare their own situation with that of other members (it can sometimes be reassuring that you are not the only one to lose a hive or have a mediocre honey harvest). The information can also be helpful in identifying best practices (was anything done differently with those hives that remained healthy?).

Parting words and a challenge. We recognize that our survey doesn't provide absolute answers. It provides only a snapshot of what our members did and experienced. It helps us understand what seems to work and what doesn't. It reinforces that we are not alone – fellow beekeepers are having the same experiences we are.

Treatment Breakdown
(Note that some hives used several combinations of medications.)

Medication	Hives using this medication	Survival rate
Crisco Patties	89%	92%
Menthol	88%	93%
Fumidil	88%	97%
Apistan	86%	95%
Essential Oils	80%	91%
Terramycin	78%	96%
No Medication	1.1%	50%

Hopefully, bee clubs will be encouraged to do their own surveys and share their results. In fact, I'd like to present a challenge: Any club reading this article is urged to participate in a similar survey this Spring, and share their tabulated results with me. Try using the survey format we used (that will unify the information collected). If you would like a reproducible copy of the survey, I would be happy to mail, fax or e-mail it to you.

Perhaps one day, bee clubs from around the country (or even around the world) will collaborate for the benefit of hobbyist beekeepers everywhere. BC

Francois Verglas, a native of France, moved to West Redding, Connecticut six years ago after residing in New York City for the preceding 20 years. At the instigation of his wife, Helene, a botanical illustrator and avid gardener, he took up beekeeping as a hobby in the Spring of 1997. He joined the board of the Back Yard Beekeepers Association in 1998 and chairs its research committee. Francois is senior vice-president, International, at Newsweek *magazine. You are welcome to contact Francois by e-mail at fverglas@aol.com*

BYBA Survey Results: 1997-1998 Season

Member Demographics (Spring 1998)
Total membership: 138
Average beekeeping experience: 14.1 years
Average number of hives: 3.3
Average honey yields per hive (Autumn1997): 31.9 pounds

Health of Bees (1997-1998 Season)
86% of the hives overwintered successfully (14% loss)
Hives judged as weak: 13%
Hives judged as average strength: 38%
Hives judged as strong: 49%

Findings related to treatments
(Hives in this survey either used no treatment, or they used one or more of the following: Fumidil, Apistan, Terramycin, Menthol, Crisco Patties, Essential Oils.):
Non-treated hives: 50% survival *(note that only 2 hives in this survey were untreated)*
Treated hives: 86% survival (179 hives in this survey were treated)

Do The Math . . . AND TREAT FOR MITES, RIGHT

Frank Chamberlin

Every year, or even every few months, I read an article about how, when, where, and to what extent to treat your bees. Most of these articles are good and informative. When is the best time to treat? Why is that the best time to treat? Questions, questions and more questions! The problem many times is that the article is written from the standpoint of where the writer lives, and you have a hard time adjusting that to your area. June in my area may be April in yours, seasonwise. Let's take the questions one by one and see if we can answer them in such a way so as to help everyone adjust the solutions to their individual areas.

When is the best time to treat for *Varroa* mites? *Varroa* mites cannot reproduce unless the bees do. The *Varroa* mite climbs into a cell with a bee larva and waits until the cell is capped. Then she lays eggs, which hatch before the bee emerges. These mites mate in the cell, attach themselves to the bee to feed, and then wait until the next brood cycle to climb into another cell to do it all over again. Since the *Varroa* mite cannot reproduce unless the bees are reproducing, it should be obvious that the best time to kill them is when there is no brood, and therefore, no mites being raised. In doing it this way, you are killing the mites at a time that they are not being replaced by newborns. The lower the level of infestation come Spring, the harder it is for the mites to build up to a damaging level.

4,200 x 4 x 0.8 + 4,200 = 17, 640

Here in central North Carolina, the bees usually quit rearing brood in late November and don't start again until February 1. In the North, they would stop earlier. In Florida, they may never quit. You need to know the dates in your area. For the last two years, they have never stopped here. I have seen the bees bringing pollen into the hives in December and January. In February, the pollen starts from the Red Maple and the Spring buildup starts. Because of the pollen coming in they have not stopped raising brood, but they have slowed down a lot. All I can do is try to do the best I can do.

I treat my hives for *Varroa* mites twice a year, even though it costs a little more. I start my treatments on January 1, weather permitting. I keep my bees in two deeps (brood chambers) for reasons I will not go into here. The first warm day in January (in the 60s), I open the hives, make a short check of the condition of the hives, and put in Apistan strips for the *Varroa* mites. I do not put them between the 3 & 4 and 7 & 8 frames as the directions say; I put them where the bees are. If the cluster is between frames four and seven, I put the strips between frames 4/5 and 6/7. PUT THE STRIPS WHERE THE BEES ARE no matter what season it is or you do no one any good.

Since menthol will not do any good at this time of year because it will not evaporate, I do not treat for tracheal mites at this time. I do keep a grease patty (vegetable shortening and sugar) in every hive all year long to help control the tracheal mites. I use no other treatment of any kind unless I see sign of a need for it. I then close up the hive and leave it alone. You also should treat your hives when there is no brood or as little as possible. If you don't know when that is, ask another beekeeper. If you don't know another beekeeper, call the agricultural extension office nearest you and ask about a bee club. If you can't ask anyone at all, watch the bees. When the pollen stops coming into the hive for more than three days, the queen will usually stop laying.

About seven weeks later, I start looking for some nice weather to take the Apistan out of the hive. You do not want to leave a weakened strip in the hive that the mites might build up a resistance to and render the Apistan ineffective against mites. It is better to take it out too early than too late. Leave the grease patty in the hive.

By the time you have done this, in my area, it is March 1, and the bees should be working on their second brood cycle. In your area it will be eight weeks after you started. If you got the Apistan in by January 1 (seasonwise), you killed the large majority of the mites before the bees ever started raising brood. The few who were still alive when they did start raising brood cannot raise enough mites for them to be a problem until very late in the season.

Let's look at a hypothetical hive and see what we can find. I know this will not be exact, but it will show us what is going to happen. Let's say you treated in the Fall, killing 90 percent of the mites, and got your mite level down to 1,000 mites in a hive of 30,000 bees (which is still too high). This is one mite for every 30 bees. We treated our hypothetical hive in late July, as we do here. We'll use July 25 as the treating date, and September 19 would be eight weeks later when we took out the Apistan and quit killing mites. The queen keeps laying

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TREAT FOR MITES ... Cont. From Pg. 47

until November 21. Since it takes three weeks for one cycle of brood to hatch, we find there are three brood cycles in this period after treatment.

In our hypothetical hive, 1,000 mites slip into 1,000 cells and lay 4,000 female eggs. Of these 4,000 eggs, 80 percent hatch and breed. This is 3,200 mites in addition to the original 1,000, which leaves us with 4,200 mites. Three weeks later these 4,200 mites have laid another four eggs each, which makes 16,800 eggs, of which 80 percent hatch and are mated, which gives us 13,440 mites plus the parents (4,200), which adds up to 17,640 mites. Three weeks later we complete another brood cycle and we have 70,560 eggs of which 80 percent hatch and are mated, giving us 56,448 new mites in addition to the parents (17,640) for a total of 74,088, when the queen quit laying for the year. Theoretically we now have an average of 2-1/3 mites on every bee in the hive. Boy, we really took care of those mites, didn't we?

