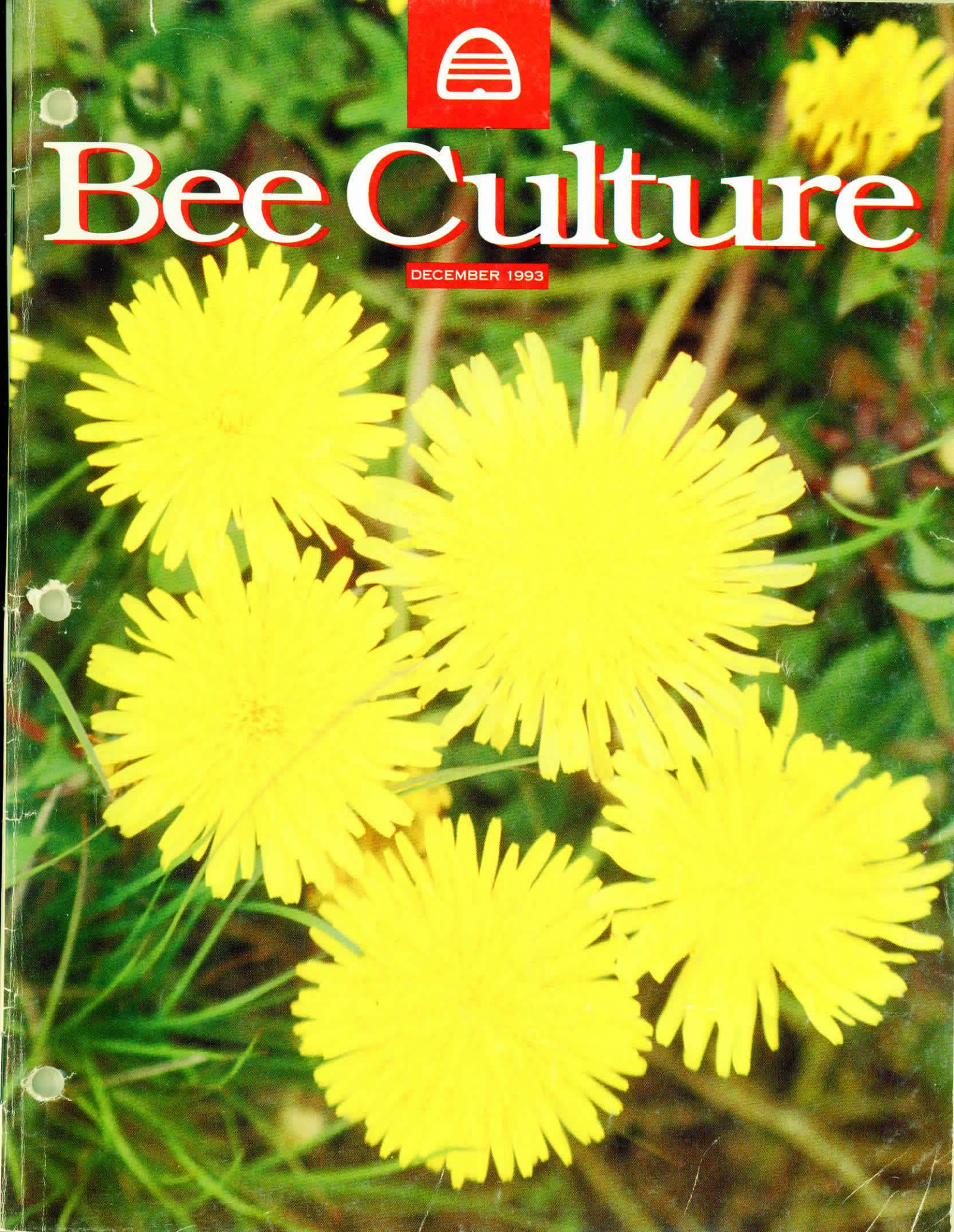

Bee Culture

DECEMBER 1993

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COLUMNS

Research Review
Controlling body temperature may help control disease.
(by Roger Morse)
642

Do You Know?
This first-ever final exam will truly find out 'What Do You Know?'
(by Clarence Collison)
661

Nectar On My Boots
Records.
(by Tom Sanford)
667

Home Harmony
Try this cooking quiz, then enjoy a Christmas treat.
(by Ann Harman)
668

Bee Talk
Times of trouble inevitably lead to times to joy.
(by Richard Taylor)
673

MAIN ALMOND COUNTIES IN CALIFORNIA
(outlined area)

DEPARTMENTS

The Inner Cover
Reader's Survey, ITC stuff, and (maybe) a joint meeting?
(by Kim Flottum)
634

