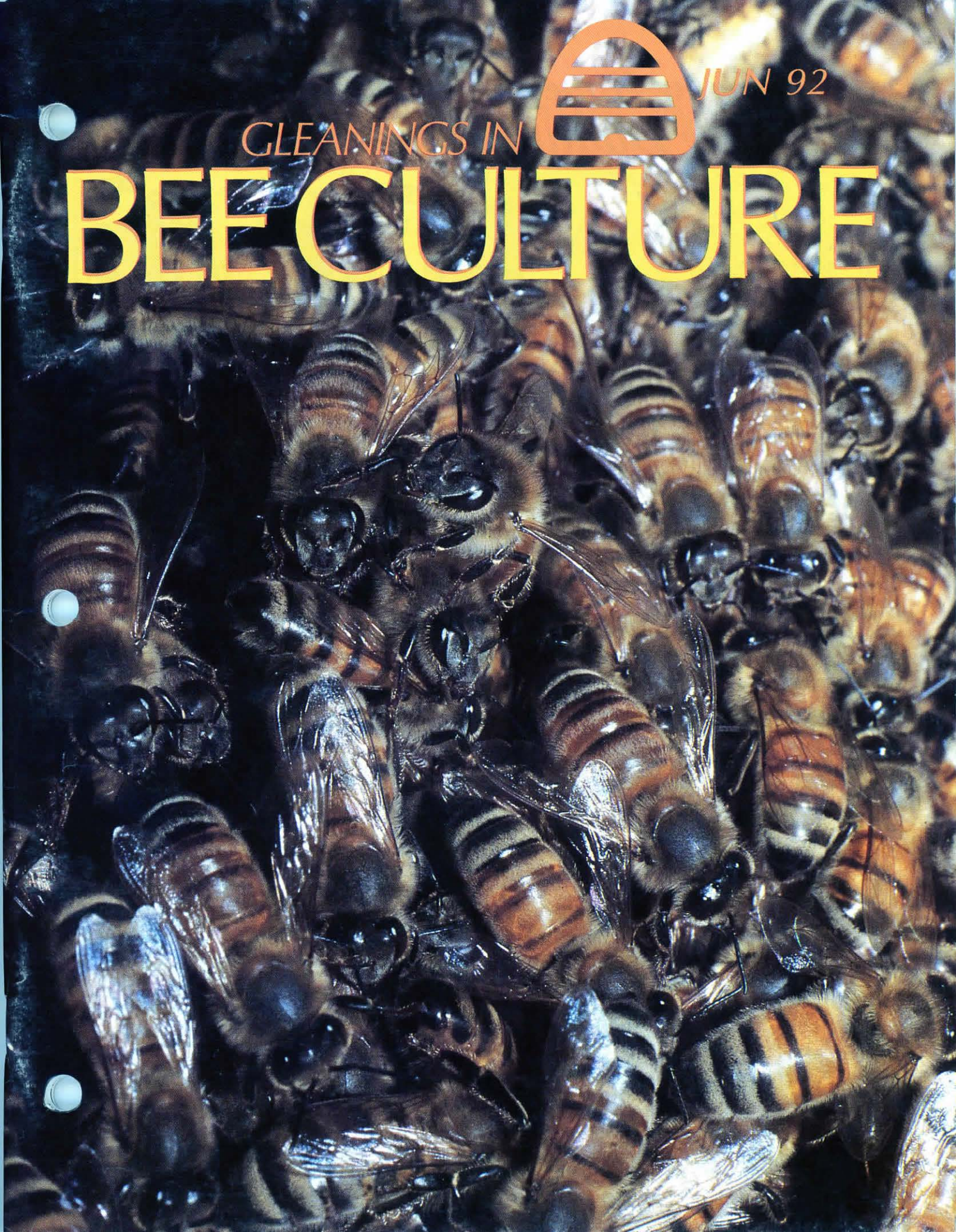
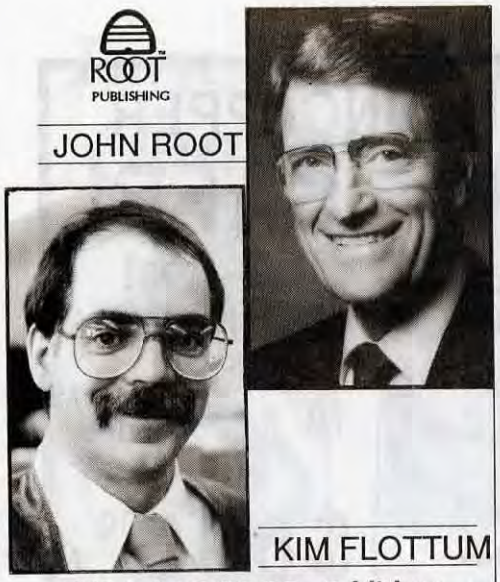
JUN 92

GLEANINGS IN BEE CULTURE





JOHN ROOT

KIM FLOTTUM

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"I Just Love Bees"

The more bees the better when the honey flow starts. This colony is so busy that bees can't get in and out fast enough during a strong clover flow last year.

If you (and nature) did most things right this spring, colony population should be at the season's peak during your major honey flow.

photo by Diana Sammataro

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119 Years Continuous Publication by the Same Organization

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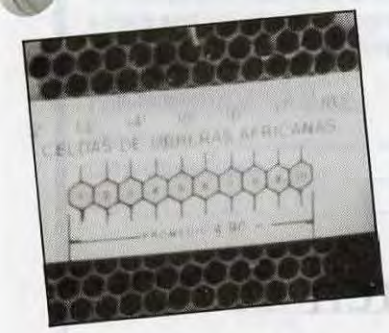

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INNER·COVER

Much Bigger Pictures

This month nearly 30,000 environmental specialists from 170 countries and their support staff are meeting in Rio to, maybe, start making the planet a safer place to live.

There's good reason to make this happen, according to experts from all over the world:

"Food output is rising in the developing world, but food per person isn't. In 45 years 11% of the *world's* land has been degraded – an area larger than India and China." (U.N.)

" resource degradation plus the (ill) health effects of pollution cost (developing countries) between 1% and 5% of their GNP's." (David Pearce – Univ. College, London).

"In the destitution of 'developing countries' and the over-consumption of industrial countries lie the seeds of *all* environmental problems." (Sir Shridath Ramphal, president, World Conservation Union).

With the end of the cold war, population pressures plus environmental decay may lead to conflict among nations over food, water and land.

Maurice Strong, the secretary-general of the Rio meeting, the U.N. Conference on Environment & Development (UNCED), says it all, ". . life as we know it is at stake."

The agenda of this environmental summit will cover climate change (global warming), forest principles (management), biodiversity (protecting the world's species of plants and animals), and something called 'sustainable development', which means, basically, the countries involved will try to design programs to have money go from rich to poor countries, develop ways to monitor agreements and treaties, transfer appropriate environmental technology, and make the world's polluters pay for their transgressions.

The U.S., along with several developed countries is a bit ambivalent on commitment to these projects for several reasons – the cost is certainly a problem in a global economy that's not exactly booming (and, by meeting all the requirements of Agenda 21, the U.S. economy will actually *decline* 2 or 3%); creating another global-scope bureaucracy to administer this program is second choice to using existing U.N. committees; there are several portions of the agreement the U.S. doesn't agree with – CO_2 production, ownership and development rights to plant and animal species for instance; and, finally, there's reducing the pollution and damage caused by agriculture.

New tilling practices, improved crop rotations, more efficient irrigation practices and practical use of biotechnology will help food production the world-over. All these practices fall under the name of 'sustainable agriculture', a technology base that even though well understood, is seldom practiced in this country.

One aspect of this technology is IPM – integrated pest management – a practice most beekeepers are familiar with, at least in passing.

Which, in a round-about way brings me to why I started all this. Awhile back, the EPA pulled the registration of a particularly nasty (but effective) insecticide called methyl parathion. This chemical was routinely used on a variety of crops, usually mixed with one or two other insecticides. Some of these crops were typically visited by honey bees.

But worse, some of the crops were sprayed while in bloom, or just as bloom was finishing. Petal fall for apples, for instance, or the early stages of bloom on sunflowers, or late bloom on seed alfalfa. These crops need protection at this particularly delicate floral-honey bee interface because that is when they are most vulnerable to the pests that attack, usually, the developing seeds.

What recourse do growers have? Parathion was one chemical of choice because it was inexpensive, killed nearly everything it touched, and broke down rapidly. Inexpensive is the key phrase here, but it had a few drawbacks – like acute toxicity to humans and field reentry problems. It was, decided the EPA,

Continued on Page 360

Reader Assistance

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NEXT MONTH

The Africanized honey bee is making its steady advance northward, and 'Killer Bee' headlines are becoming almost routine! But no matter how common they become (bees or headlines – or both), there's no escaping that *citizens* are by now acutely aware of these tiny public relation nightmares.

You can do one of two things in this situation – stick your head in the sand and hope it all goes away or somebody else takes care of it (the attitude of a surprising number in this industry), or take a proactive stance by solving these problems, thereby putting beekeepers and beekeeping in a positive light – an editorial position long held by this magazine.

During the past several years *Bee Culture* has published articles on crisis management, media and public relations, ordinance development, good neighbor beekeeping, news release articles, insurance negotiations and a host of other items that have helped prepare American beekeepers for exactly the situation that exists now in south Texas.

But no matter how well prepared we are, how perfectly schooled in the fine art of giving interviews, how cool we remain under fire – dealing effectively with an emergency requires knowledge and skills most of us don't have – yet.

Next month, Dr. Eric Erickson, from the USDA Bee Lab in Tucson, takes the first step in dealing with what could be a deadly situation – a massive stinging incident.

Erickson takes technology that every rural, town or city fire department currently has and explains how it would work to protect rescuers, and save lives. It has lots of background in basic bee biology and any fire department will be better prepared to handle this type of emergency if they read it. The article will be published in several trade journals in the fire fighting industry, this magazine and other in this industry.

Continued on Page 367

MAILBOX

doesn't come up to standards, send it back. They will get the message.

Kleber J. Minich
Natrona heights, PA

Editor's Note: Like beauty, 'standards' are in the eye of the beholder (or purchaser). Unfortunately, consumer theft has forced video producers (and sellers) to take protective actions strong enough to deter viewers from simply copying and returning the tape, with the reason that "it didn't meet my standards" written on the invoice. A sad, but necessary part of this business.

■ Video Advice?

The subject on video tape programs came up at a recent meeting so I decided to write this letter. Everyone wants to make a program about bees and put it on the market. Prices range from $30.00 to $60.00. I have purchased and viewed some of these and have decided to give my point of view.

One tape on spring through fall management was very good, although the hives had been opened and cleaned before the tape was made. It made it look so easy to do the inspection. This video was made near an airport where jet plane noises added to the sound. Another was the same except it was made near a major highway where truck noises were also added. The latest tapes on the market are on the Varroa and the tracheal mites. I was told there is too much talk on these tapes and not enough information on how to solve these problems. We all know we have a problem with these mites, so we don't have to hear it again. The producers state that once the seal is broken and removed, you cannot return it for a refund. They feel you made a copy of this program and you want your money back. I say if the tape isn't good you don't need or want it. After all, we purchase these programs to show our beekeeping friends and members of our association.

We need good speakers at our meetings and good video programs to keep us up to date on our problems and how to correct them. If you buy a video tape from a supplier and it

■ One More Time. . . .

At 88, and after 75 years of active beekeeping I was trying to give it up. So I dropped both *Bee Culture* and *ABJ*, which I have received since 1918. I have kept them by the year ever since. I got much enjoyment in rereading issues in the 20's and thinking back to the old days. Deep supers, comb honey and 250 to 300 pound averages.

My first wholesale crop went to Fred Muth in Cincinnati, shipped by rail for 9¢ (of Muth jar fame) per pound in new 60's.

One issue of *Bee Culture* of new ideas is worth more than the year's subscription.

I tried them all and many I've used for years – first as a hobby, then commercial, now as a hobby.

Several years ago due to age I went to all 6-5/8" equipment. I now find even full shallow super is too much.

Four years ago I started cutting my bees and equipment down. But I still keep two colonies, just to look at.

All the beekeepers I knew personally are gone – C.C. Miller, Kelley, Kruse, Killion, Stewart.

My first mail order was from an ad in *Bee Culture* – a young queen and 1# thin super foundation. Postpaid anywhere in the U.S. for 50¢ from Kelley, then in Hooma, LA. I have a picture of Wabash County Beekeepers, 1917 – I am the only one left.

It has been quite an experience keeping up with new ideas and trying them out.

Double wall chaff hives, modified Dadant, queen rearing, artificial increase, swarm control, races of bees, markets, etc.

During the depression a big crop sold to Sherfick Shoals, Ind. Delivered in 60's 8-1/2¢ and they gave me a bad check!

Trying different races – Caucasian, Carniolan, Cypress Golden, 3-Banded, Midnites, 3# packages $2.50, complete hive $2.50, queens, 50¢. 250 to 300 lb. average (farm chemicals 40 to 50 lb. average.) good income from 150 hives, now need 1000+.

Enclosed is another year's subscription – even with retirement I need it.

Jim Vice
Washasau, IN

■ Early Bees

As an avid reader of queen breeder ads, I know that every race and every available hybrid is gentle, a good honey producer, has good wintering ability, doesn't use excessive propolis and is showing resistance to tracheal mites. So it was a pleasant surprise to detect a distinct difference in my latest queen in my single, back yard hive.

I have an earliest blooming Japanese plum (*Metheley*) and several even earlier wild plums I propogated as ornamentals. None of my earlier bees, all Italians, visited the Japanese plum and hardly any visited the wild plums. But last August I requeened with a Hastings Carniolan and this

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MAILBOX

spring a number foraged the Japanese plum and many avidly worked over the wild plums. Many more are foraging both pears (*Comice and Seckel*) and a cherry (*Van*).

It seems that they are more content to forage close to the hive but it just may be that their tastes are different. Although they fly early in the year and in cool weather, the Italians did too.

Dan Hendricks
Mercer Island, WA

■ AHB's & Mites

Here is a prediction about Africanized bees and Varroa mites:

If Varroa mites are as devastating to wild or unprotected bees all over the country as they are in northwest Florida and *if* Africanized bees actually do spread to a good portion of the United States, then I predict that the Varroa resistant Africanized bees will take over all or most of the bee trees, cavities in buildings, etc. left vacant by the European strains.

Actually this may be a blessing in disguise because if the wild bees were gone then agriculture would lose all those pollinators. Another thing to consider is that wild bee nests generally are up high where people aren't likely to stumble into them.

Roger M. Wernicke
Pensacola, FL

■ Better Comb Honey Boxes

I want to let you know that the article that was in the March issue of *Bee Culture* on comb honey was great, however I feel that you left out one of the most important items – the last step before putting the super on the hive. You need to melt some Paraffin and with a small brush put a coating on the top and bottom of the exposed boxes in the super. This protects the box from travel stain, and you sell a clean box. When you remove the super after it is full, take your hive tool and remove the paraffin before you take the boxes out of the super.

I only produce comb honey and have been doing it for 45 years. This tip was given to me by an old beekeeper in 1948.

You may use beeswax but paraffin is clear.

Thank you for a fine article.

Carl L. Hartman
Wichita, KS

■ Thanks

About ten years ago a local surgeon and amateur beekeeper, Lee Hawkins entered the Nature Center. He told me we ought to have a demonstration beehive and that he'd set it up. He did, and it quickly became a popular exhibit.

Last fall Lee died of a massive heart attack while working in his bee yard. A memorial fund was established, and part of it was used to purchase equipment to expand the Indian Creek Nature Center's bee education project.

One aspect of this is a beekeeping class for children and their parents. It is being taught by retired extension agent Russ Swenson and is for a mixture of kids and adults. A number of children are eight and nine years old, and they are having a fine time. No doubt, we are better off because of people like Lee Hawkins.

Rich Patterson
Cedar Rapids, IA

The beekeeping class at the Indian Creek Nature Center in Cedar Rapids, Iowa. Instructor is Russ Swenson. (Photo by Rich Patterson)

■ He Takes A Licking

I got a call from a reporter who wanted a picture of a beehive. When he came out he was standing about 40 feet away and we were communicating as to where I would stand as he was taking pictures. We were not quite using Boy Scout semaphore signals, but almost.

To save my tonsils I went over and explained that I had ONE hive of bees I had trained to come out and lick my face, like a dog that greets you after you have been away. I said that colony was safe and wouldn't bother him. So he came up closer. When I put my face down close to the bottom board and whistled bees came out and started licking my face. He remarked "Well I will be ." Obviously, he threw away all of the pictures he had taken of the hives and printed the one of me, with a couple of bees licking my face.

In the best interests of Science in the vast field of honey bee lore, I will tell you how you, too, can duplicate the performance. After all, any breakthrough has to be disclosed so others can replicate the experiment. If they cannot, obviously there is something faulty in the original theory used to construct the model and thesis.

So, back to the scene in the bee yard. Since I wanted to have a closeup of the bees and hive and possibly my smiling face, and since the photographer was loath to accommodate, thinking quickly, I took a bit of honey from a jar I had brought and smeared a little on my cheek. Then, I bent down and tapped the hive so a few bees came out and started licking my face – just as I had promised.

Austin Knox
Milford, CT

Continued on Next Page

MAILBOX

■ Legal Problems

We have lost a lot of bees this spring when applicators used Furadan on Alfalfa. As you may know, Parathion has been banned and the replacement is Furadan. One applicator told us that he would probably use Penncap-M later this year. At the moment we are checking our options. My aching back, if these chemicals are used extensively where cotton and alfalfa are grown, I can't see any future for beekeeping, period.