This is, of course, assuming that there are enough brood cells for this to occur. Often there aren't, and more than one mite will enter a cell. The larvae often perish when this occurs, and certainly the mites will not producefour females each. The net result is fewer mites and fewer bees, but the ratios of mites/bee would be similar. Worst case though is that the colony crashes – no mites and no bees.

This hive may not make it until Spring, but if it does it will be very weak. When the queen starts laying again, February 1 in central North Carolina, the mites also start building up. If you wait, as many do, until mid-February to treat for mites, you have another cycle of mites to try to kill. The hatched eggs total 237,081.6 plus the parents (74,088) for a total of 311,169.6 mites. Here is where the mites beat you! Most of them are in the comb when you started treating for them, so they didn't get killed at first. They also had a bigger population to grow from, so more slip by the Apistan. Every one that gets by makes a bee weaker so she doesn't live as long, doesn't collect as much honey, doesn't make you as much money.

Let's take the same hive and break this cycle by treating on January 1 while no brood is being raised. In our imaginary hive, the mite population was 74,088 when the queen quit laying on November 21. No more are born because no brood is being raised. On January 1 we put in our Apistan and, as we did before, we killed 90 percent of the mites (66,679.2), leaving us with 7,408.8 mites. None were in cells because no brood was being raised, so we got a good kill. It is four weeks before the first bee egg is laid, February 1, and February 21 before the first bee is hatched.

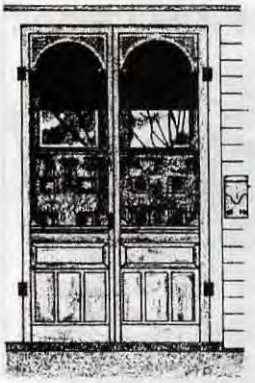
Let's compare mite levels. In the first brood cycle that began on February 1, 7,408.8 mites laid 29,635.2 eggs, of which 80 percent lived (23,708.2), plus the parents (7,408.8), for a total of 31,116.96 mites. In this hive treated in the Winter, we have approximately 31,000 mites by the third week of February. In our hive that was not treated until mid-February, we have 311,169.6 mites. That is 10 times as many mites because you waited to treat until February or, even worse, didn't treat at all in the Spring, as many do.

When you should treat is based on two things, honey flows and brood rearing. I take my supers off when the flow stops in July and put my Apistan and menthol in while the hive is open. This is the only time of year when the menthol will evaporate while there is no honey flow. To help the menthol, I leave the grease patty in or replace it with a fresh one at the same time. This saves a trip to the hives, as I have them in three different locations. There is a dearth of nectar that usually lasts about two to three weeks here. The queen quits laying and I start treating. Then the Summer/Fall honey flow starts and the queen starts laying again, but by then I have made a big dent in the population of mites. If I wait any later, the hive may have so many mites they can't get over it. If I do it any sooner, I lose part of the honey flow. I start all over again in January. For everyone, "The time to treat is when the queen quits laying and/or the honey flow is over." But try to space these two treatments as close to six months apart as possible.

I stated earlier I do not treat for anything other than mites unless I have a need to. I keep a very close eye on my hives so I usually know what's going on in them, most of the time. I love working my bees, so it is not "work" to me. Because I go to the hives often, I can see if there is an outbreak of foulbrood, nosema, etc., while it is in the early stages. I'm against using any medication unless there is a disease calling for it. BC

237,081.6 + 74,088 = 311,169.6

Frank Chamberlin is a sideline beekeeper, and mite counter, from Asheboro, NC.



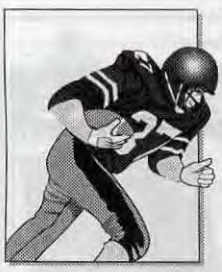
Ann Harman

Home Harmony

Super Bowl Snacks

It's Super Bowl time! Some people watch the Super Bowl because their favorite team is playing. Some watch because it is a good excuse for a party during the Winter month of January. Some watch because it's the last football game of the season. Some others only watch to see the clever commercials. And there may be some who turn to another channel because they do not want to watch football at all. That's fine – they can still make and eat some snacks.

Even if the Super Bowl game itself is played during a mealtime, snacks are still necessary for full enjoyment of the game and its preliminaries. The best plan is to prepare most of the snacks the day before. Many dips improve with overnight refrigeration. Cookies and crackers should be stored in a closely covered tin until game time. You might want to create your own commercial by telling everyone that their "snacks are brought to you by the wonderful honey bee!"



Crackers can indeed be made with honey and still be crisp. The secret is the use of small amounts of honey. But even that small amount enhances the flavor and texture. You may wish to make several kinds of crackers so the snackers have an assortment to go with the spreads and dips.

SAVORY GRANOLA CRACKERS

These crackers will keep several weeks at room temperature or several months in the refrigerator or freezer.

2 cups rolled oats
3/4 cup whole wheat flour
1/2 cup slivered almonds
1/4 cup wheat germ
1/4 cup sesame seeds
1 tablespoon honey
1/2 teaspoon salt
1/2 teaspoon oregano
1 teaspoon thyme
1/2 teaspoon onion powder
3 eggs
3/4 cup oil

In a large bowl, stir together oats, flour, almonds, wheat germ, sesame seeds, honey, salt, oregano, thyme and onion powder. With a fork, beat together eggs and oil. Stir into oat mixture. Grease a 10x15-inch jelly roll pan. With a spatula, press dough evenly into prepared pan. Bake at 400° for 20 minutes or until golden. Cut into 1-1/2-inch squares, then into triangles. Remove to a rack to cool. Store in airtight container. Yield: about 70 crackers.

Naturally Delicious Desserts And Snacks
Faye Martin

POPPY SEED CRACKERS

1/3 cup poppy seeds
1/3 cup boiling water
2 cups whole wheat pastry flour
1-1/2 teaspoons salt
1/2 teaspoon soda
1/3 teaspoon ground black pepper
1/3 cup oil
1 teaspoon honey
1 egg, slightly beaten
1/4 cup minced onion

In small bowl add poppy seeds to boiling water; let stand until cool. Sift together flour, salt, soda and pepper. Add oil, honey, egg, onion and poppy seed mixture to flour mixture. Stir until stiff dough forms. Knead lightly until dough is smooth. Shape into two balls. Roll dough 1/8-inch thick on lightly floured board. Cut with 1-1/2-inch biscuit cutter. Place crackers on ungreased baking sheet. Prick each one with a fork. Bake in 425° oven 10 to 12 minutes or until lightly browned. Store in airtight container. Yield: about 8 dozen crackers.

Naturally Delicious Desserts And Snacks
Faye Martin

WHOLE WHEAT CRACKERS

Perhaps you would like a plain cracker for some of your spreads and dips. Unfortunately, instructions for this recipe are not the best. So my word of warning is to watch the crackers carefully during baking so they do not get too brown.