Mailbox
Young beekeepers; Foreign honey; O.B. Wiser; Bee havers.
637

Book Review
Almond Pollination Handbook.
643

December Honey Report
(Field Reporters)
640

Questions & Answers
Nectar sources; Extender Patties; AFB.
(by Richard Taylor)
675

Gleanings
Federation Meets In Orlando; EAS Starts Research Fund;AHB Station Shuts Down.
(News & Events)
681

Word Search
Find the hidden words.
(Corey Smallman)
684

Classified Advertising
Bargain Pages.
688

Bottom Board
Dear Diary. A diary needs no other audience but its keeper.
(by Howard Scott)
694

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VOL 121 ○ NO12

ber '93

FEATURES

Dead Colonies Tell Lots Of Tales
The best beekeepers do not produce the most honey – they lose the fewest colonies. Find out what your colonies died of, and why.
(by Steve Taber)
644

Pollination In Arizona
Unless you happen to live there, most people think only of cactus and mesquite when Arizona is mentioned. Such is not the case.
(by Gladys Bennett)
646

Cell Door
An easy-to-make, and even easier-to-use piece of equipment that makes queen rearing a snap! Try this this spring.
(by Vincent Doyle)
651

Running A Bee School – 2
The nuts and bolts of any Bee School are who teaches it and what they teach. Here are some basics, in picking teachers and course content.
(by Richard Bonney)
657

What's The Point?
Have your ever been stung? Probably the question most often asked beekeepers. How do you answer? Here are all the facts and figures for any of the questions you've asked.
(by Dewey Caron)
665

Honey Defined
For purposes of legislation and regulation, honey now has a legal description. Use this when asked, "What is honey, really?"
(by NHB)
670

Required Reports
No matter how much honey you sell, you need to deal with the Honey Board. Here's how.
(by NHB)
671

Do Pesticides Affect Learning?
Honey bees exposed to pesticides don't always die. But those sub-lethal doses may be just as bad.
(by Carolyn Gonzales)
680

Cover

We thought this bright bit of spring would be far more welcome this month than the traditional shot of several hives covered with snow, or a barren beeyard, sitting forlornly in the rain. It also holds the promise, so dear to all who work with bees, that next season will be better, that next season will find that elusive 200 pound crop.

Enjoy your time off now though, and reflect for a moment on this season, and the holidays.

photo by Kim Flottum

Honey©TM

INNER·COVER

Stitched in the middle of nearly half of our issues this month is a reader's survey. It's our once-in-awhile quest to find out what you like, what you dislike, what you want and don't want in this magazine. But it's more. The answers you give tell us who reads us each month, what kind of beekeeper you are, how you deal with the trials and tribulations encountered on a routine basis, and some of what you do when you're not involved with bees.

It also gives you the chance to give us a grade. Tell us how often you read each of our regular authors and features. Don't be shy, and please, be honest. The more information we have about what you want and what you like, the better equipped we are to publish the exact product you desire. This is your magazine, after all. You pay for it and you should have a say in what you're buying.

Yes, there are a lot of questions, but they're pretty easy to answer. We figure it will take about 10-15 minutes, not very long, really. And, there is a chance to give an additional comment or two. If there's more you want to say than there's room to say it, please do so on a separate piece of paper. This is your opportunity to express some of those thoughts you've always wanted to say, but never got around to.

When you're done, triple fold the sheet (folding that extra sheet inside) so the postpaid part faces out, tape or staple it shut and send it back – on us.

And yes, we'll let you know some of the results down the road, when we finish analyzing all the data. So take a few moments and tell us like *you* see it. And thanks!

If you didn't get a survey and are just dying to fill one out send us a SASE and we'll send one out. But don't delay, we have to have them back by Christmas.

•

Clarence Collison's Questioncolumn is even more challenging that usual this month. It is, more or less, the equivalent of a 'final exam' in the art and science and the craft of keeping bees. If you give our monthly quiz the once over once in awhile this is the one you've been waiting for. If you've a mind to test your skills, or, as Clarence likes to say, to 'Test You Beekeeping Knowledge', take a pencil (or a pen if you're *very* secure in what you know), grab a cup of coffee, sit back, put your thinking cap on and dig in.

Now I'm not going to say there are a few trick questions in this exam, but there are some you need to read carefully. I was, I guess you could say, a bit too sure of myself when I took the test. No, I didn't make a perfect score, but I did get a 'Good' A not-so-easy fact of life is that I don't know it all, yet. (But don't tell my boss, O.K.?)

•

When Congress restructured the honey program so it no longer included a subsidy or a forfeiture option, they added a small but valuable P.S. The International Trade Commission (ITC) was asked to investigate the effect the huge influx of honey from China has had on the U.S. beekeeping industry.

So ordered by the President, the ITC has been vigorous in their pursuit of this information. And, since they have the power of the government and the full cooperation of those most affected behind them, their progress has been significant.