On another matter, in your *Inner Cover* in the April 1992 issue of *Bee Culture* you asked: "Can you afford to go to someone's house and pick up a swarm?" Since we have gradually become a lawsuit-happy country, I would answer the question – NO. Especially so in the towns and cities. The same negative answer would apply to removing bees from houses, trees, etc. However, there is a way that will relieve the expert beekeeper of any legal responsibility. He can, at least in some places, become a temporary employee of the town/city government. With this arrangement these government's public liability insurance policies would assume any responsibility should an incident occur.

Glenn Gibson
Minco, OK

■ Good Articles

At a meeting last night of the Niagara (Ontario) Beekeepers Association, I met two beekeepers who had never heard of your magazine.

They were fascinated by the two articles you printed in Nov. '91 and March '92 by O.B. Wiser. Those articles, about the Two-Queen System, were included in a beekeeping science project by my 13-year old paper boy who won the prize in a local science fair, and is now a registered beekeeper. The project was on display at the beekeepers meeting.

A. Stoddard Jones
Niagara Falls, Ont.

■ The Color Of Bees

The number of strains of honey bees each distinguishable by color that are available to experimenters is, of course, very limited. For researchers who wish to design experiments that require several different colonies that can each be distinguished by its own color, I would like to propose here a means to achieve that.

First, some personal history. My father was an amateur beekeeper, and I grew up with colonies in our yard since before I was 10 years old. Honey bees are, of course, fascinating to a kid; consequently I learned anything I could about bees and beekeeping. Summers in my country (Israel) are dry, and wild flowers bloom primarily in spring. Beekeepers, therefore, provide artificial feeding in winter, using sugar-solution in a feeder whose opening is shoved into the hive entrance. My country was under British rule at the time, and during WWII almost everything, including food, was of course rationed. The government was naturally interested in promoting the local production of food.

It, therefore provided beekeepers with extra rations of sugar to feed their bees in winter. However, in order to prevent any undetected possible diversion of such rations to the black market, sugar intended for honey bees was mixed with a red food-dye. The result: the bees soon acquired a highly visible reddish tint! So, incidentally, did the honey. The bees, therefore, looked reddish primarily, or even exclusively because the red solution inside showed through the cuticle. I do not know whether any of the dye was secreted into the cuticle itself, and at the time it did not of course occur to me to note for how long the reddish tint of the bees endured after the feeding stopped.

It is, however, obvious that honey bee colonies can be very quickly and easily given a distinct tint by using different food coloring in their sugar solution. Endurance of the tint, which might be a very important factor for experimenters, still needs to be studied. It will undoubtedly endure at least for a while.

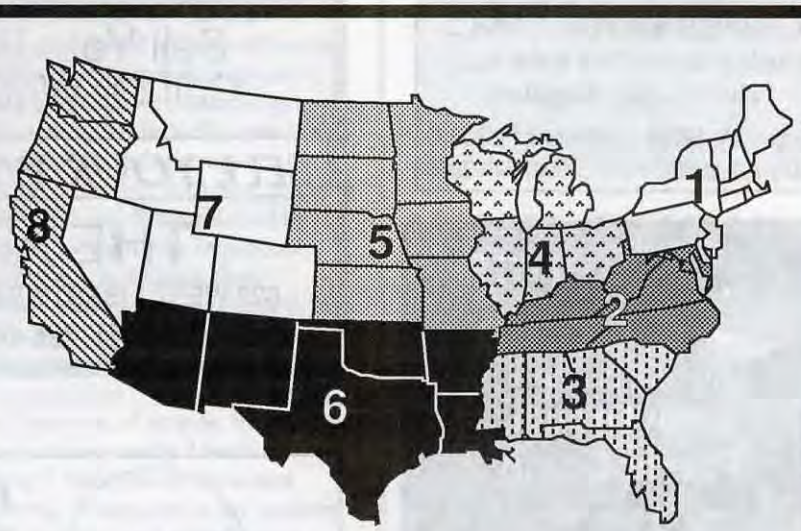
R. Rosin
Hebrew University of Jerusalem

JUNE Honey Report

June 1, 1992

REPORT FEATURES

Prices shown are averages from many reporters living in a region, and reflect that region's general price structure. The Range Column lists highest and lowest prices received across all regions, from all reporters.



	Reporting Regions								Summary		History	
	1	2	3	4	5	6	7	8			Last Month	Last Yr.
Extracted honey sold bulk to Packers or Processors									Range	Avg.		
Wholesale Bulk												
60 #Wh.	46.56	49.83	48.22	38.46	36.50	45.02	44.97	44.15	32.40-60.00	44.49	44.67	42.03
60 # Am.	43.53	42.20	44.43	34.13	39.28	41.34	41.55	44.00	31.20-52.00	41.51	41.25	40.29
55 gal. Wh.	.608	.700	.608	.606	.540	.550	.596	.580	.46-.77	.594	.558	.51
55 gal. Am.	.580	.540	.606	.600	.540	.565	.577	.530	.42-.68	.541	.534	.49
Wholesale – Case Lots												
1/2 # 24's	20.93	23.35	26.88	20.94	15.92	20.25	22.50	21.50	15.00-26.88	20.95	20.84	22.28
1 # 24's	30.03	31.31	35.85	28.00	25.54	28.60	29.72	27.50	23.50-42.00	29.70	29.22	29.65
2 # 12's	26.40	27.18	34.03	27.20	22.73	27.18	28.01	29.13	18.00-40.80	27.26	28.08	27.43
12 oz. Bears 24's	27.19	27.45	29.59	25.10	22.80	26.00	26.78	19.13	14.00-34.25	26.05	27.25	26.12
5 # 6's	31.69	32.27	39.37	30.70	25.32	29.74	29.17	27.10	24.00-48.00	30.58	29.78	29.66
Retail Honey Prices												
1/2 #	1.13	1.35	1.37	1.17	.86	1.21	1.11	1.37	.82-1.49	1.19	1.12	1.14
12 oz. Plas.	1.59	1.62	1.65	1.49	1.26	1.57	1.52	1.53	1.13-1.99	1.53	1.53	1.43
1 #	1.64	1.88	2.11	1.82	1.42	1.84	1.81	1.74	1.29-2.19	1.76	1.72	1.82
2 #	2.90	3.20	3.77	3.83	2.38	3.29	3.05	2.92	2.25-5.00	3.14	3.04	2.98
3 #	4.30	4.35	5.22	4.86	4.32	4.19	4.38	4.07	3.99-6.19	4.40	4.24	4.24
4 #	5.37	5.23	5.19	5.23	4.97	5.17	5.05	5.03	4.79-5.75	5.15	5.14	4.96
5 #	6.85	6.95	8.12	6.76	5.36	6.62	6.18	6.14	4.59-9.99	6.61	6.72	6.49
1 # Cream	2.24	2.13	1.90	1.98	1.86	2.03	2.01	2.19	1.65-2.95	2.07	2.02	1.77
1 # Comb	2.99	2.38	2.58	2.84	3.08	2.10	2.79	2.61	2.15-3.70	2.66	2.66	2.59
Round Plas.	2.32	2.37	2.60	2.63	2.16	2.16	2.22	2.72	1.95-3.49	2.37	2.12	2.45
Wax (Light)	2.35	1.24	1.52	1.47	1.36	1.36	1.33	1.22	1.10-3.50	1.53	1.72	1.57
Wax (Dark)	2.00	1.15	1.31	1.11	1.00	1.18	1.13	1.10	.95-3.00	1.27	1.30	1.16
Poll./Col.	33.20	24.50	28.00	33.75	30.00	29.00	31.15	31.00	18.00-37.50	29.85	27.81	28.14

Region 5

Cool wet spring seemed good for sales, prices and demand, but equally bad for colony build-up, feeding and pollination. Mite losses in some areas still heavy but appear to be leveling off.

Region 6

Prices and sales steady, with bakery trade picking up. Good spring weather has given boost to most producers, and package and queen producers doing well. Mite losses not as devastating as in past years, so outlook optimistic, if not profitable.

MARKET SHARE

Now is the time to start looking for additional sales at farm markets, flea markets, fruit stands and the like - now before they get set-up and going. Consider approaching these outlets with a special label, or a "Locally Grown" sticker applied. Don't wait until you have pails and pails to sell. Create a demand early!

Region 1

Sales about average for May, but most of last year's crop gone. Prices steady, but local prices vary widely due to economy. Colony losses due to mites higher in northern areas and in untreated colonies.

Region 2

Sales and demand steady. Prices healthy in some areas, but others traditionally low. Colonies in good shape generally, but mite losses continue. Early crops hurt by late freeze, feeding required and regular nectar flows a little behind.

Region 3

Sales steady, but demand light as weather warms. Early flows retarded due to cold spells, but later warm weather hurried them along. Strong colonies generally, but fewer of them this spring, driving up pollination fees.

Region 4

Demand steady, but prices flat, and even declining a bit. Aggressive markets doing well but price is usually sacrificed for shelf space. Colonies in good shape for June flows, and adequate moisture should help summer crop.

Region 7

Sales and prices slower and lower, probably due to excellent spring weather in most areas. Bees building fast and losses to mites held to a minimum in most states.

Region 8

Sales increasing, and prices heating up. It should be a good year, at least in the northern two-thirds of the region. Now that the pollination binge is over honey production heats up, and stronger than usual colonies should do well.

Try This For 'Cool' Summer Reading

Ice Cream! The Whole Scoop. Gail Damerow. Glenbridge Publishing Ltd., 4 Woodland Lane, Macomb, IL 61455. $24.95 ISBN 0944435092

BOOK

In the days before electricity, ice cream was made in a set of metal bowls, together called an "ice cream pot", "French pot", or "pot freezer" The smaller bowl was filled with mix and nestled into a larger bowl packed with ice and salt.

You swirled the small bowl in a bed of ice to keep it in motion so your ice cream froze evenly. At the same time, you scraped the mixture from the side of the bowl and worked it smooth with a wooden paddle. It took great skill and patience to keep brine from sweeping over the edge, ruining the ice cream.

In 1845, New England housewife Nancy Johnson got the bright idea of replacing the smaller bowl with a lidded cream can fitted with a rotary dasher turned by a crank. In place of the larger bowl, she used a bucket to hold the ice.

With minor improvements, Johnson's invention remained pretty much as she designed it until around 1950, when some clever soul thought of replacing the cranking handle with an electric motor. Since then, modern ice cream freezers have been continually modified to keep up with changing technology.

(From Ice Cream! The Whole Scoop)

The next great leap forward came when Gail Damerow published this book. Her motivation to do so was the fact that there wasn't a comprehensive source of information on the simple (!) art of making ice cream. This book undoubtedly holds that title now.

If you're not an ice cream fanatic you might not pick this book up, and that's too bad. Damerow covers the entire range of freezer desserts – from the rich and luscious to the diet-conscious calorie-counting concoctions that seem equally tasty.

Honey ice creams are featured in one chapter along with all the reasons why making ice cream with honey is a challenge, and why the challenge is worth the effort.

But don't limit yourself to just the honey recipes. There's so much more:

Part one deals with all the types of frozen desserts, and I mean all the types. Recipes for spoom and slush, granita and flavored ice, sherbet and ice cream, frozen custard and frozen yogurt, diet and dairy alternatives and more. Plus, how to choose a home ice cream freezer so all these work best for your situation.

Part two gets involved in the technical end of this tasty subject, including what's in the cream part of ice cream, sugars and honey (excellent information), emulsifiers and stabilizers, flavoring and the best part – from fruit to nuts (and even vegetables).

The tricks of the trade are explained here too, so your 'experiment time' is kept to a minimum – types of freezing, storing and containers. There's even a trouble-shooting section, so you can (probably) figure out what went wrong with yours.

Part three is for after you get the first two parts figured out, and is the most fun to read. It includes everything from ice cream scoops (and how to use them) to making malts, sundaes and splits to molds, cakes and decorations.

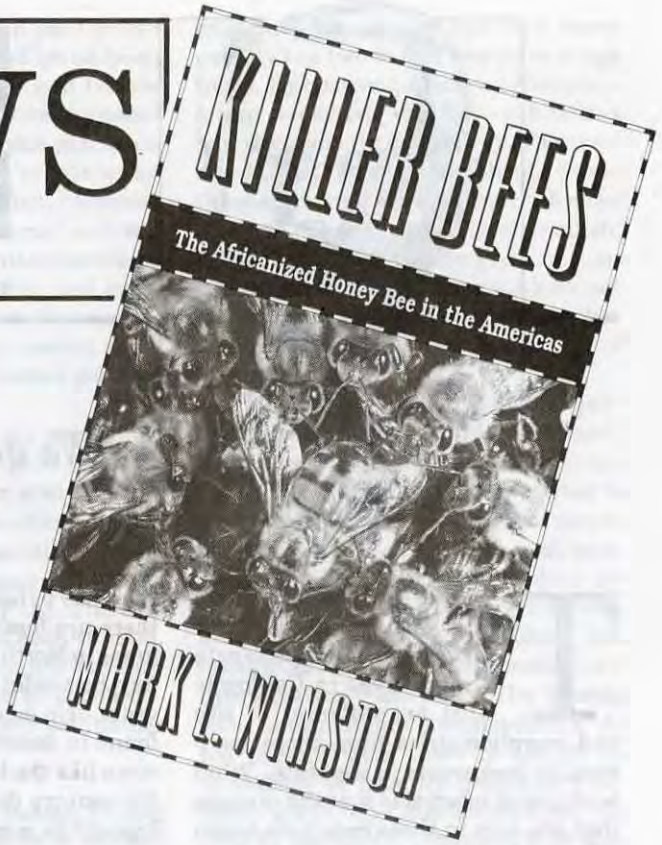
Finally, there's an incredible Appendix, glossary and list of suppliers.

Ice Cream! The Whole Scoop is a fact filled book on the entire scope of this subject. It is entertaining, historic, fun to read and, even if you are only thinking of one day making home-made ice cream, you should try this book.

June is Dairy Month, and July is Ice Cream Month – what better time to try Ice Cream?

Kim Flottum

REVIEWS



Mark Winston Knows The Bees From Brazil

Killer Bees – The Africanized Honey Bee In the Americas. Mark L. Winston. Harvard University Press, 79 Garden Street, Cambridge, MA 02138 $19.95 ISBN 067450352X.

The title of this book could have only been chosen for one reason – to get the attention of anyone remotely interested in an insect that can kill people stone, cold dead. It works.

Once past the cover (with its disappointingly average Scott Camazine photo), you will find out just how much Mark Winston knows about the bees from Brazil.

Winston spent years studying them in several countries in South and Central America, and has worked with every expert in the field. And he has published many scholarly works on nearly every aspect of this incredible insect.

I did a quick check of the Who's Who in African honey bee research by counting the number of times the 'big names' were mentioned in *The "Africanized" Honey Bee* (edited by Spivak, Fletcher & Breed). Only four people are more-often mentioned. He's done well.

And then he took all his experience and wrote it up so most anybody could make sense of it. About time somebody did, I think.

Winston has explained some aspects of this marvelous creature very well. Swarming and absconding were discussed in detail, and, although I thought I knew it all, I found out I didn't (I didn't really think I knew it all, but I thought I knew more than I did).

The rest is well done, but much of the ground has been covered already by others. Not all of it though, (and seldom as easily understood), and there are insights and observations that need to be known by the public and certainly by beekeepers. It is worth investigating.

The sermon at the end tends to be somewhat overdone, and Dr. Winston, I think, may be overstating the wonderful relationship between Canada's beekeepers and Canada's regulators, but he's allowed because he's from Canada and it's his book.

There's a long list of other sources of information at the end and if you're interested in more you'll be busy for months checking out the references (one of them was written by this reviewer, so I know he did his homework).

Mark Winston has brought killer bees home. And if you haven't already understood what you need to know – and explain to those unknowing – check out this book.

Kim Flottum

RESEARCH REVIEW

DR. ROGER A. MORSE

Cornell University • Ithaca, NY 14853

"We go from Hawaii to Japan to South Africa this month."

There are several feral, mongrel populations of honey bees living in separate desert areas in California that are different in size and morphometrics from those managed by beekeepers in the state. What is of special interest is that the changes that are seen in these bees have taken place in the 138 years since honey bees were first introduced into California. Morphometrics is the science of studying the size of various body parts to determine the relationship of one group of animals to another group.

The variations that are seen presumably came about as a result of the harsh conditions in desert areas. It is curious too that the different sizes found appear to follow a rule that bees further south under desert conditions are smaller than those further north. The several feral populations that have been measured are much more like each other than they are like bees in managed colonies.

This research calls to mind that on June 14, 1985 a colony of honey bees thought to be Africanized was found in the Lost Hills-Bakersfield area of California. The idea that this colony, and a few others found soon thereafter, was Africanized was determined by morphometrics, the same method used in the study reported here. Other methods of identifying Africanized honey bees were not used. It is too late now to determine the true origin of the Lost Hills bees but their being Africanized is in doubt in my mind.

One lesson to be learned from this study is that morphometrics, while a valuable tool, should not be use alone to determine Africanization. A second fact that may be helpful in the future is that there are feral populations in isolated areas in North America that may someday be useful in a bee breeding program. No doubt the feral populations found in desert areas in California are more like the bees first introduced into the country than those that have been brought in more recently.

Daly, H. V., K. Hoelmer and P. Gambino. *Clinal geographic variation in feral honey bees in California, USA.* Apidologie 22: 591-609. 1991.