3/4 cup shortening
1-1/4 cups milk
1 teaspoon salt
1 cup wheat germ
2 tablespoons honey
4 cups whole wheat flour

Mix ingredients and knead a little. Roll out thin (about 1/8-inch). Cut into any desired shape. Prick with fork. Bake in a slow oven (about 300°) until light brown (check them after about 10 minutes). Yield 9 to 10 dozen crackers.

Honey Recipes
Michigan Beekeepers Association

It must be about half time. How is your team doing?

BEES IN THE HERB GARDEN DIP OR DRESSING

You probably have numerous dips for crackers, chips and veggies. The National Honey Board suggests shrimp, ham cubes, ripe olives and pineapple chunks for this next recipe.

1 pint dairy sour cream
6 tablespoons honey
2 tablespoons thawed, undiluted orange juice concentrate
2 tablespoons Dijon-style mustard
2 teaspoons cream-style horseradish
2 teaspoons rosemary, crushed

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HOME ... Cont. from Pg. 49

1 teaspoon each chervil and basil, crushed
3/4 teaspoon salt
1/2 teaspoon ground white pepper
1/4 teaspoon garlic powder

Combine all ingredients. Mix well. Cover and refrigerate several hours to blend flavors. Stir before using. Makes about 2-1/2 cups.

National Honey Board

CHEESE DIP WITH FRESH FRUITS

As a change from salty, tangy snacks, try this dip with some fresh fruits such as banana slices, melon cubes or grapes. Keep this dip in mind during fruit season when it is delicious with fresh strawberries and peach or nectarine slices.

1 8-ounce package cream cheese
1/4 cup milk
2 tablespoons honey
1-1/2 teaspoons vanilla
1/8 teaspoon nutmeg or mace
1/8 teaspoon cinnamon
2 tablespoons fresh lemon juice
1/4 cup diced toasted almonds for decoration

Blend together all ingredients except almonds. Chill. When ready to serve, top with almonds and allow to come to room temperature.

Honey ... Any Time
California Honey Board

BARBECUED PECANS

Here is a snack recipe that you can easily vary to suit your taste with your choice of seasoned salt.

1 quart pecan halves
2 tablespoons apple cider vinegar
2 tablespoons honey
2 tablespoons butter
2 tablespoons seasoned salt
salt to taste

Spread pecan halves in 13x9-inch baking pan. Mix apple cider vinegar and honey; pour mixture over pecans. Bake 10 minutes at 400°, stirring often. Decrease heat to 350°. Mix butter, seasoned salt and salt and pour over pecans. Bake for another 15 minutes, stirring four or five times. Cool and store in refrigerator.

Honey Recipes Of The Williamson County Area Beekeepers

POPCORN SURPRISE

No sporting event is complete without popcorn. You certainly can have it plain, but why not try this interesting and delicious recipe.

1/4 cup unsalted butter
2 teaspoons honey
1 clove garlic, finely minced
2 quarts popped popcorn
1 teaspoon cinnamon
1 teaspoon ground cumin
1/2 to 1 teaspoon salt
1/4 teaspoon coriander

Bring butter, honey, garlic to a simmer. Pour over popcorn. Toss with mixed seasonings; toss again. Can be crisped in oven on jelly roll pan at 300°. Bake 15 minutes; stir once. Serves 3 or 4.

A Honey Of A Cookbook
Alberta Beekeepers Association

The game is over. I hope your team won and you enjoyed the snacks. However, snacks create crumbs. These crumbs seek out chairs, sofas and rugs in the hope you will not find them. But these crumbs annoy anyone left with cleaning up the after-Super-Bowl mess. Everyone! (including the dog) get busy now and clean up. You can rehash the game while all of you are making sure your "stadium" is clean for the next event. See you next year at the Super Bowl.

Richard Taylor

Bee Talk

"I have no idea when this new age in beekeeping will come about, but I think it certainly will."

One of the most interesting books I have ever read is Frank Pellett's *History of American Beekeeping*. It is long out-of-print and hard to find now except, of course, in libraries. I have been a beekeeper long enough to feel somewhat in touch with that great era of American beekeeping that extended well into this century, referred to by Mr. Pellett as the golden age of beekeeping. Great, basic discoveries were made then, but most of all, it was learned that beekeeping could be highly profitable. Anyone with a couple hundred colonies was considered a big beekeeper, and his bank account was likely to reflect that. Comb honey beekeeping thrived, honey prices were high, and sweet clover, previously considered a weed, came to be valued as pasturage for livestock. It spread throughout the dairy regions of the Midwest, producing hitherto unheard of honey crops. I almost never see sweet clover anymore, except for patches that have grown up wild here and there, but it was everywhere when I began beekeeping as a boy.

If anyone ever writes another history of American beekeeping, I think the present decades will be described as the age of the pests. Just in the last couple of decades we've seen the invasion of chalkbrood, tracheal mites and *Varroa*, and now, as if that were not enough, we have still another pest that has made it to our shores from Africa, the hive beetle, *Aethina tumida*. Those nasty little insects invade a hive in large numbers, devouring pollen and reducing the combs to ruin, protecting themselves from the bees by exuding a repellent slime.

All this has gotten me, and I daresay lots of other beekeepers, to wondering what is in the future. *Varroa* mites are the main problem. We can't go on using chemical controls forever. Mites resistant to Apistan strips have already emerged, being found first in Florida, and already they are here in New York. There remain essential oils and some suitable formulations of formic acid, but the trouble with these is that they are not terribly effective. I understand that you can get only about a 50 to 70 percent control with these, which leaves the beekeeper putting up with quite a lot.

There is, however, a brighter side to this whole picture. For one thing, honey crops have been very good in spite of the parasitic mites. Some attribute this to the fact that the mites have virtually killed off the competing feral colonies. Indeed, one very large commercial beekeeper has declared that, for this very reason, *Varroa* is a blessing in disguise. That is surely a mistake, resting on the assumption that beekeepers can go on controlling *Varroa* in their own colonies by the use of pesticides. Not so, if resistant mites emerge, as they now have.

So what can we look forward to now? Who's going to win this battle, the beekeepers, or the pests?

The answer is suggested in Roger Morse's review of recent research in last October's *Bee Culture*, and that is the development of bees that are resistant to pests, especially to *Varroa*. Dr. Morse's enlightening discussion led me to consult, by telephone, two of the researchers who are at the forefront of this research, Drs. Marla Spivak and John Harbo. I cannot go into the details of their work, because I did not have the time, nor do I have the scientific training, to get it all clear in my own head, but I can offer a general picture, which I find enormously encouraging with respect to future beekeeping.

We have long known that *Varroa* is not a serious problem in Brazil, where virtually all colonies of honey bees are Africanized. I, and many others, assumed that these bees simply attacked the mites physically, in keeping with their notorious fierceness. It now turns out, however, that mite control is primarily through hygienic behavior. That is, the bees uncap brood that is infected with mites and throw it out. What is especially encouraging about this is that, by the same behavior, the bees can control American foulbrood and chalkbrood, too.