Not without some effort, however. The ITC obtained the names of the biggest producers, producer/packers and importers and sent them lengthy and complicated forms to complete, detailing their business and a plethora of business related questions designed to ferret out any negative effect of Chinese imports.

The surveys establish a baseline of the business in question, looking at labor, production, equipment and all sorts of other costs, and honey and other sales – all from 1990 to the present. Once established, the survey then asks what effect the honey imported into the U.S. from China has had on those already-detailed costs and sales. And then, you have to prove those claims.

Though not impossible, anyone attempting to fill out these forms needs to think like an attorney, and have an MBA from Harvard on call. The form states it should take about 40 *hours* to accumulate the data and fill out the survey. Some producers and producer/packers we contacted said that was an understatement, while others finished sooner. We suspect, though can't verify, that good records help.

There is a finish line to this though. The ITC has a finite amount

Continued on Page 672

Surveys

Reader Assistance

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NEXT MONTH

January, 1994. Seems strange to start thinking of 1994 already, doesn't it? This marks the 125th year the Root Co. has been in business, and the 122nd year we've been publishing this magazine. A milestone of sorts for us, certainly, but an opportunity to offer some terrific information for you.

We'll start with the results of a season-long look at several races and types of honey bees. Last spring we started from packages, colonies of Buckfast, Starline, Carniolan, Caucasian, Italian and two strains of Cordovan. We watched and measured, photographed and manipulated them from packages to wintered-down colonies.

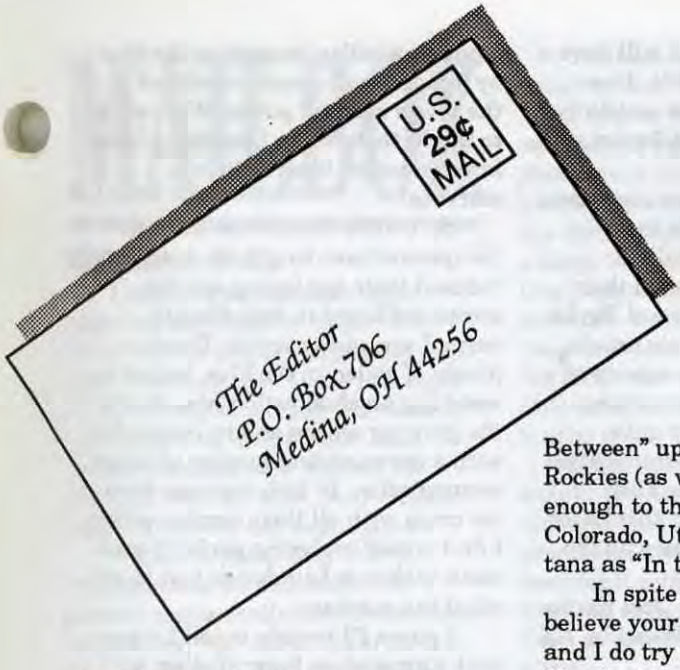
The only way to adequately show the differences in color, style and format between (and among) the different colonies is to offer side by side color shots of bees, comb, cappings and the rest. So that's what we'll do – lots of information and lots of color – 'Races', next month.

Its been awhile since the African Honey Bee first crossed the border in Texas, and the biggest question is – what's happened to beekeeping, beekeepers, honey production, pollination and research since? To answer those questions we sent our Weekender, Jeff Ott, to Mexico and Texas to find out. He's talked to researchers, beekeepers and crop producers and has some answers that will definitely surprise you.

To round out this special issue, we'll take another look at beekeeping in Arizona, this time from the beekeeper's viewpoint – honey production, marketing and more.

Plus, we have a couple of pieces for those just getting started (what better month?), and a sideliner piece that examines a problem we all have.

Next month, January, 1994. More of the best from *Bee Culture*.



MAILBOX

■ Several Things

I, too, object to the renaming of your fine publication from Gleanings in *Bee Culture* to just *Bee Culture*. The new title just isn't enough, but it is your decision.

Here's an editorial comment concerning the reading level and audience of the magazine. Granted the subject matter (beekeeping) is a specialized field, but overall I wish you could do something to make the magazine more amiable to young beekeepers. Your articles seem generally above the reading level of beekeepers aged 10 to 17. I find it very difficult to use selected articles from your magazine to instruct my 4-H children.

Some of the best columns are "Questions and Answers" and the articles on hobbyist beekeeping. Wanted, but of little value, is the column "Do You Know?" I would love to have a "Do You Know?" for children/young beekeepers. Perhaps you would consider a column called "The 4-H/Boy Scout Beekeeper" or "Beekeeping for the Young."