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In terms of honey production per colony, the state of Hawaii ranks first. Beekeepers on the islands produce a little over 150 pounds per colony. This is two and a half times the U.S. national average. However, Hawaii state has only 11 commercial beekeepers, 75 hobbyists and 10,000 colonies of bees. Most of the honey is produced on the biggest island, Hawaii.

There are two commercial queen rearing operations on the islands, both on Hawaii. An estimated 85,000 queens are produced each year, mostly for export to the mainland. Hawaii does not have an office that registers and regulates beekeepers. However, there is brood inspection as well as an inspection for tracheal and varroa mites by the state department of agriculture. The author of the paper cited below reports, "Beekeepers have strongly resisted any additional government regulation or control." The author believes this inhibits greater sales of queens from the islands.

Tracheal and varroa mites and Africanized honey bees have not been found on the Hawaiian Islands. A strong quarantine system preventing further importation of "live or dead bees and used bee equipment" has been in force since 1985. The two queen breeders "have been importing frozen bee semen of Italian and occasionally Carniolan stock for artificial insemination" to reduce the chances of inbreeding.

Messing, R. H. *Status of beekeeping in the Hawaiian Islands.* Bee world 72:147-160. 1991.

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Drones of the little Indian honey bee found on Japan visit and pollinate one species of orchid. In the process they fly from one flower to another of the same species. Drones are not supposed to do that kind of thing! Drones of our own European honey bee, that are also present on Japan, do not visit this orchid species. No other insects species were observed to visit this orchid.

What has apparently happened is that in the course of its evolution the orchid has made a chemical that mimics the sex attractant of the Indian honey bee. As a result drones are attracted to and visit the flower. The authors report, "Some drones cluster on the flower racemes and others insert their heads deep into the flowers." This orchid species produces no nectar or pollen that may be harvested.

This type of behavior has been reported before. It has been found that particular bees or wasps may be attracted to other orchid species that have

odors that mimic insect sex attractants.

The biology of the Indian honey bee in Japan is much the same as the biology of our own European honey bee. For several years we have thought they had the same sex attractant. Indian honey bees nest in protected cavities as do our bees. They have a single queen and all the behaviors we see in European honey bees are found in these bees. The Indian honey bees are about half the size of the European honey bee. Many years ago we found that the sex attractant in the European honey bee is present in all honey bee species in the world. This report from Japan indicates that the chemistry of the sex attractant in the Indian honey bee is probably just a little different from the other honey bee species.

Sasaki, M., M. Ono, S. Asada and T. Yoshida. *Oriental orchid (*Cymbidium pumilum*) attracts drones of the Japanese honey bee (*Apis cerana japonica*) as pollinators.* Experientia 47: 1229-1231. 1991.

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If colonies of bees in a kiwi fruit orchard are fed sugar syrup more bees will visit the kiwi blossoms. Feeding a colony a quart of sugar syrup every day, or every other day, is better than feeding three quarts every third day. Feeding sugar syrup in the morning is more effective than feeding it in the evening. Colonies fed more sugar syrup collected more kiwi pollen. The purpose of the paper I review here is to determine how much and how often sugar syrup should be fed to be most effective. In these tests division board feeders were used but other in-hive types of feeders should be equally effective.

The fact that feeding colonies sugar syrup will cause the bees to collect more pollen has been well established during the past 30 years. Under normal circumstances there are house bees (receiver bees) that take the nectar from the foragers. These receiver bees wait near the entrance for the incoming foragers. The receiver bees add more enzymes to the nectar and process it further before it is deposited into cells. Foragers do not place nectar in cells themselves. Apparently what happens is that when the house bees are busy taking sugar syrup from a feeder they cannot take nectar from foragers. When there are few or no receiver bees this is a signal that nectar is not needed or wanted. As a result the foragers turn to pollen collection. They can pack pollen into cells without the aid of house bees.

Kiwi fruit have male and female plants. In a producing orchard the usual procedure is to have female plants no more than three or four plants away from a male plant. Kiwi fruit blossoms produce pollen but no nectar and are generally considered unattractive to honey bees. Because of this, and especially in areas where there are competing sources of pollen and nectar, three to four colonies may be needed per acre for pollination.

Additional colonies are sometimes brought in during bloom in order to have sufficient bees in a kiwi fruit orchard. An alternative, feeding colonies sugar syrup is costly, especially in terms of labor. However, renting additional colonies of bees is costly too. The economics of all this has not been studied. (Next month *Bee Culture* will have an indepth feature article on Kiwi pollination that U.S. growers, and pollinators shouldn't miss.)

Goodwin, R. M. and A. Ten Houten, *Feeding syrup to honey bee colonies to increase kiwifruit pollen collection: effects of frequency, quantity and time of day*. Journal of Apicultural Research 30: 41-48. 1992.

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There are 26 races of honey bees found from Norway in the North of Europe to South Africa in the most southern part of Africa. All of these races can mate with one another so they are one species. The race that is most different from the rest is the Cape bee. It is found at the very bottom of Africa. Its most remarkable difference is that colonies may become queenless and then become laying worker colonies. This apparently happens frequently. The colonies may remain in this laying worker state for several months and then one of the laying worker eggs develops into a normal queen. This new queen mates in the usual manner and normal colony life returns. Usually, when a colony of European honey bees goes into a laying worker condition it perishes because laying workers produce only drones and the colony has no way of becoming queenright.

A recent study confirms this method of reproduction and discusses some other aspects of Cape bee life. Worker bees in European and African colonies of honey bees have two ovaries and each ovary usually has two to four ovarioles or egg tubes. By contrast, a normal European queen honey bee will have a hundred more ovarioles in each ovary. The average worker Cape bee has about 16 ovarioles and laying workers are much more common. The Cape bee is a smallish, docile, black bee. Colony growth is described as sluggish. Laying workers can inhibit the growth of ovaries in other workers as well as the production of queen cells.

In this study of the Cape bee particular attention was paid to the barriers that separate the Cape bee from the race of bees to the north. The answer is that there is not only a string of mountains between the two but the soil type, rainfall, temperature range, plant diversity and flowering times, are all very different. There is an area about 120 miles wide between the two races where hybridization takes place. The hybrids show intermediate characteristics. At the present time there is almost no movement of bees by beekeepers between the purely Cape bee area and the area to the north. However, it is also possible that the race to the north could not survive in the more southern climate.

The authors conclude by stating that the hybrid zone between these two distinct races "offer opportunities for natural experiments in genetics and evolution that are unparalleled by any other region in which honeybees occur." I think they are certainly correct. Q

Hepburn, H. R. and R. M. Crewe, Portrait of the Cape honeybee. Apidologie 22: 567-580. 1991.

by
Lynn Royce
and
B.A. Stringer

Up Close And (very) Personal

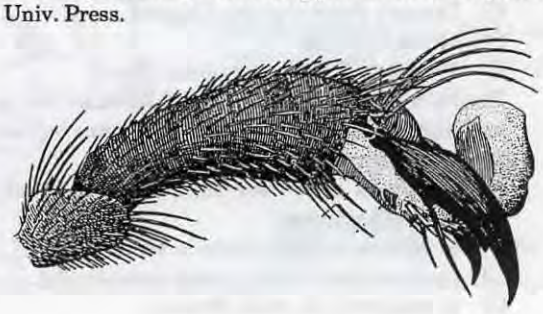
SEM (Scanning electron micrograph) of foot. The arolium protrudes between the claws, with the spiny planta visible below it. (Royce/Stringer photo.)

Have you ever wondered how honey bees are able to walk up vertical or overhanging surfaces? If you've had the opportunity to watch bees walking up the glass of an observation hive, you may have noticed their foot pads against the glass. Let's take a closer look at how it's done.

The last segment of a bee's leg, the equivalent to our foot, is a very small part called the pretarsus. There are two important features on the pretarsus which enable the bee to perform its gravity-defying wanderings: the claws and the arolium.

On the pretarsus there are two double-pointed claws connected to tendons further up the leg. The claws enable the bee to dig in and gain traction on rough surfaces. Between these claws lies a soft scoop-shaped pad, the arolium. When the foot is at rest, this pad is curved upwards and lies out of the way. However, when the claws are spread wide past the point of clinging, such as on glass, the arolium is pulled downwards and flattened against the walking surface. In this way, the foot can adhere to very smooth surfaces on which the claws fail to gain a purchase.

Two plates on the pretarsus contribute to the versatility of the honey bee foot: the unguitractor plate and the planta. The unguitractor plate bridges the gap between tarsus and pretarsus, and is the connector between the muscles of the leg and claw-arolium complex. The planta (Latin for "sole of the foot") is adorned with stiff spines which are thought to exude a sticky liquid helping in the adhesion of the foot to smooth surfaces. Spines on the planta are also used to pierce wax scales for removal from the abdominal wax glands to the mandibles. ◯



? DO YOU KNOW ?

ROYAL BIOLOGY

CLARENCE H. COLLISON

Many factors affect colony development in the spring and early summer. Conditions that promote egg laying by the queen, proper balance in the age structure of the worker population and optimal brood-rearing are extremely important considerations while making routine management decisions. Evaluation of the queen and requeening on a regular schedule are also important management procedures. Requeening colonies is not an easy task and many beekeepers prefer to let nature take its course. Queen failure, however, may occur at a bad time and ultimately jeopardize honey production for the year. Understanding the role of the queen and workers in colony reproduction and broodnest homeostasis will help in evaluating colony development. How well do you understand basic bee biology and the factors that affect population development? Please take a few minutes and answer the following questions to see how well you understand these important topics.

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

1. ___ Brood developing at the periphery of the brood nest takes longer to develop than brood located in the center of the nest.
2. ___ Fertilized eggs are larger than unfertilized eggs.
3. ___ Larval brood food is produced by mandibular and hypopharyngeal glands in nurse bees.
4. ___ Adult queens are fed by workers of brood-food producing age and a queen is generally fed by only one worker between egg laying periods.
5. ___ Workers with developed ovaries are found in most normal queenright colonies.
6. ___ Most eggs and young larvae found in queen cups are there because they were moved from worker cells by workers.
7. ___ The majority of a honey bee worker's time is spent resting or walking through a colony.
8. ___ Bees will accept a queen the same age and in the same physiological condition as their own queen much more rapidly than they will one who is unlike their own.

Multiple Choice Questions (1 point each).

9. ___ The ovaries of worker honey bees have ___ ovarioles.
   A) 51-100
   B) 2-12
   C) 100-129
   D) 13-50
   E) 130-180
10. ___ The Koshevnikov gland is associated with the:
   A) Queen's Mandibular Gland.
   B) Worker's Hypopharyngeal Gland.
   C) Drone's Reproductive Organs.
   D) Queen's Sting.
   E) Worker's Tarsal Segments (Feet).
11. ___ Workers are running back and forth in waves and buzzing to excite other workers are behaviors that occur when a colony:
   A) discovers that they need to begin emergency queen rearing.
   B) is getting ready to issue a swarm.
   C) realizes that a new queen is emerging.
   D) is preparing to evict drones.
   E) has recently been invaded by a mouse, or disturbed by a skunk, bear or other animal enemy.
12. ___ Honey bees recognize their own queen and retain their ability to differentiate between her and another queen for about ___ hours.
   A) 24 hours
   B) 16 hours
   C) 12 hours
   D) 4 hours
   E) 32 hours

Division of labor within the honey bee colony follows a general progression of activities from nest to field tasks. Workers tend to perform groups of jobs at any given age, and task performance is closely linked to glandular condition. Listed below are groups of tasks. Please indicate which task is normally done first within each group.

13. ___ A) tending the queen
   B) cleaning the bottoms of cells
   C) guard duty at the hive entrance
14. ___ A) brood care
   B) ventilation of the hive
   C) building comb
15. ___ A) packing pollen in cells
   B) building comb
   C) ventilation of the hive
16. ___ A) ripening nectar into honey
   B) guard duty at the front entrance
   C) tending the queen
17. ___ A) foraging for nectar and pollen
   B) packing pollen in cells
   C) guard duty at the front entrance
18. Prior to becoming field bees actively foraging for nectar and pollen, young house bees begin preparing for field activities by taking a series of "play flights." Name three accomplishments achieved from these play flights. (3 points).
19. Describe three conditions that result in the bees fanning their wings. (3 points).
20. Explain why it is more difficult to find a virgin queen than a laying queen in a colony. (2 points).

ANSWERS ON PAGE 357

WEATHER WATCHER

ANN HARMAN

To most people – and that includes beekeepers – weather is what is happening outside right now. "Has anyone seen the snow shovel? I have to dig my way to the car." "Quick! Grab the picnic things! It's starting to rain." Tomorrow the sun will be shining and the snow shovel will have been forgotten, along with the scrambled picnic. Past and future are equally immediate. "Cold last night, wasn't it?" "Take your raincoat; it looks like rain." Violent weather conditions – prolonged severe drought, blizzards, hurricanes – may linger in our minds a bit longer but even these have a fairly short influence on our daily lives.

Weather, however, plays a very important part in the lives of our bees. As beekeepers, the more aware we are of weather – past, present and future – the better we can manage our bees throughout the year. Weather influences the forage plants, and therefore the lives of our bees.

Of all the various weather phenomena, rain, wind and temperature will be the factors that have the most influence on honey bees.

Nectar, the watery sugar solution secreted by plants, is thought to be produced as an attractant for pollinators. Although the water content of many nectars is about 20 50%, the concentration of sugars is sufficient to attract honey bees. The production of nectar requires a considerable expenditure of water by the plant during its blossoming period. Therefore, nectar production is greatly influenced by weather conditions. If blossoming occurs during a period of drought, nectar production will be curtailed, or even eliminated. The number and size of blossoms, as well as the size of the plant itself, can even be reduced during prolonged periods without rain. Excessive rain can wash nectar from blossoms and can even cause a decrease in the amount of nectar being produced.

Nectar production is also influenced by the amount of sunlight the plant receives just before nectar secretion. Bright sunny days lead to greater nectar secretion and higher sugar content potential. Temperature is also a factor, since many plants will not produce nectar until the daytime temperatures are suitable for triggering the production. Excessively high temperatures will reduce nectar production, or cause available nectar to evaporate quickly. This is particularly true when the humidity is low.

Humidity is an often overlooked factor in nectar quality. When relative humidity is low water evaporates from the nectar increasing the sugar concentration and making the nectar more desirable for collection. Wind also increases water evaporation and thus increases sugar content.

One other factor of nectar production remains, not truly weather-related but with an influence on nectar collection by bees. Most plants produce nectar during rather specific hours of the day. For example, the ubiquitous dandelion and some of the brassicas produce nectar during the morning hours of 9:00 to 11:00 a.m., while clovers produce later in the day, generally from 1:00 to 3:00 p.m. Although these morning and afternoon hours seem to be the prime ones for nectar production, viper's bu-

Dandelions are early risers, producing almost all of their nectar and pollen before lunch.

gloss does not produce nectar until even later, after 3:00 p.m. or so.

Weather plays a role in nectar production, nectar secretion and also influences the honey bee herself.

Honey bees can sense light, temperature, humidity, rainfall, wind and time of day. The ability to sense all of these factors enables bees to be successful in gathering food and caring for the colony.

Bees need a clear sight of the ground and a reasonable level of light in order to navigate to and from their food sources. A heavy cloud cover will prevent bees from foraging, however, cloudy but bright weather allows them to conduct foraging. Rainfall, even a light rain, will keep them in the hive. Sustained wind over 12 miles per hour will confine bees to their hive since they will be blown off course.

The outside temperature plays an important role, too. Ideal foraging temperatures are between about 65° to 85°F. Although bees begin to cluster at 57°F they can continue to fly until the temperature drops to about 50°F. Excessively high temperatures confine the bees since they cannot regulate their body temperature away from the hive.

Knowledge of the influence of weather on food-gathering can help beekeepers manage their hives throughout the year. Yes, it is possible for colonies to starve in the late *summertime*. A several-month drought that severely curtails nectar production means that a strong colony will consume its honey and not be able to find enough to sustain it until rains come. Prolonged cold, windy, rainy weather in the spring may lead to a short supply of nectar and pollen needed for developing brood. In addition, the age, field bees, unable to forage, crowd the hive and lead to congestion within the brood chambers. Blossoms may be torn from plants by high winds or rain, thus removing a nectar source. Weather conditions may inhibit bee flight during that part of the day when a plant is producing nectar. Scout bees coming from the hive after the critical time will find little or nothing to report to the field bees. Bees will choose nectar sources richer in sugars over weaker ones. Nectar diluted by excessive rain may be passed over in favor of sources with richer but not as numerous blossoms. This choice could be unfortunate if the richer source is limited to a small area. Unexpected late (or early) frosts can destroy buds as well as blossoms that may have provided excellent forage.

The calendar says Spring or Summer. Will nectar and pollen sources be available for your bees? Will they be able to take advantage of available food sources? Being aware of weather patterns will encourage you to check your hives for stores throughout the year, even during those times of "great honey flow". If the plants are not producing, if the bees cannot fly – then feeding may be necessary *any* month of the year.

Weather watching is not just for the television meteorologists, it is for beekeepers, too. Q

A Small-Scale Commercial Beekeeper Deals With The BEES IN BRAZIL

EDMILSON REIRE DO'RED
Rua Bernadino de Campos 775 Ap. 8, 14.100 Ribeirão Preto, SP BRASIL

Before becoming a beekeeper I worked as an administrator for Nucleobras, the Brazilian government company which administers the nuclear power plants in Rio de Janeiro. But as part of a cost cutting program 400 employees were laid off in 1978. I was one of them.