So now the question arises: Is this behavior inheritable? If so, then this raises the possibility that resistant bees can be bred, and this, surely, is what is needed. Pesticides are no solution in the long run. But if we could breed bees for hygienic behavior, then we would not need pesticides, and we could control, even if not eliminate, not only *Varroa*, but other diseases as well. The bees in Brazil have not only shown resistance to *Varroa*, but beekeepers there find less and less *Varroa* every year, strongly suggesting that mite resistance, through hygienic behavior, is indeed inheritable. And this increased resistance has come about there simply through natural selection favoring resistant strains, without specialized bee breeding to that end.

Dr. Spivak, as Dr. Morse pointed out, has done extensive controlled

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BEE TALK ... Cont. From Pg. 53

experiments, comparing colonies with a high degree of hygienic behavior with colonies headed by commercial queens not chosen for this, and she found not only a significant difference in mite infestation, but also that the hygienic bees were better honey producers.

Dr. Harbo, through experimentation of a quite different nature, has found that such hygienic behavior is indeed inheritable, to a very high degree. This has been known for decades, having been demonstrated by Dr. Rothenbuhler in Ohio long ago, but its significance was not then apparent. Unlike Dr. Spivak, who used naturally mated queens for her tests, Dr. Harbo used queens artificially inseminated by a single drone, thereby gaining much greater control of inheritance. His method, in broad outline, was to take a very large quantity of bees – I do not know how large – inoculate it with *Varroa* mites, such that these would be evenly distributed through this population, then divide these bees into 28 small colonies of about two pounds each, and introduce a queen to each. These nucleus colonies are thus all related to each other as sisters, but the queens are unrelated to each other, and the aim is then to see whether the new colonies show significant differences in *Varroa* resistance.

Dr. Harbo found that the differences were indeed significant, and that *Varroa* resistance is, therefore, inheritable. And when I asked him what this portends for future beekeeping, he sounded optimistic. We are not, of course, going to have resistant bees in the next couple of years, but we are going to have them. What will hasten this will be the reestablishment of feral bees. This should come about eventually, gradually at first, but then more rapidly. The bees in feral colonies that are not resistant will, of course, die out, as they already have, while those showing resistance, primarily through hygienic behavior, will tend to survive, and to pass this resistance on, in the classic pattern of natural selection.

Meanwhile, bee scientists have their work cut out for them, as do commercial queen breeders. And the days of pesticide use in beekeeping are numbered, which is very welcome indeed. I have no idea when this new age in beekeeping, if it can be called that, will come about, but I think it certainly will, through a combination of highly specialized queen rearing, in cooperation with nature herself. BC

Richard Taylor is a philosopher and lifelong beekeeper in the Finger Lakes region of New York.

INNER ... Cont. From Pg. 6

chemicals in your colonies? Well, we don't think beekeeping can be chemical free, but there are management strategies that can reduce, and *maybe* eliminate that practice. Integrated Pest Management, for specific problems is the way to go. And it goes on here, this year.

Illuminating the nuances of each race of bees needs to be done occasionally to keep abreast of the latest discoveries, or at least that's what we think. Caucasians, carniolans, Italians, Buckfast, the hybrids and the myriad commercial and USDA released varieties all go under the scope this season.

All of this sounds suspiciously, like a commercial. Well, maybe. But it's really an opportunity to share information you can use to make better decisions and stay flexible.

•

Bill Wiley Won't You Please Come Home?

Probably every county, state and regional fair has a permanent location with at least some of its facilities staying on site year round.

But I want to tell you, in several installments, about one regional fair that makes most of the rest of us pale in comparison.

It's called the Topsfield Fair, and it's located not far out of Boston, so it has a large population to draw from. A half million people over the 10 days isn't uncommon when the weather cooperates. Like most, it meets in the Fall, last year from October 3-12, but unlike most, the building that houses the beekeeping exhibit stays active year round.

The beekeeping group associated with this building, and with the Topsfield Fair is the Essex County Beekeepers. Hundreds strong, mostly, but not completely drawn from hobby beekeepers in the area (several commercial beekeepers belong, but aren't especially active), they have built an empire with the fair, and the work they do there.

I'm going to go into some detail on what they do, and how they do it, with photos, interviews and observations later this Spring, but for now, I want to give you a bit of insight on the person who's actually in charge of all this.

His name is William Wiley, Bill to his friends, who is one of the Superintendents of the Essex County Agricultural Society, which supervises the fair each year. He is in charge, by default, by decree, and by sheer determination of the beekeeping and Honey Show and the beekeeping building it is held in each year.

An entire building, dedicated to bees, beekeeping and beekeepers. What an enviable situation. But of course this just didn't happen. And neither does the planning that goes into this just happen. More on both of these later.

Back to Bill. During the 10 days of the fair (the building is open 10:00 a.m. until 10:00 p.m. every day) three crews of 12 people each man the sales booth, the candle rolling, the observation hives (4), and the stocking and cleaning and whatever else needs doing. But by the end of the day everyone's pretty much worn out. Not Bill. Or not so you'd notice anyway. He stays late and cleans up, gets things ready for the next day, takes care of the money and deposit, checks in on the other parts of the fair he's responsible for, then, and only then relaxes. But not at home. Nope. The building that Bill built has an upstairs storage and office, and a place to camp out. And Bill does, for the whole 10 days.

So, I'm sure that somewhere, somebody, during the whole of the Topsfield Fair is humming to herself, maybe just a bit forlornly, the title to this short article . . . Bill Wiley, won't you please come home?

Until next month, keep your hive tool sharp, your smoker lit and your wits about you as the season gears up again.

HONEY PRICES ... Cont. From Pg. 17

our report. You will note patterns basic to all regions during the year, and, patterns specific to each region, or perhaps regions adjacent to each other.

Familiarity with trends in your region from last year, which are a reflection of the world honey market, the crop produced, the number and size of your competitors, the increase, or decrease in available and types of outlets and other tangible, and intangible factors will enable you to predict, to some degree, what you can expect in future months. Of course you need to know of those factors so you can plug them into your marketing formula.

Bigger pictures are always interesting as they show how all the pieces fit together, and where you fit (or don't fit) in the mix. Figure 13 shows the average price of each commodity for the entire year for each region. This number incorporates the very high (well, pretty high) prices early in 1998, and the lower prices gathered at the end of the year. What this shows is how commodities compare to each other in price over different areas of the country. Some are fairly consistent across all regions (case of 1 lbs.), while others are less so (1 lb. Retail). Regional favorites (dark honey in 5 lb. Jars) that sell for more than run-of-the-mill products (ELA in 5 lb. Jars) don't show up well here. However, size differences show fairly well. Look at half pound jars retail in urban vs. non-urban regions.

If you turn this data around a bit, and look at it from the perspective of the average price across all regions for each month (Fig. 14 on page 17), a somewhat different story emerges. The great influx of imported honey, coupled with a real or perceived domestic shortage skewed prices dramatically starting in early Summer and any seasonal price trends at this level are obscured. In fact, it's pretty much a straight line downward from January on for most products.

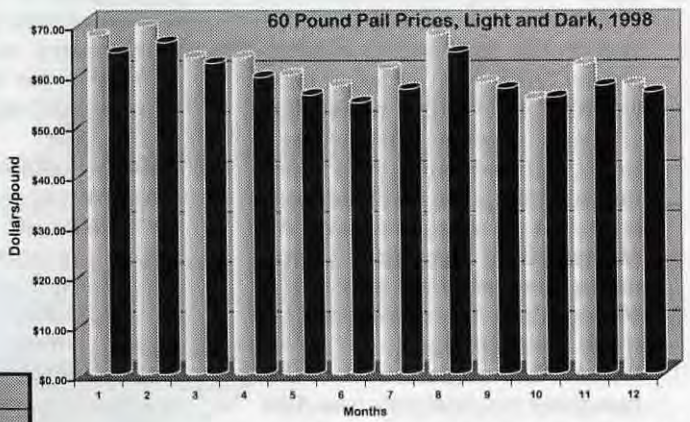
Coupled with this is that, according to some sales figures, retail sales are declining in larger markets. Speculation as to why runs rampant. One theory is that the large influx of imported honey (in response to the high U.S. prices) that flooded packers warehouses was of inferior quality and the buying public simply quit buying. Another theory is that the inflated price, set during the short term shortage and not reduced to reflect reduced import prices, was simply too high to be sustained and buyers of retail, wholesale and bulk honey found alternative sweeteners or just quit buying. A third theory suggests that 1997 and 1998 were banner years for attention from the press towards honey bees, beekeepers and the industry in general. The attention increased awareness, and sales. But the media and the public are fickle, and when attention from one wanes, action by the other follows suit.

Reduced sales, even with exceptional quality and similar prices were reflected in thousands of local markets this past Summer and Fall at farmer's markets, county fairs and back door stands. Our reporters nearly unanimously reported sales to be steady to reduced this past year, with prices steady (higher than last year), but demand reduced. No quality problems here, but somewhat higher prices and less attention may explain this phenomena.

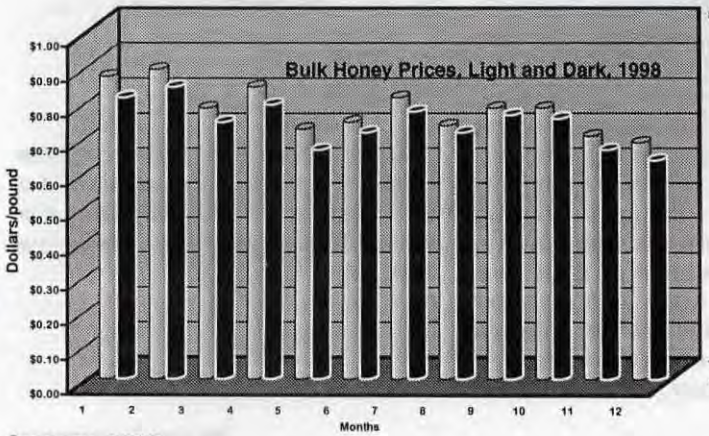
What will the future bring? The implementation of the loan program will set prices in the mid 50s for large producers, and in all probability the import price. Steady to declining retail sales may cause further price reductions. The Honey Board's focus on the medicinal value of honey may boost retail to a degree, but conventional wisdom suggests this is more fad than long term program and will have only minimal effect. I hope that's wrong.

Good news lies in the niche markets available to most beekeepers and small to moderate sized packers. "Locally Produced," country of origin, distinct varieties, and the personal touch of the seller will keep existing markets and enable growth.

But this isn't news. A boxcar load of corn is a commodity. But a well-made, attractively packaged, reasonably priced corn muffin will sell and sell and sell. Value added, locally produced – words to grow by this year. BC



For all sellers, the price of a 60# pail slowly declined during the year.



Although most volatile on a local scale, bulk prices for all sellers were mixed during the year.

?Do You Know? Answers

1. **False** All life stages of the small hive beetle are normally found within the hive or in stored beekeeping equipment except the pupal stage. The mature larvae burrow into the ground to pupate. Most pupate within five feet of the hive.
2. **True** The small hive beetle is described as being as destructive as the wax moth. In South Africa the beetle attacks weak colonies and stored equipment and is rarely found in strong colonies. In the United States the beetle has apparently killed some strong colonies.
3. **True** Adult and larval small hive beetles inhabit beehives where they feed on stored pollen and honey. Larvae that feed on honey only do not do as well as those that feed on honey and pollen.
4. **True** *Varroa* mites cannot stay alive for more than a week on unoccupied beekeeping equipment. Mites in brood cells with dead pupae, however, can stay alive for up to three weeks.
5. **True** Young bees on orientation flights, returning foragers and drones drift with prevailing winds. Tired, heavily laden bees will also enter other hives. Full of nectar or pollen, they are normally allowed entry into most hives. Drones are rarely refused entry in a prosperous colony. All of these bees may carry *Varroa* mites, but drones carry more *Varroa* mites than foragers over three weeks of age.
6. **False** The original host of the honey bee tracheal mite was *Apis mellifera. Apis cerana* was the original host of *Varroa.*
7. **False** *Varroa* mites reproduce in both worker and drone brood cells, but drones. Mite reproduction does not occur in queen cells as the queen's development time is too short. Occasionally, in heavily infested colonies *Varroa* mites may invade cells with queen larvae.
8. **True** On entering a brood cell, the female *Varroa* mite begins to feed, sucking the blood of the larva. Larval blood containing juvenile hormone stimulates the development of an egg cell and the maturation of a sperm-cell. The blood of adult bees has no stimulating effect on ovaries of mites. The first intake of larval blood is sufficient to allow two eggs to develop. Further feeding on the pupa results in the development of several more eggs.
9. **True** Summer female *Varroa* mites may enter brood cells up to seven times with the average between 3 and 4. Non-breeding winter mites live longer, up to 9 months, but have fewer reproductive cycles.
10. **True** In a worker cell the maximum number of eggs laid is five, in drone cells up to seven. The eggs are usually deposited on the cell wall.
11. **True** *Varroa* mites have a haplo diploid sex determination system similar to honey bees. Male mites are produced from unfertilized eggs and female mites develop from fertilized eggs.
12. **False** Mated adult female tracheal mites disperse from older host bees to young bees. This transfer, which is an essential component in the life cycle of the mite, and the only period when mites are known to be outside of the tracheal system. Only female mites move outside of the host.
13. **False** Female tracheal mites measure 143 to 174 µm (length) by 77 to 81 µm (width), whereas males are somewhat smaller: 125 to 136 µm (length) by 60 to 77 µm (width).
14. **True** Honey bee tracheal mites will infest queens, drones, and workers. Drones have larger tracheal trunks and there is evidence that they are preferentially infested. Workers however, being much more numerous, are of primary importance in determining the impact of the mites on the colony. Queens, because of their longevity, may serve as a reservoir for mites, but are not infested as often as workersand drones.
15. **True** Honey bee tracheal mites have no eyes, but many sensory hairs for determining position and location.
16. **False** Even though formic acid is reported to be effective in controlling both honey bee tracheal mites and *Varroa* mites, it is very effective against tracheal mites and not nearly as effective against *Varroa* mites.
17. **False** The ether roll technique is used to sample colonies for *Varroa* mites but not tracheal mites. Most methods used to diagnose tracheal mites involve a dissection technique that involves a physical search for and examination of the first pair of tracheae.
18. C) Florida
19. B) South Africa
20. A) 1-2 days old
21. C) attaching themselves to worker honey bees and sucking blood.
22. The female *Varroa* mite quickly climbs on a young worker or drone bee, and when it feels hungry, finds a gap between the overlapping abdominal segments. It squeezes between the chitinous layers until it finds and bites through the soft, folded, intersegmental skin in order to draw the bee's blood. They are unable to puncture the adult bees exoskeleton.
23. Apistan Strips
    Apistan Queen Tabs
    Apistan Package Bee Strips

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.