We were in a recession at the time and so the lines for job applications were long and there were few options for someone like me. After trying this for awhile I got tired of waiting for some response and decided to get away from the big city and try my luck in the country.

Sometime during this transition period I bought some honey at a beekeeping association's stand in Rio de Janeiro and was intrigued by the idea of keeping bees. After taking a short course in 1978 and some long discussions with beekeepers I found I was "infected" by bee fever.

I moved to a house in São Paulo state on the border with Minas Gerais state. Initially I bought eight colonies but soon realized this was foolish. Bees are free for anyone who provides a home for them. So I bought lumber, made hives, and placed them in the fields. Soon after flowering began they were filled with swarms. Three other new beekeepers and I caught almost 800 swarms within a 16 square kilometer area (about six sq. miles) during an eight month period.

It is quite easy to build up to 1,000 colonies in a short time, however you have to have locations for all of them, which is a problem as there is lots of competition and flower sources are getting harder to find. Many of the eucalyptus groves have been cut to make charcoal for steel furnaces and they are not always replanted. I built up to nearly 400 colonies but couldn't handle more because the area I had access to was not large enough. So I sold the extra swarms I collected.

Production Costs

During the eucalyptus flow, we need to make at least 50 kg (110 lbs.) of honey per colony over the six month period to cover our costs. Gasoline is quite expensive in Brazil (twice the price in the U.S.). Truck maintenance is also costly because we drive long distances over rough roads which causes considerable wear. Other significant costs are wax foundation, losses due to animals, like armadillos (ours are much bigger than those in the U.S.) and ant eaters, which can wreck colonies, and the rental fee we pay to the forest company to keep the bees on their land. Our rental contracts average 5% of the honey per colony or three kg. (about 6-1/2 lbs.). Comes to about 75 kg., or 165 lbs. And there's the cost of the containers, labor and taxes. Sometimes thieves robbed frames of honey, and some of my neighbors lost complete colonies. But since our average yield on this flow was above 60 kg (132 lbs.) we still came out ahead.

Smoking a hive during the honey harvest. Note the common hive stand and the extra large smoker. We later changed our colonies to individual hive stands.

Equipment

Nearly everybody uses standard Langstroth style equipment because it is easy to find and the resale value is much higher than for special sizes. I used to make my own boxes and frames, but my foundation sheets came from a small, local company. I gave them wax blocks and paid them to make it into foundation.

When making equipment one has to be very sure the lumber is dry. Otherwise the equipment will become offsize due to shrinkage, which makes it difficult to exchange parts. The sides of the boxes may become bowed, and distortions in the wood are very inconvenient when it becomes necessary to move the bees, as one has to spend time and material to patch up all the holes.

The hives are usually made of pinho (pine), cedrilho (a local wood) or mogno (mahogany). Pinho is best to work with but it is expensive. The mogno makes nice looking boxes and is excellent for frames, but most people use cedrilho because of the price.

Transferring a colony that has outgrown the baithive.

Examining a frame of bees from a newly arrived swarm captured in a baithive.

Working The Flows

Our main crops are eucalyptus and orange, but we also get honey from aroeira (a tree) and cipó uva (which looks like wild grape). The cipó uva is very important during the dry season. The honey is light with an excellent taste and aroma. The vines climb the trees in the forest. It blooms during July and August, when the whole forest seems covered with white blossoms and the smell of the flowers in bloom is fantastic. Unfortunately it is becoming quite difficult to find a good cipó uva site because nearly all of the natural forest has been cut. Sometimes we take the bees south into Parana state between the major flows when there is nothing for the bees to forage on in our area, though the trip is expensive. We don't get much surplus honey in Parana, but the colonies build up nicely for the eucalyptus flow.

Harvest Time

Our honey house is in Barretos, in western São Paulo state. This is the region where we get orange honey so moving supers from the apiaries is no problem in terms of distance. However we had to be careful because there are many people and animals near the apiaries in the orange groves, and I usually gave a can of honey as a present to the orchard owner.

During the eucalyptus flow things become more difficult because of the distance, between the honey house and my colonies. After working all day and being on the road for more than five hours, we get back quite tired. Normally we have to drive our heavily-loaded truck at night because the daytime temperatures are so hot the bees would overheat. If we transport the supers in hot weather the combs often soften and break. By the end of harvest time the temperatures are a bit cooler and we can sleep and come back early in the morning.

Rent for the eucalyptus locations is three kg. (6.6 lbs.) of honey per colony.

To remove honey we use some smoke and then just shake the combs. This is relatively fast because the bees fall off easily. There are some other advantages to this technique. We avoid losing queens because we shake all the bees back into the brood chamber and we also avoid taking any brood to the extracting room. Normally two people are necessary to take off honey. I have done it alone but with two, the work goes much faster.

We store the full frames in supers, cover the stacks and leave them in the apiary while we go on to the next. Naturally we have to be careful to seal up any cracks in the piles of supers to avoid robbing.

We come back at night to pick up the honey from the various apiaries. Sometimes we take the honey supers along during the day as we go from apiary to apiary, but then the bees become more difficult to handle.

Extracting and Packing

To extract the honey we first uncap with an uncapping fork. We use a fifty frame radial extractor. The honey then goes to a decanter to settle out the wax and other debris. The empty combs we take to a robbing apiary to clean them. These we leave 70 to 100 meters from the apiary so that the bees will find them easily, but without much risk of starting robbing within the apiary. All of our supers are full depth Langstroth equipment to facilitate the work.

We store the honey in five gallon cans, though some we packe into 1/2 to two kg. plastic or glass jars. Though glass is cheaper, plastic is lighter and easier to work with.

The market price is a problem. The big companies offer cash but pay little. So I take my honey, pollen and propolis to Rio de Janeiro to get the best price. The tobacco industry buys honey to cure their tobacco, and we sell some to the cosmetic industries, hospitals, hotels, and other places.

We make a good living with Africanized bees. It only takes knowledge of the bee and lots of hard work.

Recently I spent a few years in the U.S. working in both construction and for a commercial beekeeper. I would be interested in going back to help beekeepers who will face the Africanized bees in the southern U.S. If anyone is interested please let me know by sending a letter. I would like to learn more about American beekeeping techniques and would be willing to teach what I know about beekeeping with Africanized bees.

Acknowledgements

I thank Dr. David De Jong of the University of São Paulo in Ribeirão Preto for his encouragement and assistance while writing this.

AFRICANIZED BEES, PARROTS & TERMITES

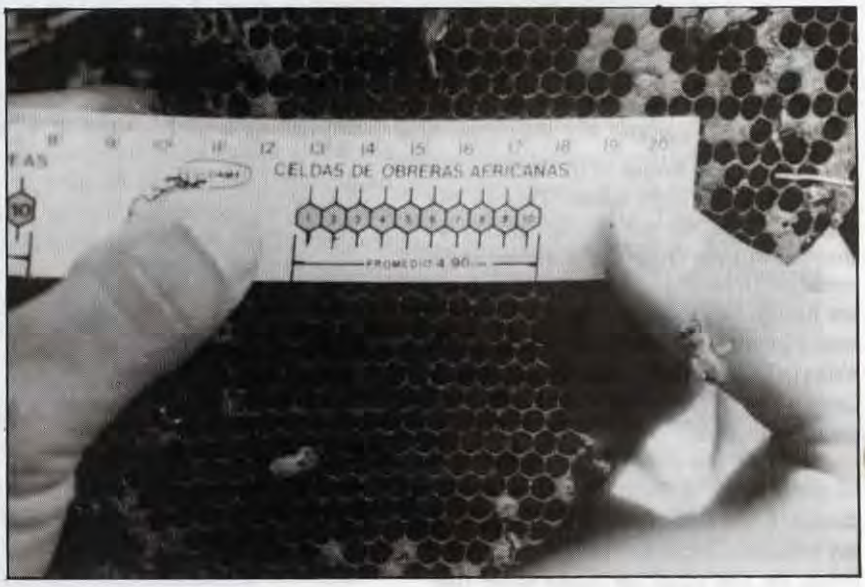
A TALE FROM COSTA RICA

GERALD M. LOPER

In the Spring of 1991 I was making a survey of Africanized honey bee (AHB) nesting sites near Cañas, Costa Rica when a local beekeeper, Nelger Barrantes, told me of a special nest on his grandmother's ranch. A few miles into the foothills off the Pan American highway and south of Cañas, the road became a bumpy 4-wheel drive trail. After stopping a few times to view a few other feral AHB nest sites, some howler monkeys and a relatively rare toucan, we came to a tall tree with a termite nest. These nests are constructed of a resilient, somewhat brittle cellulosic matrix, and typically range from one to three cubic feet in volume.

While many such nests are relatively close to the ground, this one was about 35 feet up on a nearly horizontal limb. Barely visible on a bottom edge was a small hole, the size of a small parrot. Although it was mid-morning on a hot, humid day, there were very few bees flying in and out of this hole. It was May and in this part of Costa Rica there had been little or no rain for four to five months. The nectar and pollen flow had been over for at least a month. While my wife and I got suited up and prepared to take video and 35mm pictures, our guide suited up, took an insect net and climbed up the tree to the nest. Only after almost 10 minutes of banging on and shaking the nest did a few hundred bees come out which were easily netted by Nelger. No bees came around to attack us at ground level until, after some really violent banging on the nest, it began to break up, with pieces of comb falling to the ground.

Soon, the entire nest was knocked to the ground where we could examine both the nest and honey comb. The previous occupant, probably a parrot, had occupied a small (approximately 20" x 10") cylindrical cavity inside the bottom of the nest just above where it was attached to the limb. The honey bees (had they evicted the parrot while it was away?) had constructed several elongated brood and honey combs in the cavity, but just inside of the round 2" diameter entrance hole they had constructed one or two small combs effectively "blocking" the entrance to anything much larger than a bee. I don't know how the parrots (or termites?) do it, but they had sealed the cavity off from the myriad of labyrinthine tunnels which were still full of live termites! Talk about an apartment complex, this was a really complex "apartment"! Apparently because of the dry season and lack of food resources, there was almost no stored honey, just a little pollen, perhaps a total of six square inches of sealed brood and only about a thousand bees. We measured the empty brood comb, getting a distance of 4.90 cm per 10 cells indicating Africanized bee comb. When tested (enzyme analysis), bee samples from this colony keyed out to be highly Africanized. While climbing down the tree, Nelger found the queen and her "court" of about 25 bees on the limb about 20 feet from where the nest had been. Evidently she had run out before the nest was knocked from the tree. ○



HONEY ICE CREAM

GAIL DAMEROW

"Can you make homemade ice cream with honey?"

I heard that question often last summer while touring with my latest book, *Ice Cream! The Whole Scoop*. It's one of those questions with an answer that starts with, "Yes, but "

The "but" part, as any beekeeper might expect, relates to the difference in moisture content, sweetening value, and flavor between honey and the table sugar used in most ice cream recipes.

Milk and Honey

Honey has one important characteristic in common with ice cream (besides being sweet and tasting good). Like ice cream, honey consists of a mixture of water and solids.

In the case of honey, those solids consist of some 25 different sugars, the primary ones being fructose, sucrose, and dextrose. These sugars combine to give honey a solids content ranging from 79 to 83. The other 17 to 21 percent is water.

COMPOSITION OF HONEY

Invert sugar (glucose & fructose)	74.5%
Moisture	17.5%
Sucrose	02.0%
Dextrin	02.0%
Miscellaneous*	03.8%

*Includes organic acids and traces of vitamins and minerals.

Put a spoonful of honey on your tongue and it slides sensuously down your throat. (Try that with a spoonful of sugar) The combination of solids and water are responsible for honey's characteristic smooth mouthfeel.

Similarly, a combination of solids and water give ice cream its smooth texture. The solids in ice cream come from various sources. Some solids are contributed by flavorings such as cocoa powder, coffee crystals, or crushed fruit.

The main source of solids in ice cream is dairy products. Homemade ice cream has traditionally been made from cream and milk, but other dairy products work just as well. Popular alternatives these reduced-fat days include cream cheese, cottage cheese, and yogurt.

Dairy products contain two kinds of solids: fat and nonfat. Whole milk has approximately four percent fat and nine percent nonfat milk solids. The other 87 percent is water. Take away the fat and you have skim milk, containing about nine percent solids and 91 percent water.

Remove half the water from skim milk and you have evaporated milk. Remove all the water and you have pure nonfat milk solids – commonly known as powdered milk.

Let's have another look at that fat we just skimmed from the whole milk. Add a little milk back to it and you have heavy cream containing 40 percent fat and five percent nonfat solids. Add progressively more milk and you have whipping cream (30 percent fat, six percent solids), light cream (18 percent fat, seven percent solids), or half and half (10-1/2 percent fat, eight percent solids).

Successful homemade ice cream strikes a delicate balance between milkfat, nonfat solids, and water. The exact nature of that balance depends on individual taste. Some people like the creamy richness of high fat ice cream. Others prefer the chewiness of high solids ice cream. No one enjoys the coarse, grainy texture of ice cream containing too much water.

If you find an ice cream recipe you really like and then you modify it (say, by substituting honey for sugar), you

may upset the delicate balance between fat, nonfat solids, and water. The results may therefore not turn out as wonderful as you thought they might.

Table sugar, or sucrose, is an important source of solids in most ice cream recipes. Sugar contains nearly 100 percent solids and produces the familiar texture and flavor most of us associate with ice cream.

When you substitute honey for sugar in an ice cream recipe, you also add water. If you remove a little water elsewhere, you would also remove the solids contained in that water. So, to compensate for the extra water added with the honey, increase either milkfat or nonfat solids.

To increase milkfat, boost the percentage of cream you use. If your recipe calls for a combination of milk and cream, for example, use a little less milk and a little more cream. If your recipe calls only for cream, for a portion of it move up to cream with the next highest fat content.

If you are as fat-conscious as most folks have become these days, you would probably prefer to boost the nonfat solids instead. Increase nonfat solids by substituting evaporated milk for a portion of the milk or by dissolving a little powdered milk in your ice cream mix.

Another alternative is to substitute whipped cottage cheese, low-fat cream cheese (neufchatel), or yogurt for part of the milk or cream. To further increase the solids in your yogurt, strain out some of the watery whey. Use a yogurt strainer or hang the yogurt in a few layers of cheese cloth. The longer you let it drain, the more solids the yogurt will contain.

How much?

Moisture isn't the only thing you change when you use honey to sweeten ice cream. You may also alter the sweetness of the ice cream.

According to the National Honey Board, honey is 25 percent sweeter than sugar *on a total solids basis*. If you assign sugar a sweetening effect of 100 (meaning "100 percent sweet"), honey solids would have a sweetening effect of 125.

But, remember, that's just the solids. When you factor in its moisture, honey would have a value of 103. Yet the accompanying chart shows honey at 75. What, you might rightly ask, is going on here?

SWEETENING EFFECTS COMPARED TO TABLE SUGAR

Sweetener	Sweetening Effect (%)
Saccharin	30,000
Aspartame	18,000
Cyclamate	3,000
Fructose	150
Granulated Sugar (sucrose)	100
Maple sugar	98
Brown sugar	96
Corn sugar (dextrose)	82
Corn sugar (glucose)	80
Honey (dextrose, fructose, sucrose)	**75**
Maple syrup	59
Corn syrup (dextrose & maltose)	54
Rice syrup (maltose, glucose)	50
Galactose	32
Maltose	32
Lactose	20

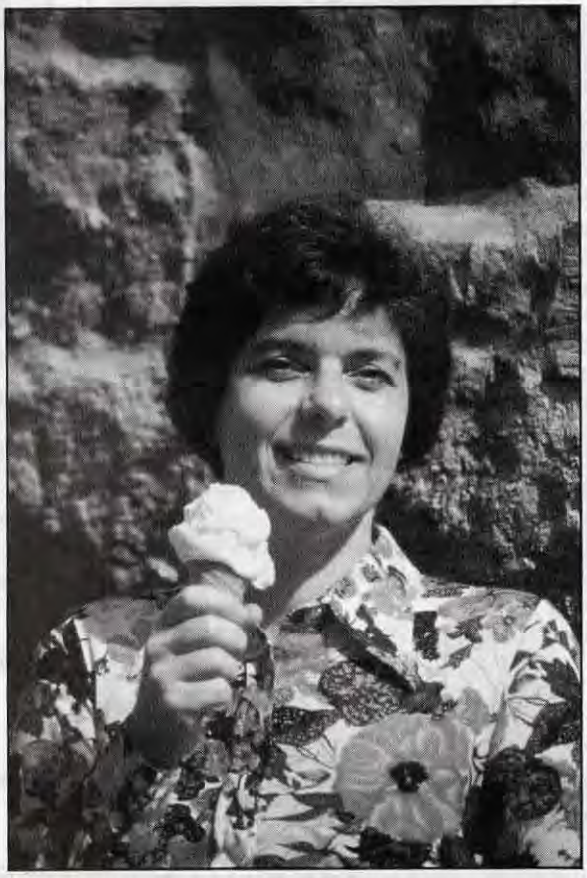
Well, the perception of sweetness is entirely subjective. Each of us has our own opinion on the sweetening value of any particular substance. Despite all of today's scientific hi-tech advances, no objective test has yet been devised to measure sweetness.

The chart shown here was compiled for my book, *Ice Cream!*, based in large part on a consensus by a panel of tasters I assembled. The tasting was done over a period of time, and each sample was tasted on at least two different occasions.

But you don't have to believe my panel, or the National Honey Board, regarding the sweetness of honey compared to sugar. Do your own subjective evaluation using the tea test.