Glean ings

JANUARY, 1999 • ALL THE NEWS THAT FITS

Already There 4 Years

FIRE ANTS, ALMONDS AND QUARANTINES

Imported fire ants (IFA) represent a serious threat to California. Because of this, the state is taking extreme measures to keep them out. All bees from the IFA quarantine area will be checked closely for IFA. If even one ant is found at the border, the load will likely be turned back. If IFA are found in the almond orchards, the hives will be subject to depopulation and the beekeeper will be held liable for eradicating the IFA. If you plan to take bees to California for almond pollination make sure the hives and pallets are free from IFA.

The California Department of Food and Agriculture (CDFA) is in charge of enforcing the inspections. They are aware of the need of gulf bees for almond pollination and will cooperate with beekeepers on the hive inspections. The county ag commissioner will be in charge of the inspections. The California border station will notify the ag commissioner in the county where the bees are destined. The hives will be inspected as they are being off-loaded into the orchards. If the hives are free of ants, the inspection shouldn't take long. The important thing is to know where the bees are going so that information can be communicated to the county ag commissioner.

Since Oct. 9, when more than 40 mounds estimated to contain about 300,000 ants each were discovered in a field and adjacent park in the Robinson Ranch planned community near Trabuco Canyon in CA, state officials have discovered hundreds of mounds in residential areas of Cypress, Coto de Caza, Los Alamitos and Mission Viejo. Mounds have also been spotted in a residential area of El Monte, in Los Angeles County, and in a nursery in the Riverside County city of Indio.

The estimated dozen previously reported infestations of red fire ants in the state were contained to nurseries and orchards in isolated agricultural areas, and were quickly eradicated. The ants found recently are in suburban and urban residential areas across a broad territory, making the problem harder to control.

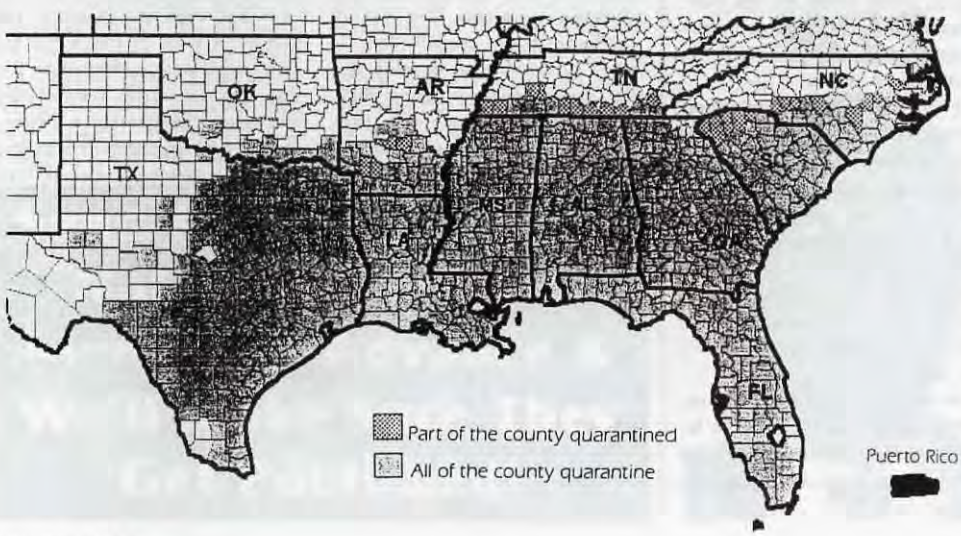
Robert Dowell, primary state entomologist for the Department of Food and Agriculture, said officials surveying the ant populations believe many of the colonies have been established for as long as four years. He said it is too early to determine precisely how wide-spread the infestation is.

Compounding the battle was the discovery of two types of fire ants in Orange County, multi-queen and single-queen colonies.

State and county agricultural officials learned that the problem was more complex than previously thought after consulting with visiting ant experts from Florida and Texas, where fire ants are a persistent problem.

"Eradication is an inappropriate word," said Gena Parsons of the Texas Fire Ant project, a coalition of university researchers. "There are too many of them to kill. When people put out baited insecticide in agricultural or residential areas, it kills some of the ants, but not all.

Map and segments courtesy of American Honey Producers *Magazine*



Quality Control

If 99.9% Is Good Enough . . .

12 newborns will be given to the wrong parents.

114,500 mismatched pairs of shoes will be shipped per year.

18,322 pieces of mail will be mishandled per hour.

2 million documents will be lost by the Internal Revenue Service.

2.5 million books will be shipped with the wrong covers.

Two planes landing at Chicago's O'Hare airport will be unsafe every day.

315 entries in Webster Dictionary will be misspelled.

20,000 incorrect drug prescriptions will be written this year.

From Crop Decisions

UK GETS APISTAN

November 26 the registration of Apistan was granted for use in England. This now means England has two products to treat *Varroa* with. Bayvarol and Apistan.

Terramycin Resistance?

TRANSGENIC PLANTS & ANTIBIOTICS

The Food and Drug Administration has issued draft guidance entitled "Use of Antibiotic Resistance Marker Genes in Transgenic Plants: Guidance for Industry" and a report entitled "Report on Consultations Regarding Use of Antibiotic Resistance Marker Genes In Transgenic Plants." FDA is making both documents available for public comment. Electronic versions of the draft guidance and report are available on the Internet at http://vm.cfsan.fda.gov/~lrd/biotechm.html.

FDA's 1992 policy statement regarding foods derived from genetically engineered plants specifically discussed antibiotic resistance selectable marker genes, noting that both the gene and the encoded enzyme, unless removed, are expected to be present in foods derived from plants developed using the markers. The agency acknowledged that when present in food, enzymes that inactivate certain clinically useful antibiotics theoretically might reduce the therapeutic efficacy of antibiotics administered orally.

FDA administrators maintain that is it important to evaluate such concerns with respect to commercial use of antibiotic resistance marker genes in food, and to consider the possibility that resistance to antibiotics in microorganisms has the potential to spread through horizontal transfer of such marker genes from plants. This second consideration was reflected in FDA's evaluation of the use of the kanamycin resistance gene product (neomycin phosphotransferase II, or nptII) when the agency amended the food additive regulations in 1994 to permit the use of nptII in the development of transgenic tomato, cotton, and oilseed rape.

Since that decision, the agency has continued to receive inquiries from crop developers as well as from the public regarding the safety and regulatory status of antibiotic resistance marker genes. To address the issue, a team of scientists from FDA's Center for Food Safety and Applied Nutrition, Center for Veterinary Medicine, and Center for Drug Evaluation and Research recently held consultations with outside experts having expertise in relevant fields including gene transfer and antibiotic resistance. The purpose of the consultations was to determine whether, and if so, under what circumstances, FDA should recommend that a given antibiotic resistance gene not be used in crops intended for food use. The report summarizes these consultations on the use of antibiotic resistance marker genes in transgenic plants.

And Soil Groundwater Purification

LOCUSTS FOR SHADE & HONEY

Trees can shelter livestock—as well as farmsteads—from winter's cold as well as summer's heat. But ... 1,200 trees in a pasture?

That's how many black locust trees Charles Feldhake is growing in a WV pasture. The Agricultural Research Service soil scientist planted the trees in rows about 30 feet apart in a 5-acre watershed where 25 sheep graze. Another 25 sheep graze an adjacent, treeless watershed.

Feldhake and horticulturist Carol Schumann want to find out whether the trees can catch excess nitrogen from livestock urine and manure in subsoil, before it reaches groundwater. The researchers are at ARS' Appalachian Soil and Water Conservation Research Lab, Beaver, WV.

Feldhake and Schumann are interested in other benefits of "agroforestry," the term for growing trees and shrubs on farms. Locust trees can be sold for firewood or fenceposts. The flowers provide nectar for honey-making bees.

The scientists are testing black walnut, honey locust and sea buckthorn on pastures. European farmers grow sea buckthorn, a shrub, for its nutritious berries.

This past winter, scientists opened up a forest strip and planted red oaks with faster-growing trees and shrubs, including white pine, Chinese chestnut, pawpaw, hazelnut, blueberries and raspberries. They want to find out if the shorter-term plantings can yield marketable products without negative effects on red oaks that would be selectively cut for high-value veneer.

In addition to research goals, scientists hope to demonstrate to local farmers that perennial woody species make sense as Appalachian crops.

QUICK CHEMICAL ANALYSIS

A new device called a biosensor will help farmers and regulators detect herbicides and pesticides in soil and water. The biosensor relies on living organisms or their by-products to identify traces of chemical residues in only minutes.

Molecular biologist Autar K. Mattoo at the Agricultural Research Service co-developed the biosensor with scientists from the Czech Republic and Italy through a grant supported by the North American Treaty Organization. In Beltsville, Md., Mattoo leads the Vegetable Laboratory of the ARS, the chief research agency of the U. S. Department of Agriculture.

Heavy applications of herbicides and pesticides can leave environmentally unsafe residues in soil and water.

The biosensor detects these residues by using a chlorophyll-protein complex that measures oxygen levels. To use the biosensor, the farmer or regulator passes a soil or water sample through the device. If the sample contains an herbicide, the chemical will react with the biosensor's proteins and inhibit oxygen production. This information is relayed to a computer that displays the data in graph form.

The biosensor can only measure herbicides that inhibit photosynthesis — diuron atrazine, simazine, ioxynil, bromoxynil and dinoseb. But this group constitutes about 50 percent of all herbicides used in agriculture.

The test is ultra-sensitive. Its detection limits are similar to or slightly better than the more complex, highly sensitive ELISA test, which is antibody-based. The biosensor works well at room or warmer temperatures. Its membrane is stable for up to about 40 hours and can be re-used within that period for any number of measurements.

Once commercialized, it should be economical and easy to use—distinct advantages over currently available herbicide detectors.

Pollination Demand Will Increase

SUNFLOWER, CANOLA, MEADOWFOAM AS LUBRICANTS

Sunflower-oil-derived lubricants may be churning inside automobile crankcases of the future. Scientists have made compounds called estolides from oleic acids found in sunflower oil. Estolides are unique fatty acids that researchers made by chemically altering the oleic oils. The estolides can be used as a base in lubricants like hydraulic fluids. Although these fluids are classified as lubricants, their primary purpose is to transfer pressure in machinery to activate motion, not to lubricate mechanical systems. The use of sunflower-derived estolides has allowed researchers to develop the first biodegradable hydraulic fluid targeted for commercial use. Estolides also have applications in textiles, detergents, personal care products and pharmaceutical products. Estolides of the future may be made from high-oleic-acid soybeans.

New markets for soybeans, canola and meadowfoam could spring up more quickly in the future. That's because of a new ARS test and protocol that will help speed development of industrial lubricants from vegetable oils. More than 10% of hydraulic fluids and other industrial lubricants now made from synthetic and petroleum-derived oils could be replaced with vegetable-derived products. Current lab tests require at least a gallon of fluid and can take five weeks. The new test takes one week and uses only two ounces of fluid to check hot and cold temperature performance, friction, corrosiveness, flammability and other characteristics. From a check of 50 vegetable-derived base oils, the researchers selected three that perform as well as petroleum-made lubricants. The research was done under a cooperative research and development agreement with Caterpillar Tractor Co., Peoria, IL.

National Center for Agricultural Utilization Research, Peoria, IL

Prestigious Award

HAMBLETON & STUDENT NOMINATIONS SOUGHT

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

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

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

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

SHIM BECOMES TECHNICAL LIAISON

Dr. Hachiro Shimanuki has been reassigned by USDA's Agricultural Research Service to the newly-created post of Technical Liaison to the Industry, where he will spend 80% of his time. He will also remain on the Beltsville Bee Research Lab staff, for 20% of his time. Dr. Mark Feldlaufer has been named to replace Dr. Shimanuki as Research leader of the Beltsville Bee Research lab.

In his new position, Dr. Shimanuki will serve as an advisor to National Program Leader Dr. Karl Narang and assist Dr. Narang in coordinating the research at the ARS bee labs. This initially will be for a 90-day assignment.

Dr. Shimanuki's new contact information is: Dr. Hachiro Shimanuki, National Program Staff, USDA-ARS, Rm. 219, Bldg. 005, Beltsville Agricultural Research Center – West, Beltsville, MD 20705, Ph. 301-504-7066, FAX 301-504-5467, E-mail: shs@ars.usda.gov

CERENA'S MYSTERY

A bee used throughout Asia to produce honey has surprised and puzzled scientists. They've learned that the bee, *Apis cerana*, hides a large amount of an oily compound in an unexpected place— its venom sac.

The compound may be an active ingredient in what some scientists think is an alarm pheromone. Bees use their alarm pheromone to alert hivemates of threats to the colony, such as an intruder. When bees outside the hive emit the pheromone, bees inside the hive can detect it with their antennae, then use the scent to find their way to the intruder.