Brew up a pot of tea and pour equal amounts into two cups. Sweeten one cup to taste with a measured amount of table sugar. Sweeten the second cup with as much honey as it takes to make the tea taste as sweet as the first cup. Avoid confusing your taste buds and sample the tea only with the tip of your tongue, where your sweetness sensors are.

In your ice cream recipes, use the same relative amount of honey you needed to sweeten your tea to taste. If you used three-quarters as much honey to achieve the desired sweetness (a sweetening effect of 75), substitute three-quarters *of a cup* of honey *per cup* of sugar. If you used slightly more honey than sugar to achieve the same sweetness (a sweetening effect of 103?), substitute slightly more honey for the sugar.



Gail Damerow

Flavor?

Honey's unique characteristic is not its moisture content or its sweetness, but its wonderful flavor. Because honey contributes its own strong flavor, many ice cream makers prefer to use less honey than they would sugar. Or, for a more subtle honey flavor, only half the sugar might be replaced with honey.

Whether you substitute honey for all the sugar, or only a portion, depends largely on the flavor of the ice cream you are making. Because honey imparts a delicious flavor of its own, it can be used without additional flavoring.

If you use honey to sweeten other flavors, too much may overwhelm the primary flavoring, es-

Continued on Next Page

ICE CREAM ... Cont. From Pg. 341

pecially if that flavoring is fairly subtle. Too much honey can also decrease the intensity of strong flavorings like coffee and chocolate.

The flavor of your ice cream will, of course, be determined by the kind of honey you use as well as the amount. When using honey in combination with other flavorings, take care to avoid clashes.

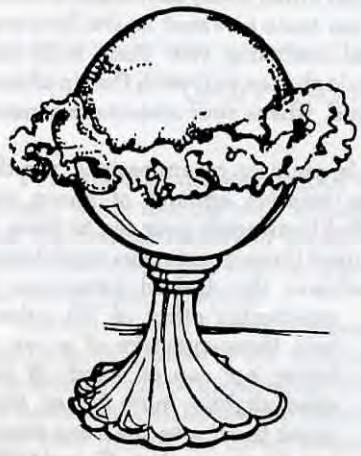
Many ice cream aficionados feel that honey does not go well with coffee or vanilla. Almond flavor, on the other hand, brings out honey's more delicate undertones. The snappy tartness of lemon especially complements honey, creating a flavoring favorite among frozen yogurt fans.

Other flavorings that go well with honey include banana, carob, chocolate, date, pineapple, strawberry, peach and other stone fruits, any kind of nut, and bisque (ice cream containing cereal, crushed cookies, or other baked goods).

Select a mild flavored honey for most fruit and bisque ice creams. Use a stronger honey for recipes in which you might otherwise use barley malt syrup (such as a non-dairy, soy based ice cream) or molasses (gingerbread ice cream, for example, made with raisins and crushed gingersnaps).

The recipes and charts appearing here have been excerpted, with permission, from Ice Cream! The Whole Scoop *by Gail Damerow ($24.95), Glenbridge Publishing, Ltd., 4 Woodland Lane, Macomb, IL 61455, 1-800-345-6665.*

Gail Damerow is an independent writer and the chief smoker for her family bee yard.

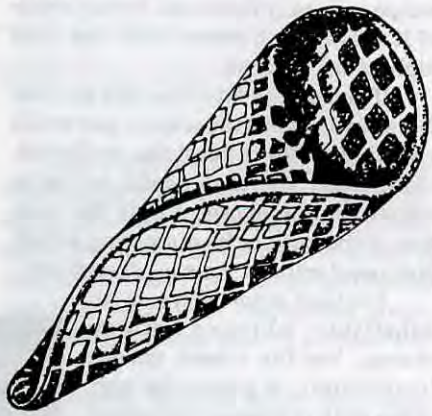


FREEZE YOUR OWN

Today's easy-to-use ice cream freezers make it a snap to whip up ice cream in minutes. Even the busiest beekeeper has little excuse for failing to treat family and friends to nutritious, delicious homemade honey ice cream.

Waring puts out an inexpensive ice cream freezer that easily converts from hand-crank (for patio parties and keeping kids busy on short car trips) to electric (for freezing dessert at the same time you cook dinner). Serious ice cream fanatics may prefer the imported Simac Magnum, an all-in-one, push button unit with an electronic chip that turns off the stirring mechanism when your ice cream is done.

Ice cream that has been frozen in a machine is called "stir frozen" because it was frozen under agitation. Ice cream can also be "still frozen" in the household freezer without agitation. The trick is to freeze it in shallow pans and to whip it every half hour or so until it is completely frozen, Even then, still frozen ice cream is never as creamy smooth as its stir-frozen counterpart.



A natural combination is one that unites honey with a a floral flavor, especially when the two flavors match, such as orange blossom honey with orange petals. You'll find dried flower petals at many natural food stores. Try camomile, jasmine, lavender, rose, or orange blossom petals in the accompanying recipe for Honey Blossom Ice Cream.

This, and the other recipes shown here, are offered to help get your imagination rolling toward creating your own signature honey ice creams.

In the following recipes, C = cup; T = tablespoon; t = teaspoon; oz = ounce.

RECIPES

Honey Blossom Ice Cream

Heat just until bubbles form ..... 3 C milk.
Pour warm milk into ..... 1/2 C dried flower petals.
Steep 15 minutes and strain.
Lightly beat ..... 2 eggs.
Beat in ..... 1/2 C honey.
Add flavored milk.
Stirring, heat until thickened.
Cool, strain, & combine with ..... 1 C heavy cream.
Chill and stir freeze.

Yield: about 1 quart

Honeyed Fruit 'n' Nut Ice Cream

Combine and chill ..... 1 C fruit juice or puree.
..... 1/3 C honey.
Blend in ..... 2-1/2 C heavy cream.
Stir freeze until slushy.
Chop and stir in 1/3 C chopped nuts.
Complete freezing.

Yield: about 1 quart

Honey Almond Frozen Yogurt

Stir until smooth 2 C plain yogurt.
1 C light cream.
1/2 C honey.
1/2 t almond extract.
Chill and stir freeze.

yield: about 1 quart

Low-Fat Banana Honey Ice Cream

Combine 3-1/2 C whole or skim milk.
1/2 C honey.
1/2 C mashed ripe banana.
1/8 t salt.
Chill and stir freeze.

yield: about 1 quart

Topping It Off

Don't overlook honey as an ice cream topping. One of my favorite toppings combines two tablespoons of heated honey and one tablespoon of tahini (sesame seed puree) per serving. On special occasions, I might toss in a handful of coconut or a few chopped dates and pecans. For the less adventuresome palate, peanut butter (or any other nut butter) may be used in place of tahini.

The following recipe for Honey Fudge Sauce turns pleasantly chewy as it cools. For a little less chewiness, stir in up to 1/4 cup melted better.

Serve Honeyed Fruit Sauce over frozen yogurt, garnished with strawberries or sliced kiwi. For variety, make the same recipe using pineapple or mango chunks in place of a peach.

Honey-Fudge Sauce

In double boiler, combine 4 oz nonsweetened chocolate.
1 C honey.
1/8 t salt.

Heat, stirring, until blended.
Serve warm or cooled.

Yield: about 1 cup

Honeyed Fruit Sauce

In skillet, melt ..... 3 T butter.
Stir in ..... 1 T lemon juice.
1 T honey.
Chop into chunks & add .. 2 medium bananas.
1 peach.
Stir gently until heated through, about 2 minutes.
Serve warm.

Yield: about 1 cup

SUMMERTIME And The Livin' Is Easy

O.B. WISER

The gentle breezes of spring bring down the petals from the apricot trees, and petal drop from the cherries, peaches, plums and pears is not far behind. The flower-covered ground in the orchards announces the end of **Early Spring.** The dandelions are past their prime. The apple trees are just beginning to blossom with the black locust trees. The feathery umbrella of the dandelion is the crowning touch of early spring.

The constant hum of bees in the locust and linden trees announces the finality of **Late Spring.** Nectar and pollen sources without number have rushed pell-mell into springtime. The multitude of blooms has provided more than adequate stimulation to the exploding populations of the hives, and they are now ready to swarm, as nature intended. Anything less than swarming or dividing will not stop the bees' instincts.

Dividing your the strong hives brings down the curtain on Springtime beekeeping, as the heavy honey flow begins to taper off and early summer, with its change of menu, fast approaches.

Here in Utah, I shift gears into my summertime beekeeping program shortly after the divides are made usually sometime in May. The hustle and bustle and big push give way to the warmth of summertime and frost free nights. The agenda for beekeeping becomes somewhat relaxed.

FIRST SUPERS At the front end of summer is when the first super is put on the parent colonies. Hives that are candidates for supering are two full boxes of bees and brood. Ideally, the second box is beginning to fill with honey. This means the outside three frames are nearly filled with honey and nectar.

These first supers are wet with honey from the past season's extraction and, frankly, they attract the queen to move up and lay eggs. I believe this occurs just as she is slowing down because of the reduced honey intake. This added brood helps to build the late summer field force.

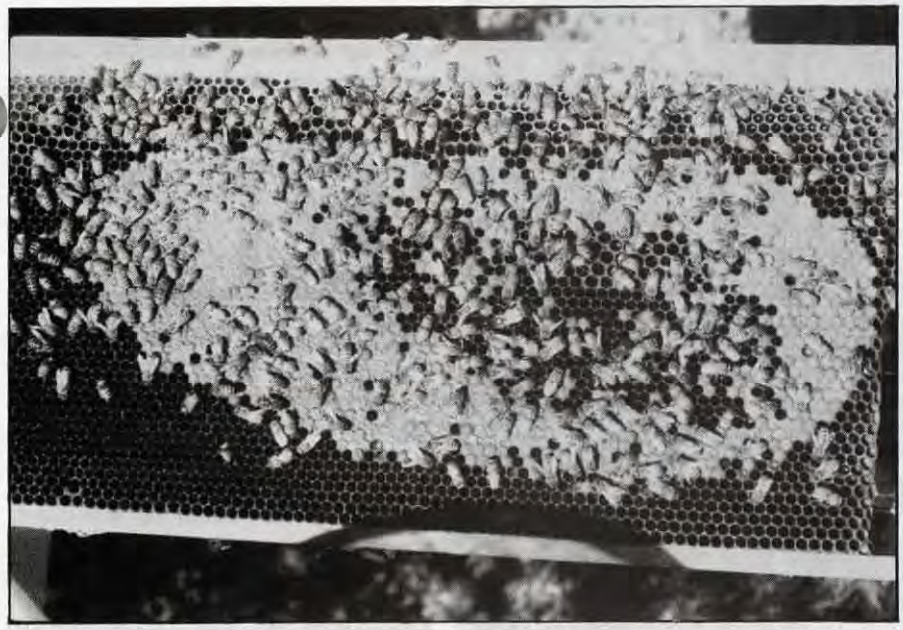
At this time I open my pollen traps and begin to trap pollen. I also do some yard work like replacing old pallets or carpeting the bee yards for weed control. I may build fences or move into new locations.

BEE WORK All divides are carefully watched to make sure they have queens and usually in June they receive their first box, making them two boxes high. In Utah, June usually means a dearth or lack of nectar and the hives consume all their stored honey. This is a wonderful time **to treat for AFB,** when a complete turn over of honey occurs in the brood nest. An extender patty placed between the two brood chambers now is a good way to clean up a foulbrood problem. Honey ontamination does not occur if you use the extender patty *in the brood nest*. The medication used is moved only to the brood boxes. And besides, withlittle or no honey being stored at this time, there is none to contaminate which is the whole idea.

SECOND ROUND OF SUPERS First supers go on strong hives in hopes that honey will fill them and to give room to the expanding population. The idea of cracking supers for ventilation has no place in an arid climate and, from my point of view, in any climate. The bees, given a normal entrance (check Root entrance reducer – it fits in a slot that's 16-1/4" x 1" – which is normal), can channel all the air they need into the hive. In fact, I ran a whole yard with nothing more than one 1/2 inch hole in the second box and a 1" x 3/8" slot for a lower entrance. I saw no difference in honey production.

The second super goes on shortly after the major honey flow starts if needeed. Make sure the extender patty is gone, or remove what's left before you add this super, though.

The second super can do a lot of damage to a hive if put on improperly. Do not reduce your hive's survival



This colony still has lots of room, and you need to be careful not to oversuper – yet.

When there's a beard of bees out front, and a strong honey flow in progress, check to see if the colony is 'plugged', and needs more room.

chance for next winter with the second super. The criteria for supering is as follows – all frames are full of honey in the first super, which means little, if any, brood. If there is brood, it is only a little bit of sealed brood in the center three frames, with all empty cells in the brood box filled with honey.

I repeat, I do not put the **second super** on until the first one is nearly full of honey. This insures brood will be pushed *down into the lower boxes* because there is a barrier of capped honey to keep the queen down and out of the honey supers. The second super goes right on top. I do not bottom super.

THIRD ROUND OF SUPERS Further supering takes place as needed. I go out at least every three weeks with great expectations. When I do super, I always super on top. Bottom supering is just too much backbreaking labor for what I consider insignificant gains. Bees hoard honey. They will not stop bringing in honey until there is no room left at all in the hive. Bottom supering in my area only insures that no honey is stored in the second brood chamber; and, frankly, I want that second box plugged out, capped and the brood pushed *down into the bottom box.*

DOWN TO THE TOENAILS A very effective management tool used in each of my yards is to take a few select hives apart clear down to their bottom boards, pulling frames in each box to figure out what is going on. Then you know better what to do with the whole yard.

In the beginning of the last month of summer I take a vacation. Prior to this (during the whole summer) I put boxes together and wire frames and put in foundation. I like to put foundation in during the warmth of the summer rather than in the cold of winter. The last super on a hive for the season can be 100% foundation. That means all 10 combs are foundation. This acts as a cap, forcing the bees to really fill the lower supers and the brood chambers before they move into the foundation. I love to take off 10 frames of what was just recently only foundation, all drawn and capped in one box. It is beautiful.

SUMMER TIME TIPS

1. Undersupering is frustrating, but oversupering can cause a disaster. Having all the bees at the same strength (accomplished with proper dividing methods) makes all the difference, in summertime management. All colonies are equal, and the behavior in each super is predictable.

Plugged out bees caused by undersupering can be seen when there are a majority of your hives in the middle of the day with very little flight activity and huge clusters of bees hanging out on the front of the hive. When you examine the hives you will find all cells filled with brood or honey – no empty cells and lots of burr comb, five pounds of honey between the lid (or inner cover if you use one) and top bars is not unusual. If this happens early in the honey flow, it can be dangerous, because the bees will not raise enough brood for winter. If it occurs at the end of the honey flow, well, they will winter well. You lost some honey, but gained peace of mind.

2. Hefting the hive is an art well worth the time to learn. You simply put your left shoulder against the hive, grab the handhold with your left hand (hopefully a wood cleat), and tilt the hive up to about 45 You have to judge the relative weight. Do it to a full hive so you can compare it to an empty hive or full super versus partially full.

3. Nectar Shake How do you tell when a honey flow is in progress? Well, first of all pull several uncapped frames out of the super, turn the frame on its side, and **shake** it over the top of the hive. If a bit of nectar falls out, no honey flow. If the whole frame empties and drowns the top of the hive and spatters all over your shoes and bee suit, well, just smile. You have a honey flow – a heavy one. Cured honey will not fall out.

When taking a couple hives down to their toenails, pull some frames in the brood nest and **shake** them. This is the first place a lot of nectar is stored. Sometimes the top boxes are all capped, so you will not know if there is a good **shake** unless you check the brood boxes.

4. Vacations One of the most important things in beekeeping is knowing when to go fishing. Be ready to go when your work is done. If you are up on your bees and you know your locality, that fishing trip is mighty important to you and the family. So go and enjoy yourself and let the bees cook while you play, and **I learned that the hard way!** ○

Meet BOB RUSSELL

This beekeeper and custom vegetable and herb grower works with his customers.

Bob Russell of Delaware was looking for a career change. He found it by returning to the soil. He found a niche growing custom vegetables/herbs for restaurants that serve seasonal tourists along the Delaware seashore. And he feels bees fit right in with his gardening.

Bob describes the things he grows as "nothing fancy – except for price when you see them in the grocery store." He works closely with individual restaurant chefs and grows those plants they will use. He takes "orders" and plans his growing season accordingly.

And what does he grow? He grows over 10 types of greens to make a salad mixture both pleasing to eye and taste. He grows 15 specialty vegetables not commonly available in the market place – like purple broccoli, speckled beans and yellow striped tomatoes. Herbs are also extensively cultivated (17 in all) as well as seven edible flowers.

Lately he has gotten into heirloom plant cultivation. Bob says "losing a variety of tomato, potato, pepper or whatever is like losing a bird or animal to extinction. Once they are gone they are lost." Many of the older varieties have more taste or eye appeal and are usually as nutritious. They are "part of our heritage and need to be preserved for all mankind" according to Bob.

Bob grows his plants from seeds ordered from various seed catalogs. He believes in extending the season to get the best price. He likes to "take a chance" so he uses row covers, ground mulches and other aids to get hearty plants started and in the ground growing while other growers are still thinking of their season.

Part of the success Bob Russell Custom Growers enjoys is due to the way Bob works with chefs. The restaurants are mostly fancy, attractive places that cater to a selective clientele. Presentation of food and taste are important to customers and they like the unique or unusual touch that specialty vegetables or herbs impart to foods. Bob feels in partnership with the chef to present the best quality produce available when it is needed. His food is fresh.

Bob likes to grow his produce organically. He feels the food is better and better for you. "The last thing I want to do is to kill the honey bees – they are part of my growing system," he says. He also knows that he "is out there every day" and his own exposure to pesticides is not healthy. But for organic produce to work, he feels he has to "take education to the chefs – to communicate with them." The chef must know to rinse the produce thoroughly and how to handle the occasional aphid or caterpillar that goes undetected from garden to kitchen to dining table.

His abundance of herbs gives his bees a smorgasbord of flowers during the season. He likes to think they "give my honey a special taste." A two colony beekeeper, the apiary fits into the specialty crop growing scheme in Bob's garden. His plantings are high density and he relies on honey bee pollination for his herbs, squash and beans. He is after maximum production.

Bob works intensely with his two-plus acres of plants. The apiary is at the edge of the garden. He says he likes to think he is working along with his bees. "They have moods but we get along well." He feels his diversified planting provides the bees with a good selection of nectar plants through the year. Bob harvests honey in the fall as his plant growing season slows down.

DEWEY CARON

The inter-relationship that bees, organic farming methods and specialty vegetable growing have are explained to chefs and visitors to his farm. He explains how valuable bees are to his crops. He shows chefs his growing techniques and explains the need for bee pollination and his reluctance to use pesticides. He has healthy bees and organic produce as a result. And as he offers tastes of his produce he includes honey from his hives to visiting chefs.

Bob started his first colony from a swarm he captured. He has learned his beekeeping from experience. His pet peeve is that people confuse bees with wasps and yellow jackets. He attempts to educate his visitors about bees and their vital pollination role. He wants people to know "how valuable bees are."

The fields around the home of Bob Russell, custom grower/beekeeper, contain unique and unusual plantings. His honey is a mixture like no other in the area. Bee colonies are an integral part of his business and the honey a sweet, tasty reward for his (and their) efforts.

Bob Russell, with one of his colonies in the background, standing in a patch of chives.

Care-Free COMB HONEY

J. HERBERT FRETZ

Care-Free Comb Honey production requires that you know the basics of bee biology, behavior and the local environment.

For 44 years I have been a back-lot beekeeper, and since 1942 I have been a Minister in three states. While in Pennsylvania I had 10 to 12 hives, in South Dakota I maintained 30 hives, and now in Indiana I had 40 hives until I retired in 1987.

That year I decided to keep 12 hives with four new goals in mind. First, I would try to develop more of a let-alone style of beekeeping, to give me more time for all my other interests. Second, I would no longer sell liquid honey but would pursue my first love – section comb honey, and third, I would need only a small crop each year. Perhaps only six to eight supers of old-fashioned section comb honey (about 200 sections), just enough for family, friends, neighbors and ourselves. Fourth, all in all, I wanted to enjoy the beauty of the bees more, and not kill myself lifting, sweating and extracting tons of honey.

I feel I have attained enough of each of these goals so I am ready to share my experience with anyone, who, because of age or infirmity might be interested in a system of section comb honey production that produces enough for family and friends.

I would add one word of caution. My system is not for the beginner. An adequate knowledge of bee behavior is essential. You need to be able to recognize and differentiate between a working hive and a declining hive, even by observ

Note the two rows of sections just taken from the side of the super are just as nicely filled out as the middle rows.

Conventional section comb super taken off hive September, 1990, with all sections. Note sheet metal separators attached to section holders, and ventilated side board still in super.

ing bee activity or lack of it at the hive entrances. You need to know and understand the local honey flows, diseases, queen behavior and the rest of the basics.

When I reduced my 40 hives of two full depth bodies each, I chose 12 of the strongest with good laying queens, and piled the rest on top of these 12 hives. After eliminating worn-out bodies and frames, I had five full-depth bodies on each of the 12 hives. That first year I didn't super because I wanted each hive to be packed with honey and brood by fall. During that interim year I did a lot of lifting of these 60 bodies in order to monitor the work of the queens and to be sure I had a good, disease-free brood nest in the lower 2-1/2 bodies and plenty of honey in the upper 2-1/2 bodies.

That fall, as usual, I fed Terramycin™ and provided upper winter entrances. At the end of October I hefted each hive and found them full of honey and pollen. By early April the next year I found all 12 hives had plenty of honey, and yet had plenty of space for egg-laying and incoming pollen. All had wintered well and had good clusters of bees.

By dandelion time late in April an abundance of pollen and nectar was more than enough to keep them busy. Every year since I can affirm that I have wintered successfully all 12 hives with five full-depth bodies each, with only one or two exceptions.

It seems to me that with five bodies on each hive, in contrast to the two bodies I formerly wintered with, there is plenty of honey and room for the bees to choose their best winter nest. Then, come spring there is plenty of room to expand the brood nest and store early nectar, so I don't have to super as early. In late April and May, I go down in the bodies only far enough to see that the queen is laying in solid patterns, and that all the cells are healthy – no disease. If so they are O.K. This is the only time during the season I go down this far. By observing the bees at the entrance from then on and by knowing the honey flows, I can tell most of what is happening inside.

At first I expected a lot of swarming in May because my hives were boiling with bees. I have been amazed these past four years that I haven't, but I'm not sure why. Maybe I missed some, or I've just hit four non-swarming seasons. Could it be the five bodies of good comb always provide some place for the queen to lay and the workers to keep busy? Or am I just lucky?

Nevertheless, by June I have prepared my six to eight section supers, using the Killion method* of folding solid sections and fastening the foundation (I dislike split sections). The main honey flow in northern Indiana is white Dutch Clover beginning about the middle of June. About a week after the flow has started I pick out the four or five strongest hives, take off the top body and if the bees are filling the next body with nectar, I place one section super on the hive and *replace the top body on top*.

In about 10 days I check each of the supered hives and usually find the bees beginning to draw out the section foundation, even without a bait comb.

I want the hive boiling with bees. If all four or five hives are drawing out the section super foundation, I may put a second super on the strongest hives. Or, if I find some of the sections not being filled, I may remove the super and finish it on the better hives.

During these years I have been able to finish all six - eight supers on about half of my hives, with only two section supers on the best hives. You may ask, what happens to the other five or six hives that are not supered? Well, I just let the bees fill those five full depth bodies! You see, no longer do I care how much honey I can harvest from my hives. I want my bees to enjoy themselves with plenty of honey so that I can fellowship with them. There is enough honey for all of us!

What a thrill to witness nectar laden workers rushing in June to help me. Or to smell above the hives the sweet scents of autumn fragrance in late October. The added bonus for me is that leaving so much honey for the bees seems to make them happy all winter long. And next spring, they're anxious to start early in joyful forage. ○

*See, Carl E. Killion, *Honey in The Comb,* Paris, IL, 1951; or Eugene E. Killion, *Honey in The Comb*, Dadant & Sons, 1981.

A *MOST* UNUSUAL HONEY

LARRY GOLTZ

A field of strawberry plants near Fall River Mills, California.

A six-county area of northern California, including Shasta, Lassen and Siskiyou counties, contains approximately 2,000 acres of land devoted to growing strawberry plants. This nursery acreage bears no marketable fruit harvest; in fact, blossoms appearing on the young plants are removed before any fruit is formed. An enlarged and fleshy receptacle forms the bulk of the strawberry fruit and is the edible part. The numerous simple pistils of the strawberry flower develop into tiny achenes which are seen on the outside of the fruit and which are commonly called seeds. In growing strawberry plants for market none of this development is desired so the blossoms are picked off by field workers, but not, apparently, before some nectar is gathered. There are some 200 acres of plants in the vicinity of one of my apiaries. The June-bearing strawberry plants, mostly of the variety Chandler, developed at the University of California at Davis, normally blossom in the month of May at which time my bees take advantage of a short period of bloom to gather a honey crop. Another variety grown, Selva, which is everbearing, may prolong the nectar gathering opportunity. The June-bearing (short day) plants are produced in much greater quantity than the everbearing or day-neutral varieties.

Historically, strawberry plant culture is not new to Shasta County, the same county of northern California that is a leading package bee and queen producer. Strawberry plant culture began in about 1920 by Charles Loftus in Shasta County. Similar beginnings were taking place in southern Glenn County in California and in Oregon. About three to four million plants were grown in 1920. Now, with about 450,000 plants produced *per acre*, the output has far outstripped these modest beginnings. Between five and six hundred acres of strawberry plants are grown in nurseries in eastern Shasta County and adjoining western Lassen County. Each parent plant, started early in the spring in well prepared, sterilized soil will yield between 100 and 120 plants per harvest. This increase is made possible by vegetative reproduction through the casting and rooting of runners from the parent plants during the spring and summer growing season.

Harvest of the vigorous young plants takes place during October. Mechanized harvesters dig or lift the plants, shake the soil from the roots in large rotating drums and convey them to a bagging platform. The bagged plants are hauled to a sorting shed where they are trimmed, graded and bound in small bundles for shipment by truck to growers located mostly in Watsonville, Santa Maria and Oxnard areas of Calif. The plants are back in the ground in

Strawberry plant harvest. The revolving drum shakes the soil from the roots of the plants, but doesn't damage the crown.

After shaking the plants are bagged and sent to the grading shed.

these producing areas by the end of January following fall plant harvest.

Two basic systems of strawberry fruit production are practiced in California: a high elevation winter system and a low elevation summer system. Both utilize plants produced in California nurseries. In the high elevation system as practiced in eastern Shasta County, the plants are harvested in the fall of the year and planted in January in southern California. The strawberry plants grown in the lower Central Valley of California are held in storage and planted the following fall.

Honey bees from my Fall River Mills apiary fly well over a mile to reach the strawberry plants. Nectar yield, according to my best estimate, peaks during the middle of May. The honey has an attractive red-pink color and is of heavy body, with a mild and not unpleasant taste. It sells readily at the Redding, California Farmer's Market. I rate it comparable in quality to the local premium grade yellow star thistle honey. Since this so-called "strawberry honey" is unlikely ever to appear on grocery shelves I can capitalize on its uniqueness. During the four years I have had bees near the strawberry nurseries my hives have produced a crop average of about 20-25 pounds per colony. This yield is the only surplus gathered from an apiary that is surrounded by hundreds of acres of irrigated alfalfa fields. Harvesting the alfalfa for hay before bloom begins precludes any nectar yield from the alfalfa, unfortunately. This most disappointing situation is partially offset by the harvest of my unusual "strawberry honey" To anticipate the most-asked question regarding the honey I must answer as I do some curious buyers – "No, the honey does not have the flavor of strawberries!"

Although honey bees have proven beneficial to the development of the strawberry fruit there is no demand for pollinating colonies in the growing areas of California. I had noticed an abundance of yellow pollen in the combs in the spring which I had mistakenly attributed to dandelions. In retrospect I now believe this golden pollen came from the strawberry bloom.

COOPERATION

STEVE TABER of Honey Bee Genetics

Goudous • 82370 Villebrumier, France

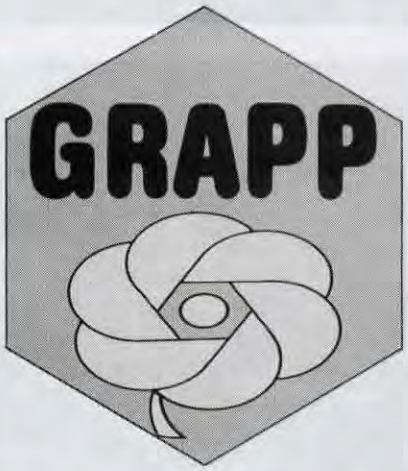
"Cooperation can make pollination profitable."

One of the major problems beekeepers have, and I think this is true the world over, is fighting with each other. Not actually fighting you understand, but undercutting their brethren in the price they charge for honey, for queens, for packages, and for pollination services.

When I started at the USDA bee lab in Louisiana in 1950, the state beekeeper meeting held in the winter was the time for discussion on the price of packages – specifically a two pound package of bees with a queen. The producers would come to a collective agreement on a price which no one would sell below – *the bottom price*. But in actual practice that magic price was a *ceiling* which nobody, but nobody, would sell at. Instead, everybody sold *below* that agreed upon price.

Summer pollination fees are much the same in California, with lots of bees and not a great deal of demand for pollination services. Beekeepers, instead of getting a fair price for their services, seem happy to have any income at all, and often accept $10-$12/colony. During almond pollination it is usually a different story because there are not enough bees in the state to do the job. So, thousands of beekeepers bring their bees into California and the price is from $25 to over $40 for each colony of bees. Even this year when there were actually enough bees, the price was good and beekeepers were, for the most part, happy.

The same thing was going on here, in my part of France, until just recently. Beekeepers had more bees than needed to pollinate the various crops, so there was rampant price cutting which led to the inevitable result of low prices for each colony.



But a group of these mostly-young beekeepers decided it was time to cooperate with each other and they formed a small association – a co-op. They printed up a small brochure to hand out to farmers, which explains how bees pollinate crops and make the farmer's fruit and seed much better and more profitable. The name of their organization is *Groupment des Apiculteurs Polinisateurs Professionnels*, (GRAPP) which translates, approximately, into *Beekeepers' Group of Professional Pollinators.*

This apiary is the closest to Pascal's warehouse-honey house. Four Dadant-size hives are on each pallet, when full of bees, brood and combs with top and bottom attached, each hive will weigh close to 180 pounds.

Pascal with John Kefuss, (John is originally from Canton, OH) in Pascal's honey house.

Pascal with arm on his flatbed truck, a Mercedes-Benz, with pallet loader on the rear, also in rear is the warehouse forklift.

It is important to remember that just because *you* know bees are required to pollinate a crop, many farmers do not. They need to be told about it – repeatedly! It wasn't long ago that a farmer near where I lived in California told me that rain pollinated his prune trees and he didn't need my bees at all.

The push behind this co-op venture is a young man named Pascal Lacroix who lives in Aussonne, which is a suburb of Toulouse. Pascal is in the process of building up his business, completing his warehouse and honey house and trying to make a living from his bees.

Pascal keeps everything on pallets, four colonies to a pallet and his lift picks up two pallets at once and places them on his truck for quick and easy movement. Inside the warehouse/honey house combination he uses an electric fork lift to move things about. The truck holds 80 hives which takes him about 30 minutes to load.

Pascal charges according to the stress on the bees

He runs 384 colonies in what are called "Dadant Hives", that hold 11 frames, which are the same *length* as our standard frames but are about two inches *deeper*. He also has 220 five frame nucs. Some of the nucs he uses in pollination, and some develop into large colonies to replace failing queens, which keeps his numbers relatively constant. All queens are replaced after two years of service.

Pascal's pollination contracts yield about 20% of his total gross income and he has many different prices depending on the work involved and the damage to his bees. For instance, he charges 200 francs (about $40) for a five frame nuc to be placed in a tunnel greenhouse because the small colony will not survive.

Crops pollinated include apples, kiwi fruit, prunes, melons, cucumbers and seed sunflowers. For these crops he charges from 120 to 160 francs ($24 - $32). Some farmers want him to place pollen traps at the colony entrance as it is thought this causes bees to do a better pollinating job.

This spring, he and other members of GRAPP moved their bees over 400 miles north, near Paris, where they did some experimental work on the pollination of black currants. Some plants were in cages, with and without bees, and other plants were in cages with bumble bees. These experiments involve people who are experts in raising bumblebees to be used in pollination. They will also place large numbers of colonies around the black currant plots hopefully to provide good fruit set.

His disease prevention program includes treating all colonies with fluvalinate in October and November to kill varroa mites. Colonies are not treated routinely for AFB, but rather each colony is inspected in the fall and again in the spring and mild cases of AFB are treated with Terramycin™ while heavily infected colonies are burned. Pascal is not at all concerned about tracheal mites, *Acarapis woodi*.

His primary honey crop comes from sunflowers but on occasion he produces honey from chestnuts, black locust (the American black locust which was brought to France about 200 years ago and grows here in great abundance but is called "acacia") and wild flowers in the Pyrenees Mountains a few miles to the west.

The seed companies he pollinates for are American – Pioneer, Asgrow and Cargill. Each has a division here in France. He requeens hives every year with virgins or queen cells he buys from John Kefuss, an American friend who keeps bees and raises queens near Toulouse.

QUESTIONS?

Excluderless

Q. Do you use queen excluders in producing comb honey over a single-story or one-and-a-half-story hive?

Charles R. Wilson
Belmond, Iowa

A. No, and it has been years since I have found either brood or pollen in the comb honey. You can do without an excluder *provided* there is honey in the center frames of the hive below the supers, because the queen does not cross over capped honey to lay eggs above it. To insure the presence of honey in the brood chamber you must leave the honey from the preceding fall honey flow.

No Attic Brood

Q. The "open brood nest" system for controlling swarming requires removing three or more combs of brood from the center of the brood nest and replacing them with foundation or drawn combs. This creates the problem of what to do with the combs of brood, in case you do not want to use them to create new colonies. Why could you not put them in a hive body *above* the comb honey supers, either nine per hive body, or fewer than that with dummy boards, so that the emerging brood could rejoin and thereby strengthen the colony from which they were removed?

Kevin Fick
S. Farmingdale, NY

A. You must never put brood above a comb honey super, because the heavy traffic of bees to and from that brood, and thus through the comb honey super, causes heavy travel stain, rendering the comb honey unmarketable.

Hexagon Hives

Q. Would not a hexagonal hive be preferable to our standard rectangular one? Square corners are seldom found in nature, and a hive that more closely resembled a cylinder would be easier for the bees to keep warm, as well as having many other advantages.