Until now, pheromones had never been found in bee venom, according to Agricultural Research Service entomologist Justin O. Schmidt in Tucson, Ariz. ARS is the U.S. Department of Agriculture's lead scientific agency. Other honey bee species studied apparently store their alarm pheromone in spongelike tissue at the base of the stinger.

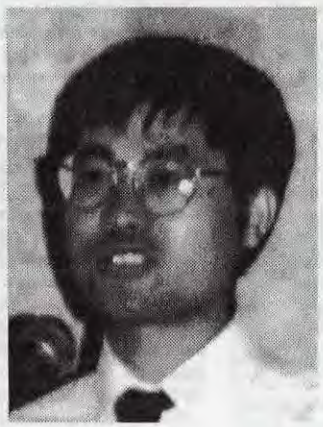
Schmidt collaborated with researchers from England and Brazil in analyzing more than 300 Asian hive bees from Hong Kong, Malaysia, the Philippines, India and Japan. They found that the fuzzy A. cerana has 50 to 100 times more of the pheromone component than other honey bees examined.

The compound is (Z)-11-eicosen-1-ol, or eicosenol for short. Scientists have known since 1982 that bees make eicosenol but – until the *A. cerana* study—had not found it in such large quantities or in any honey bee's venom sac.

Schmidt wants not only to pinpoint eicosenol's value to this bee, but also to find out if it could be used to help the leading domesticated honeybee in this country, *Apis mellifera*. The compound, for example, might help fend off harmful mites that have devastated many *A. mellifera* colonies.

Send Us Your Meeting Notices At Least 2 Months In Advance & We'll Make Sure They Get Published!

MICHIGAN GETS NEW SPECIALIST



After a long interview process at MI State Univ., Zachary Huang, PhD, was named Apicultural Specialist and Assistant professor of Entomology. Dr. Huang was a feature speaker at the MBA Winter meeting in Cadillac, MI and began his official MSU duties November 1. He received his B.Sc. degree in Hunan, China and his PhD in honey bee physiology and behavior at the Univ. of Guelph, Ontario, Canada. His most recent assignment was at the Univ. of IL as Senior Research Scientist. Dr. Huang succeeds Roger Hoopingarner, PhD, who retired after a long and successful tenure at MSU.

WIS B.O.Y.

"Beekeeper of the Year" award for 1998 went to Leon Metz of Hazel Green at the Wisconsin Honey Producers Association Convention held in Platteville. Leon started beekeeping in 1977. He sold his honey door to door at first making it into a full-time business in 1982.

Leon has been a member of the WHPA for many years – serving on the convention committee, promotion committee, chaired the baking contest for several years and is co-chairman of the honey queen committee. In recent years he has been district chairman.

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The Race Is On . . .

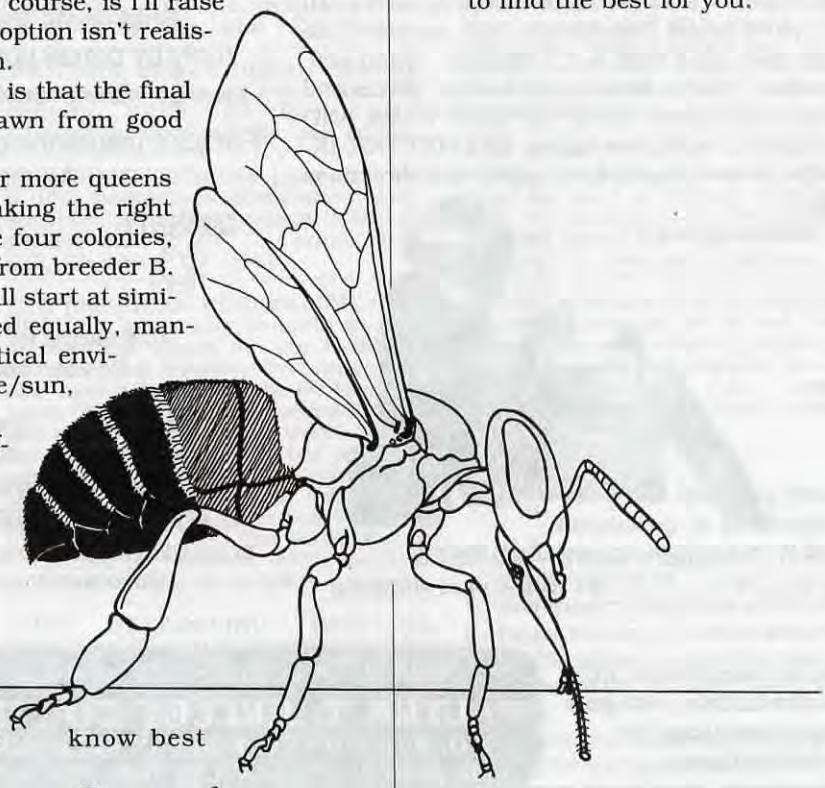
Kim Flottum

For many beekeepers, Spring (whenever Spring arrives where you live) brings with it thoughts of requeening. Usually one of two decisions is made: I liked what I had last time and I'll get some more or, it's time to try something different. A third choice, of course, is I'll raise my own. But for most of us this third option isn't realistic, so it's buy new queens time again.

A perhaps dangerous assumption is that the final decision is based on good data, drawn from good records.

Comparing and contrasting two or more queens requires good record keeping, and taking the right data. For instance, let's say you have four colonies, two with queens from breeder A, two from breeder B. Comparing A to B requires that they all start at similar strengths, were fed and medicated equally, managed the same and had nearly identical environments (old/new equipment, shade/sun, same yard, etc.).

If these are all the same, then, after a season, or better, two (overwintering is important) an evaluation can be made, based on your criteria – brood production, behavior on the combs, defensiveness, Spring build-up, honey production, disease susceptibility, mite tolerance, Winter food consumption, pollen collection . . . the list goes on and on. You know best what works best for your operation.



You can make your A or B choice now. However, often, for good reasons, bad reasons or no reason, Choice C is made – somebody new. And with this must come the decision – what race (hybrid, variety) should I try this time?

For the sake of discussion, we will consider the commercially available races and varieties and hubrids of bees, as commonly found in the popular journals. This removes from discussion the African bees in the south and southwest parts of the U.S., and the German Black, which is seldom available here.

This leaves the following races, hybrids and derivatives (I'll explain below) – Carniolan, Caucasian, and Italian. The derivatives, mentioned above, are the result of crossing differing strains of the same race. And hybrids of course are crosses of different races.

On this page over the next few months we are going to examine all of these that are easily obtained through the mail, and detail the biology of the 'true type,' and the advantages and disadvantages inherent therein, and do the same with the derivatives and hybrids. We'll do this, based on the latest data, information from breeders, and information from beekeepers who have field tested them.

When complete, you should be able to make useful decisions on what kind of queen to purchase, that will do best in your location and work well with your management style.

So, Carniolan, Caucasian, Italian, Cordovan, Buckeye Reb, Buckfast, New World, Starline, Yugos, Russians, Hawaiian, Midnight, All American . . . there's lots to choose from, and the race is on to find the best for you.

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