Douglas Rawley
Wayne, PA 19087

A. One of the few certainties in practical apiculture is that one should not even think of trying to invent a better hive. The great advantage of the standard ten-frame hive is that it and all of its parts are interchangeable with others like it. It is doubtful, moreover, whether any other design would constitute a significant improvement. What is important in honey getting is not the hive, but how the bees are managed. This has the status of an axiom. And management reduces to two things: (1) having strong colonies that (2) will not swarm excessively. Achieve that, and success is yours.

Round Better

Q. What is your opinion of the square plastic "cassette" sections for getting comb honey?

John Iannuzzi
Ellicott City, MD

A. I tried them once, on five colonies, and did not like them at all. You get half combs, there being no middle. The plastic cassettes come with the foundation affixed to the side, and the bees build out from that, which is very contrary to their nature. The cassettes also become propolized, top and bottom, just like the old wood sections. There is no such problem with circular sections. And there is more waste, and hence more overhead, because, unlike the rings of circular sections, the cassettes cannot be reused. Partially filled sections are almost a total loss. There are many advantages to circular sections, in terms of economy and the minimizing of labor, and no advantages that I know of to cassettes.

Wet Paint!

Q. Does it hurt the bees to paint the hive while the bees are in it? I plan to use a latex paint.

Marko Watkins
Bourbon, IN

A. No, there is no harm in painting an active hive. It has been my experience, however, that latex paint used outside and thus exposed to weather soon peels.

Pollen Inserts Safe

Q. An orchardist who uses my bees for pollination inserted special entrances in the hives together with pollen he had purchased from another state, in order to get better pollination. Is there any chance that my bees could pick up mites from this pollen?

Name withheld by request

A. Since bee mites cannot live in the absence of live bees, I think there is no chance of their being transmitted in pollen, or in anything other than live bees.

Questions are welcomed. Address Dr. Richard Taylor, Box 352, Interlaken, NY 14847, and enclosed stamped envelope for response.

ANSWERS!

Richard Taylor

? Answers To Do You Know ?

1. **True** Brood developing at the periphery of the brood nest normally takes longer to develop than centrally located brood. Differences in developmental rates are believed to be associated with variations in brood nest temperature and nutrition. Temperatures lower than the normal brood nest temperature of 35° C at any stage can delay emergence for up to five days and underfeeding of larvae also will delay development time.
2. **False** While there is considerable variability in egg size (both length and weight), these differences are explained by genetic and possibly physiological factors, rather than being associated with them being fertilized or not fertilized. Even eggs from a single queen can vary tremendously in size over a relatively short period of time.
3. **True** Brood food consists of a clear component from the hypopharyngeal glands, which is presumably mixed with honey, digestive enzymes and water and a milky white component from the mandibular gland. Worker larvae are fed 20-40% from the white component and 60-80% from the clear component during the first two days of larval life. On the third day the amount of the mandibular gland secretion decreases.
4. **True** Adult queens are fed by workers of brood food producing age and presumably receive mostly brood food, possibly with some additional honey. A queen will lay 2 to 26 eggs between feedings and is generally fed by one worker between each period of egg laying.
5. **True** Although a significant amount of egg laying by workers does not occur in queenright colonies, workers with developed ovaries are found in most normal colonies.
6. **False** Queen rearing in preparation for swarming begins when eggs are laid or placed in queen cups. Most of the eggs in queen cups are laid there by the queen, but workers can and do move a small number of fertilized eggs or very young larvae from worker cells into cups.
7. **True** Although workers perform virtually all tasks associated with colony life except reproduction, observations have shown workers spend most of their time either resting or patrolling the nest, seemingly doing nothing. These periods of inactivity are interspersed with frantic activity sessions during which individual workers perform many different tasks in a short period before resting again.
8. **True** Bees will accept a queen the same age and in the same physiological condition as their own queen much more rapidly than they will one who is unlike their own. Thus, if she is actively laying eggs at the time she is introduced, the probability of her being accepted is greatly increased.
9. B) 2-12
10. D) Queen's Sting.
11. B) is getting ready to issue a swarm.
12. A) 24 hours
13. B) cleaning the bottoms of cells
14. A) brood care
15. B) building comb
16. C) tending the queen
17. B) packing pollen in cells
18. The young worker bees get flying practice, they are able to defecate away from the hive, they learn the position of the hive in relation to the local landmarks and learn the direction and rate at which the patterns of polarization move across the sky.
19. Regulation of temperature; to remove moisture from unripe honey; to lower carbon dioxide levels in the hive; to disperse scent pheromone from the Nasonov gland (scent gland).
20. The older laying queen is larger since she is swollen with eggs and thus moves slower. Virgin queens are likely to be running rapidly from place to place, often fanning their wings as they run and burrowing into clusters of bees to get out of sight. The laying queen, unless severely disturbed will be found only in the brood nest area.

There were a possible 25 points this month. Check the table to determine how you did. If you scored less than 12 points, do not be discouraged. Keep reading and studying.

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

BEE TALK

RICHARD TAYLOR

Box 352, Interlaken, NY 14847

"Swarming is probably the one aspect of beekeeping that concerns serious beekeepers more than any other."

June is swarm time. Of course there will, at this latitude, have been swarms in May, and there will probably be a few in July, but June is when swarming reaches its peak. So I should talk about swarming this time.

The trouble is that I have talked about swarming so many times that it will be just about impossible to think of anything new to say. On top of that, when you get to be my age you have a hard time thinking of anything new anyway. So anyone who has come across my reflections on swarming before is not likely to find much that is new here. The very first **Bee Talk** I wrote for this magazine, over 20 years ago, was about swarming. It is probably the one aspect of beekeeping that concerns serious beekeepers more than any other. So it is easy to get talking about it, again and again.

I'll begin with one neat trick that every beekeeper should know. It is a way of utilizing a swarm to get an absolutely prodigious honey crop from a single colony. The only hitch is, you have to know what hive the swarm came from.

Here is how it works. Suppose you see a swarm pouring out of one of your hives. Well, as soon as the swarm is out and starting to cluster someplace, move that hive off to one side, and in its place set another hive, with empty combs or foundation, and hive that swarm there, right on its original stand. If you want to make sure those bees don't all come swarming right out again, you can give them a comb with some brood in it, from any hive in your apiary. That will hold them. Result? The swarm is augmented by all the field bees from the moved hive. They have little or no brood to feed and tend. So that enormous population of bees, animated by the spirit of the swarm, goes to work gathering nectar, and you get an enormous crop. The hive will be as tall as you are by the end of the season. It is a great way to get comb honey, because the bees fill the sections so fast, and you can get the supers off before you get travel stain. You'll get no more swarms from either colony, because the moved one has lost its field bees, and the new one has lost its brood. The moved colony, having lots of brood and a nice new queen, rebuilds its population fast, and you'll get a decent crop from that one too.

Now you might think that, if you find a swarm clustered in your apiary, you could set off to one side any hive, whether it was the one the swarm came from or not, and proceed as just described, with a similar result. I have tried that several times, and it doesn't seem to work the same at all. I'm not sure why, since the bees don't fight or anything. It must have to do with what I alluded to above as "the spirit of the swarm." A swarm has a psychology or temperament all its own. Every beekeeper has noticed that a newly hived swarm is very gentle, even when it has come from a very cross

One of my youngsters with my swarm catcher. The hook at the top goes over the branch they are clustered on, and a quick yank dislodges the swarm.

hive. Another aspect of that temperament is zeal. A newly hived swarm is the hardest working colony in the apiary. It is for this reason that a newly hived swarm is excellent for getting foundation drawn. It is also for this reason that the procedure described above results in such huge crops.

That procedure, incidentally, is called "padgening" The word comes from the name of a British beekeeper of yore named Pagden, so it should probably be called "pagdening". The term has been around for a long time, and yet, amazingly, I have found professors of beekeeping who never heard of it.

All right; here's another idea you might find useful. When you gather a stray swarm, whether in your own apiary or someplace else, it is lots easier to get it into some sort of screened box and cart it away, rather than trying to hive it there and then move the hive. What I do is dump the swarm into a huge funnel inserted in the top of my swarm box. The swarm box is just an old hive body with eight-mesh screen on both sides, one of which is hinged, and with a hole for the funnel to go in.

Now there can be a bit of a problem shaking all the bees into that funnel, or whatever it is you want to shake them into. They tend to scatter and to take wing, so you lose a lot of them. But I solved that problem. My swarm catcher is a pole with a hoop and a burlap bag on the hoop. I shove that up under the swarm and dislodge the swarm into the bag. Trouble is, the bees start crawling out and taking wing while I'm bringing them down to within reach, and then they don't dump out of the bag into the funnel very well. So what I do is put a good big plastic trash bag inside the burlap bag, as a liner, holding it in place with a few clothespins. The bees don't crawl out of that, because it is slippery, and when I get them down within reach I can pull out the plastic bag full of bees and dump them into my swarm box with hardly any loss of bees at all.

I love gathering swarms, especially when they are not from my own apiaries. Even when I don't need them, and am hard put to know what to do with them, I just can't resist responding to a call to come get a swarm. I've heard beekeepers say they don't gather stray swarms because they are afraid of introducing disease into their apiaries, but I have never seen the slightest reason to think that is true.

(Questions & comments are welcomed. Enclose a stamped envelope for reply.)

INNER ... Cont. From Pg. 316

just too hot to handle anymore (after scores of years in use, however).

There are effective replacements though, but alternatives tend to be more expensive, (because of reduced human toxicity or number of applications required), or more lethal to honey bees. And here's the risk.

It's far easier to tell others to bite the bullet when changes occur that will be beneficial in the long run than to do so ourselves. And, for the most part, getting parathion off the market is beneficial in the long run. So was removing DDT, and chlordane and a host of other compounds. But, in the short run, what's left usually isn't as effective, even if it's better for us. And that's what beekeepers are facing now that other chemicals are being applied to blooming (or almost blooming) crops.

Generally, the pesticide - honey bee problem has improved in this country during the past 20 years. Applicator training, improved communications and better understanding of bee/flower interactions, less toxic chemicals available, increasing demand for honey bees as pollinators, and beekeepers' reluctance to place non-pollinating bees near areas routinely sprayed have helped.

But as the crop pest control business evolves, there will be problems with the little details that big conferences, like the one in Rio, always seem to overlook.

The big picture is brighter, though – reduced toxic materials put into the environment, and those that are introduced are applied less often, and are more precisely placed–but it's the learning time required to get all the pieces to fit that you need to be aware of, and beware of.

If your bees are near those crops mentioned — and others – check out what may be different this year with growers and applicators and extension agents.

The big-picture, long-run outlook may be better, but bees that die this summer from pesticides won't benefit in the long or short run.

And neither will you.

•

We talked about pollination fees last month in the honey report, so this time we thought we'd give you an idea of just part of what's out there to be pollinated.

Cucumbers require pollination to form straight, uniform fruit, and honey bees are by far the best vectors of pollen movement from male to female flowers.

A common recommendation is to provide one strong colony per acre of cucumbers to ensure adequate fruit set. Some research suggests that on average a colony and a half per acre is better to increase fruit set to maximum, and act as insurance if poor weather sets in.

Growers have to accommodate increased fruit set (and hopefully increased yields), with greater inputs of fertilizer and other chemicals, water, labor and a market that will profitably support more production. After all, there's no reason to increase yield and costs if money is lost in the process.

This season nearly 94,000 acres of cucumbers have been contracted to processors for pickles, with Michigan (19,000 ac.) and North Carolina (17,600 ac.) the largest producers. Other big-acre states include Texas (8,100 ac.), Wisconsin (4,700 ac.), California (4,100 ac.) and South Carolina (7,500 ac.).

Meanwhile, the spring crops of fresh market cukes will take up another 10,700 acres, with Florida (7,900 ac.) leading the way.

Other crops needing pollination this year include Honeydew melons (4,100 ac. in Texas); 9,200 acres of bell peppers (yes, honey bees will increase yield) in Florida and Texas; 108,000 acres of watermelons in several states; and about 45,000 acres of strawberries, mostly in California.

Together, that's about 270,000 acres of fruit and vegetables under contract to processors or fresh market distributors for the early part of the season. And these are only the ones the U.S.D.A. knows about. That little operation down the road that only grows 25 or 30 acres will need some, too, along with the 200 or 300 acre operations that supply small wholesalers, restaurants, farm markets and private processors.

I think I could safely say that 270,000 acre number is off by a factor of three, or maybe even four, over the course of an entire season. That means there are potentially 800,000 to a million acres of fruit and vegies needing one colony per acre to be pollinated. And this doesn't include almonds or apples or avocados or squash or alfalfa or cranberries or blueberries or cherries or . . . .

Given the range of prices we have reported in our Honey Report over the course of a year, the estimate of just the veggies and fruit we measured comes to between $12 and $40 million. That's quite a range, and quite a chunk of change to put into an economy the experts say is hurting.

Add in all the rest of the crops and you're in the neighborhood of $50 - $150 million. A mighty nice neighborhood I'd say, and that's just the money crop producers are paying (or should be, anyway) to beekeepers so honey bees can do their thing.

We may not be Exxon, but we're not just some guy with the bees anymore, either. We are *Big Business* and even if you are just some guy with the bees in the back of your truck, you've got to *act* like you're Big Business.

Conduct yourself professionally, produce a quality product, deliver on time, expect to be treated the same and who knows, Exxon may be watching over its collective shoulder.

Kim Flottum

GLEANINGS GLOBE

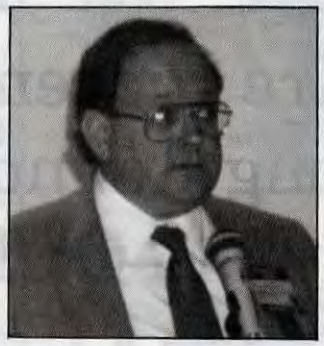
JUNE, 1992 ALL THE NEWS THAT FITS

A Taste of Canada

EAS TO GUELPH, ONTARIO

Make plans to attend the 1992 Eastern Apicultural Society meeting July 29-31 at the University of Guelph, Guelph, Ontario, Canada. The Ontario beekeepers have arranged an excellent program of speakers and workshops. Topics include tracheal mites, reactions to stinging insects, bee management, raising queens, judging honey/beeswax/mead, nectar sources for bees and much more.

Doug McCrory



Larry Connor

Cynthia Scott-Dupree

Dewey Caron

Roger Morse

In addition to the excellent program, EAS has a big honey show, a room full of commercial exhibits, social events like a BBQ and dancing, Master Beekeepers examinations and lots of opportunities to see, hear and talk about honey bees with fellow beekeepers. An excellent Beekeeping Short Course precedes the conference itself July 27-29.

The University of Guelph is a modern campus with great dorm, eating and meeting facilities all close together. Guelph is in southern Ontario in a large fruit growing/agricultural area with lots to do and see besides the conference. It is less than one hour west of Niagara Falls and Toronto.

Speakers are host-country oriented, which will give attendees an outstanding opportunity to see what's been happening north of the border. They include Jean Chapleau, Rob Currie, Don Dixon, Peter Kevain, Cynthia Scott-Dupree, Doug McRory, Gard Otis and Mark Winston. From the U.S. is James E. Tew, Roger Morse, Dewey Caron and Gene Robinson.

Registration forms are available after May 1. For further information, write EAS Secretary Loretta Suprenant, P.O. Box 1463, Champlain, NY 12919.

WINSTON WINS HAMBLETON

Each year the Eastern Apicultural Society honors an outstanding scientist in apiculture. This year the Hambleton Award will be given to Dr. Mark L. Winston of Simon Fraser University.

Mark's research over the years has encompassed many areas: pollination, pheromones, the Africanized bee, colony behavior, and overwintering.

He finds time to give presentations on his work at both scientific organizations and beekeepers organizations, as well as to the non-beekeeping public. He also participates in activities of the Western Apicultural Society.

Beekeepers may be familiar with his excellent book, *The Biology of the Honey Bee*, published in 1987. He also has a chapter in the forthcoming revision of *The Hive and the Honey Bee*.

Several Stinging Incidents Reported Already

AFRICANIZED BEES MOVING NORTH

Six counties south and west of San Antonio have been added to a quarantine restricting the movement of commercial bee operations following the detections of Africanized honey bees.

The addition of Kinney, Frio, McMullen, Atascosa, Medina and Uvalde counties makes 24 Texas counties quarantined, according to Dr. Horace Van Cleave, spokesman for the Texas Apiary Inspection Service, a unit of the Texas Agricultural Experiment Station.

Four hives of Africanized honey bees were found in traps monitored by the U.S. Department of Agriculture in Kinney, Frio, McMullen and Uvalde counties. One hive was found in an irrigation control box in Frio County. Although the Africanized bees have not been found in Atascosa and Medina counties, those two were included because at least one hive was found within one to five miles of their borders.

The quarantine allows beekeepers to move beehives *within* but *not out of* the zone in an effort to prevent the assisted spread of Africanized honey bees. The apiary inspection service, the regulatory agency for the Texas bee laws, imposes quarantines based on the Texas Africanized Honey Bee Management Plan.

Eight counties across the southern tip of Texas – roughly a 100-mile radius from the U.S.-Mexico border – were quarantined after the first AHB swarm migrating into the United States was detected near Hidalgo on Oct. 15, 1990.

Since then, counties have been added as the bees continue to migrate northward. The other counties under quarantine are: Maverick, Zavala, Dimmit, Webb, Brooks, Cameron, Hidalgo, Jim Hogg, Kenedy, Starr, Willacy, Zapata, Nueces, Jim Wells, Kleber, Duval, Val Verde and La Salle.

Between April 6 and 15, 1992 a stinging incident in the city of Corpus Christi involving two men was reported by the Corpus Christi Health Department. The incident occurred the afternoon of April 13. Both men were taken to a hospital for treatment. AHB confirmation has not yet been received.

Officials of the African Bee Program in Mexico report the first fatality in northern Tamaulipas. The victim was an older man and the incident occurred in his home in the town of Valle Hermoso, located 50 miles south of Brownsville, Texas. A 12 year old boy and his 36 year old father were also stung at the same location. Both were hospitalized in San Fernando.

Ninety eight feral and trapped swarms had been captured in TX this year by the end of April. Seventeen were confirmed AHB and 21 are suspicious. Several confirmed reports of confined animals being stung to death have been received, along with several incidents involving people. Some incidents involved AHB, others were not determined at press.

Several trap lines have been set up to moniter the northward movement of the bee. AHB was reported in Texas City in mid-May.

Graphic: Agricultural Communications, Texas A&M System

QUINTERO HONORED

Elba Quintero, of Harlingen, Texas, was honored by fellow employees in the U.S. Department of Agriculture with the 1992 Unsung Hero Award for her work as Project Coordinator of the Africanized Honey Bee Program for USDA's Animal and Plant Health Inspection Service in Brownsville.

In presenting the award to Quintero and the other honorees, Secretary of Agriculture Edward Madigan cited her outstanding performance in the effort to prepare the people for the arrival of the bee and for coping with the changes needed in beekeeping practices.

"Because of Quintero's efforts, we have a great working relationship with beekeepers and others in the agricultural community," added Joe Davidson, Quintero's supervisor. "She's been very helpful to lots of people, and her work frequently stretches into evenings and weekends."

MICHIGAN HONEY QUEEN

Jodi Conners is the 1992 Michigan Honey Queen. She is the daughter of Gerald and Barbara Conners of Holton, MI. Presently she is living in East Lansing and is a sophomore at Lansing Community College majoring in Computer Graphic Arts.

She is already very knowledgeable about bees and is looking forward to a busy year at state and county fairs, parades, and schools.

CANOLA GAINS NEW MARKET

At the January 1992 Bio/Technology Winter Symposium in Miami, FL, Dr. Toni Voelker announced that the Calgene Company, has genetically engineered canola plants to produce a new source of laurate (C_{12}), a key raw material for the soap, detergent, oleochemical, personal care and food industries.

Currently commercial sources of laurate are limited to coconut and palm kernel oils, which are imported into the U.S. primarily from Southeast Asia. The performance of detergents and other products containing laurate cannot be duplicated with other plant fatty acids from commonly available oils such as corn or soybean nor can such crops be modified to produce laurate by conventional plant breeding.

Current U.S. imports of coconut and palm kernel are approximately one billion pounds per year. Commercial production of canola varieties engineered to produce high purity laurate in North America may offer significant supply advantages to major U.S. industrial users.

BRO. ADAM OUSTED AS BEE LEADER

World famous bee breeder Brother Adam of Buckfast Abbey in Devon, England has been ousted from his post in charge of the Buckfast bee-breeding program. Famous for his development of the "Buckfast" queens Brother Adam is in his 90's with failing health and was just beginning a new breeding program to develop a varroa resistant bee.

After attending a conference in France on the Buckfast bee, Brother Adam returned to England to find he was no longer in charge of the apiculture program. The emphasis is being shifted away from queen breeding, which produces some £20,000/year in royalties, to comb honey production which sells well at the abbey gift shop. Commercialization of the Buckfast Abbey has led some local pundits to rename it "Fast Buck Abbey"

BEEKEEPERS EXTRAORDINAIRE

At their annual spring banquet this year The Reverend Clarence and Mildred Bopp were awarded "Beekeepers of the Year" for 1991 by the members of the Eastern Missouri Beekeepers Association. Clarence and Mildred have been active in the association for over 12 years. They were mainly recognized for their willingness to give "bee talks" and promote honey to elementary school children. They are pictured with President Bob Finck – right.

HONEY BOARD NEWS

The Product Research and Development Committee of the National Honey Board is seeking applicants to participate in its expert panel.

The Product Research and Development Committee works on a wide variety of projects – from investigating and developing new uses for honey to protecting and enhancing honey's image. In 1992, research is underway to optimize the use of honey in breakfast cereals, dairy products and meats.

"Scientists and technologists in various fields assist the committee on a regular basis to develop or review technical documents and research proposals," said Bob Smith, executive director for the National Honey Board. "In addition, many projects require involvement from experts in honey production, packing and processing."

It will not be necessary for participants to travel to Honey Board meetings. Participants will be asked to review project documents by mail. To offer your participation, or to nominate someone you know, you may obtain an application from the National Honey Board, 421 21st Ave., #203, Longmont, CO 80501.

USDA NAMES NEW BOARD MEMBERS

Secretary of Agriculture Edward Madigan has announced the appointment of six members and seven alternates to three-year terms on the 13-member National Honey Board.

Board members are appointed to represent seven regions throughout the country for three-year terms. Producers, handlers, importers, marketing cooperatives and the public are represented on the board.

The newly appointed members and their alternates, listed by region, are:

Region 1 – E. Randall Johnson, Nampa, Idaho, and alternate Marjorie Ehry, Dundee, OR.

Region 2 – Larry Krause, Riverton, WY, and alternate Barbara Stockwell, Arivaca, AZ.

Region 3 – John Miller, Gackle, ND, and alternate JoAnne King, Marion, ND.

Region 4 – Stephen M. Klein (reappointed), Marshall, MN, and alternate Donald Folkema, Fremont, MI.

Madigan named Robert G. Appel, Manville, IL to the handler 2 position. David F. McLure, Littleton, NH is his alternate.

Appointed as alternate to the marketing cooperative position is Dewey B. Robson, Carrington, ND.

Appointed to serve as public member is Leslie L. Kuenzi, Portland, OR, and alternate Kelly J. Duffin-Maxwell, Glenview, IL.

Appointees will be installed June 26 at the board's annual meeting. Their three-year term of office will end March 31, 1995, except for the public member and alternate appointments which will end March 31, 1993.

IBRA Improves

JAR GETS NEW LIFE

For nearly 30 years the *Journal of Apicultural Research* has been IBRA's journal for reporting experimental science – becoming respected as a prestigious outlet for publishing scientific studies of bees in general and honey bees in particular.

Now the *Journal of Apicultural Research* has been revamped with a more modern look and a much more readable format. But behind the new image are fundamental changes in management.

An international editorial team now works on this publication. Dr. Thomas Rinderer, research leader at the U.S. Department of Agriculture's Honey Bee Breeding, Genetics and Physiology Laboratory, heads a team at Baton Rouge which selects, reviews and arranges the refereeing of manuscripts, approving only those reaching the required standard of scientific merit. Three staff at IBRA – the International Bee Research Association – in Cardiff, United Kingdom, edit these papers and manage the production of a complete journal from the collection of manuscripts.

"The size of the editorial team will ensure that manuscripts receive prompt attention, regardless of the work commitments of individual editors", said Dr. Rinderer. "Time limits have been set for each stage of the editorial and production process, and combined with an efficient manuscript tracking system, no undue delays will occur."

Andrew Matheson, Director of the International Bee Research Association, welcomes the cooperation between the USDA and IBRA in producing the journal: "The editorial team is committed to bringing our colleagues a journal respected for its quality and the speed of review and production"

Guidelines for authors, sample copies of the journal and information on subscriptions are available to anyone interested, from: IBRA, 18 North Road, Cardiff CF1 3DY, UK.

NORTHERN NEWS

The Canadian Honey Council has called for the federal government to conduct a comprehensive national Varroa Mite survey.

The council's annual meeting was told that the initial discoveries of the mite along the U.S.-Canada border were only the leading edge of the infestation.

The resolution said Varroa had been named as a pest under federal legislation and the central government had an obligation to implement and fund the Varroa survey.

The council also voted to recommend to Agriculture Canada that special permits for the use of formic acid against Varroa be made available through all appropriate provincial departments.

It was also decided that the council will continue to lobby the federal government to fast track the registration of chemicals for control of Tracheal and Varroa mites. A resolution said that with the increasing incidence of Varroa mite finds in Canada, eradication as a control measure may in time become impracticable.

Agricultural Canada, meantime, announced that it would schedule menthol as a means to control Tracheal mite. Food-grade menthol must be used in either natural crystal or synthetic formations.

Menthol will not be allowed during periods of honey production and in the spring its use must be discontinued no later than two weeks before the anticipated honey flow.

It will be allowed after the honey crop is removed and before fall feeding begins.

Meanwhile, the Canadian Honey Council believes that a joint promotion program with the U.S. National Honey Board could benefit producers in both countries.

At its annual meeting, the council voted to investigate – and if the idea is feasible – initiate such a program.

USDA Research Pays Off

COMPUTER SIMULATES COLONY DEVELOPMENT

Honey bee colonies are used by the EPA as bio-indicators of pollution and environmental contamination. However, one problem with honey bee colonies is that factors other than toxins can influence colony population dynamics. Examples of these are diseases, food shortages, weather conditions and, most recently, tracheal mites. Whether environmental contaminants are responsible when colonies fail to thrive in an area was difficult to discern until a tool became available that could predict colony population dynamics. The first computer program to fill this need was BEEPOP which was created by Drs. Gloria DeGrandi-Hoffman, Eric H. Erickson, Gerald Loper, and Mr. Stephan Roth of the USDA-Agricultural Research Service, Carl Hayden Bee Research Center, Tucson, AZ.

Dr. Jerry Bromenshenk of the University of Montana created a personal computer version of BEEPOP and called it PC-BEEPOP. PC-BEEPOP generates daily colony population estimates based upon the exact conditions at a site, and allows users to incorporate additional mortality factors such as diseases, pesticides, and starvation that were not included in the original BEEPOP program. EPA now uses PC-BEEPOP to identify sites that may contain toxins, by comparing actual colony population dynamics with PC-BEEPOP predictions to determine if environmental toxins are impacting colony population growth.

Originally PC-BEEPOP did not include sensitivity to tracheal mites which can have a strong impact on colony population size. To fill this gap in model sensitivity, PC-MITEPOP was created by Drs. DeGrandi-Hoffman and Bromenshenk along with Drs. Lynn Royce of the Oregon State University, and Jeff Pettis of Texas A&M who have done extensive research on tracheal mite biology. PC-MITEPOP simulates the population dynamics of a honey bee colony infested with tracheal mites. PC-MITEPOP uses PC-BEEPOP for predictions of the honey bee colony population size and age structure.

Dr. Bromenshenk has received a grant from the EPA to validate PC-MITEPOP. Dr. DeGrandi-Hoffman is a collaborator on the grant and is responsible for the creation and any necessary modifications of PC-MITEPOP. PC-MITEPOP will provide an additional tool for the EPA that will enable this agency to screen sites suspected of being contaminated and discern whether affected colony population dynamics are a product of tracheal mite infestations, environmental contamination or both.

USDA BIG!

USDA is a huge organization, Sec. of Ag. Madigan says. Its $62 billion annual outlays make it the 4th largest federal department, and its nearly 111,000 staff-year employees make it the 6th largest federal employer. Its annual budget is exceeded by only 17 foreign nations. Its size would rank 4th among U.S. corporations and its credit and lending services would make it one of the nation's largest banks. More than half of its budget supports food assistance programs. Nearly 40 percent of USDA's employees are in the Forest Service, which manages 191 million acres.

Dr. Rob Page from U.D. Davis in California. Also joining the group from the honey bee program at Davis will be Dr. Eric Mussen. Dr. Lynn Royce from Oregon State University will provide a presentation concerning her successful work on controlled queen mating in flight chambers. To give the group a taste of eastern beekeeping Dr. Jim Tew from Wooster, Ohio and Kim Flottum from *Gleanings In Bee Culture* will provide us with the latest views from the Federal Extension Service, and the world of beekeeping publications.

After several years absence, the **W.A.S.** Loyal Order of Bee Beards will return. Social functions will include a traditional Northwest salmon bake and a banquet to be held in the "sky boxes" of the newly renovated OSU football stadium.

The organizers invite all interested beekeepers to join us in August for an exceptional social and educational experience. Please contact Dr. Michael Burgett, Entomology, OSU, Corvallis, OR 97331-2907 for further details.

☆ PENNSYLVANIA ☆

Delaware Valley College will again offer its Summer Beekeeping Short Course – June 25 - 27. The courses are offered under the direction of Dr. Robert Berthold and take place on the campus.

Cost for the Spring course is $50 discounted to $40 for Delaware Valley College students, Alumni, Senior Citizens and immediate family. The cost for the advanced Summer course is $65.

You are urged to register early. For further information contact Dr. Bob Berthold, Delaware Valley College, 700 E. Butler Ave. (Rt. 202), Doylestown, PA 18901-2697 or call (215) 345-1500.

☆ WEST VIRGINIA ☆

West Virginia Honey Festival 12th Anniversary, September 12 - 13, 8:30 a.m. to 6:30 p.m. , Parkersburg City Park, Parkersburg.

There will be a Honey Run Road Race, cooking with honey demonstrations, Bee Beard shows by Steve Conlon, music by the Florida Boys, a "Baking With Honey" contest and auction, a honey and wax show and auction and extracting and equipment exhibits. Admission $1.00 for persons six years and older.

Call or write for further information: WV Honey Festival P.O. Box 2149, Parkersburg, WV 26102 (304) 428-1130 or outside WV call 1-800-752-4982.

NEXT ... Cont. From Pg. 317

But we've taken Erickson's article a quantum leap forward in both application techniques and information. *Bee Culture* staff will have put together a live demonstration of an incident of this type. We'll actually be training a small, local fire/rescue department how to handle a billion bees in the air. We'll be testing a real-world situation, available chemicals, actual equipment and live bees.

And you'll be right there in the front seat. We'll talk to the beekeepers who'll be helping us, the firefighters who will be tackling this problem, local authorities who are responsible for citizens and firefighters, and others involved.

But there's more. This demonstration will be filmed (we hope this works), and the video will be available so other firefighters can view the procedures, listen to the experts and learn how-to, too. Then you can take this to *your* local unit and give them a very needed helping hand.

Next month in *Bee Culture* – Take a Proactive Stand, don't wait for the other guy!

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"I Just Love Bees"

JIM BAYES

My ears strained to pick out where the slight buzzing in my head was coming from. It originated from just beyond the woods full of poplar trees to my left, a little bit beyond the gulley separating the parking lot from the hill. The slope of the hill was full of stickweed that was turning an ash-brown like old newspapers, probably due to the lack of rain.

Beekeeping has been a part of the family even before there was a family. If I remember correctly, it began with my father's grandfather, down in the "hollers" of Eastern Kentucky. In my educated opinion, it should have stayed there.

The two men standing about 50 yards away reminded me of the small fluorescent-white figures one receives with a space shuttle model, ordered from the back of a Marvel comic book. They were pre-occupied with the erect boxes standing about chest-high before them.

The acrid smell of a campfire or a blazing fireplace was light upon the air, and as I flared my nostrils in order to better capture the scent, I saw one of the spacemen removing the thin top from the stack, while the other picked up something that looked like a tea kettle. The spaceman who had picked it up began to wield it in front of himself like a laser gun, but instead of vaporizing the stack before him, he began to pump an organ-like object connected to the rear of the teakettle while moving it back and forth over the top of the boxes like some sort of magic wand.

Pillowy puffs of white smoke began to emerge from the spout of the kettle, engulfing the stack. After approximately 60 seconds of waving and pumping, the larger of the two men reached down into the boxes and pulled out a rectangular slate, a dark brown in the center fading into light yellows around the edges. He held the slate up toward the sun and away from his face, like someone farsighted trying to read a book. Small yellow dots darted and dodged around the green netting surrounding his head. Gingerly he replaced this slate and proceeded to remove and replace what seemed to be at least a dozen more of these, giving each the same type of inspection.

Being done with that, the smaller of the two spacemen turned towards me and made a come-hither motion with his arm. I hesitated for a moment, then slowly ascended the hill. Halfway up, the larger spaceman met me and removed his helmet.

His black hair lay in stringy disarray, each cluster holding a bead of sweat at the end. His horn-rimmed glasses were held together with a strip of duct tape across the bridge, and he spoke in a slightly stuttering accent.

"Well, uh, . Is ya' . ready?"

I laughed dryly and replied that I was ready, but that I didn't think they were ready for me.

He chuckled sort of childishly and spoke quickly, "Shore, uh, they ready for ya'. You see when you get there... you just kinda' hafta' relax a bit."

I found that hard to comprehend, but I went ahead and began to don the off-white jumpsuit he was shedding.

The steam of body heat rising out of it was overwhelming and the heavy denim fabric seemed to be made of lead due to the drenching of sweat it had received. Ridges and cracks had formed at the joints of the elbows and the knees, and had hardened to a point of pliable cardboard. It was easy to tell the gloves had once been white, but the palms and fingers had turned a soot-gray and the fingertips were so stiff that clenching a fist was a near impossibility. A pair of black rubber boots were handed to me and after I placed these over my shoes, I was helped with the drawstrings on the cuffs of the legs and sleeves. These were to prevent any visitors that didn't have my best interest at heart.

As I struggled through nearly 20 minutes of lectures, immense heat, and the unhealthy desire to swat at anything that moved, I finally quipped, "You must sure love honey to put up with all of this."

"Nah," he replied. "Can't stand it. Couldn't eat it even if I wanted to diabetes."

I saw a grin break through the silver netting covering his face as he turned and said "I just love bees."

BOTTOM·BOARD