In the October 1993 *Bee Culture*, you had a series of articles entitled "Winter Well." If you superimpose the national maps for the areas you covered, you will note that nearly ALL of the states of Oklahoma, Kansas, Colorado, Utah and some of Nevada are not shaded in. Not a big deal except Utah is the Beehive state. In the future, perhaps you could extend the "In Between" a little westward and the others a little farther, or better yet, extend the "In Between" up to the foothills of the Rockies (as we treat our bees near enough to those out east), and make Colorado, Utah, Nevada, and Montana as "In the Mountains."

In spite of these objections, I do believe your magazine is excellent, and I do try to use it to teach from. Thanks for your time and the excellent magazine!

Miles Raymond
Olathe, KS

Editor's Note: We have investigated the possibility of publishing information aimed specifically at younger audiences because information on the wonder and work of keeping bees needs to be available to those 10 years old and up if our ranks are to be replenished. The problem is finding 1) information presented at the level you describe (even the Boy Scout Merit Badge book isn't aimed at that level), and, 2) an audience large enough to make the effort worthwhile. Our research tends to show a very limited number of users. But we are open to comment. Let us know – is there a need for this level of information? And if so, where is it?

■ Nomenclature No-No?

Having a special interest in the Hymemoptera, I was drawn to the quiz "Do You Know?" by Clarence Collison that appeared in the Oct. 93, issue.

I "buzzed"through the quiz without a problem except for true/false question #9. "Bald face hornet nests and populations are typically smaller than yellow jackets." The insertion of "those of" in the appropriate place would have corrected the grammar but, not wishing to be labelled a "nit picker", I will accept assumed language in the interest of brevity.

There is a problem with the question however. Barring a recent revision, the bald-faced hornet is classified as a yellow jacket, genus Dolichovespula by taxonomists. The given answer to the question addresses this correctly by stating it has larger populations than *other* yellow jackets.

The answer, however, is wrong! The bald-faced hornet and its nests are large but populations are "typically" smaller than those of other yellow jackets.

An excellent publication on this subject is a 1981 USDA publication, Handbook #552 – The Yellow Jackets of America North of Mexico. However it may be out of print.

Perhaps the government printing office, with some strong encouragement will consider an update and new release of this fine publication.

John Gorman
Cross Plains, WI

Editor's Note: John Gorman served as a technician at the USDA Bee Lab in Madison, WI before it closed.

■ Third World Nectar/ Syrup VS. American Honey

Having traveled and observed a bit of third world beekeeping, here are some thoughts to ponder:

1) In an Asian island country there is a saying that goes "There is honey from the stove and honey from the hive, but honey from the hive is used mostly for medicine"

2) In most third world countries, nectar is taken from the hive daily with 30% to 40% moisture, extracted, and then allowed to ferment before drying it by machine.

3) In London, women complained about the black ring around the top of the teacup after tea. The source of the ring was from oxidized steel in the honey that they added to their tea that came from third world countries in unlined drums and tanks.

Continued on Next Page

MAILBOX

Yes, American Honey does cost more. When bees are allowed to cure and cap honey, bacteria will not grow in the honey.

Yes, American Honey costs more, but, so do American trucks, houses and clothing. Have you ever asked yourself why America also has the longest lifespan?

American honey is well worth the extra money it costs. I have seen the conditions in which the other honey was produced in. American beekeepers, hold your head high, America needs your bees for honey and pollination!

An American Beekeeper
G.C. Millet
Millet Pollination
Marsing, ID 83639

■ Missed Opportunity?

I was reading *Gleanings In Bee Culture* 50 years ago and I still have a hard time with the new title. However, I'm writing about the article in the Sept. issue by Richard Taylor and his "Bee Talk" column.

People start telling me about bees from their experience with the electronic media (T.V.). Quite a number of times I have called their attention to just what Richard Taylor called our attention to in his article.

We are missing some aspects of communication which are working among us. I don't think we quite grasp the scope of our communication possibilities, or what is working among us. Richard Taylor, thanks for the article. *"Gleanings"*, keep up the good work.

Joel Kottke
Wassilla, AK

■ Too Much Pollen?

It distresses me when what I see in my hives seems so at variance with the reports of research. I refer to rates of pollen collection and the report reviewed by Roger Morse in the September, 1993 issue.

That report stated that the amount of pollen brought to the hive by foragers was somehow related to the hive's need for pollen. What am I to think, then, when I watch my bees bring in pollen like the hive is starving?

As I write this in late October, the queens have long since drastically reduced their egg laying and the amount of brood is dwindling to normal pre-winter levels. There is plenty of pollen in the hive, judged by watching an observation hive during the growing season and by contending with a never-ending surplus of pollen accumulation. In fact, my bees drive me crazy with all their surplus pollen. I find myself replacing perfectly good comb with new foundation just to get rid of the surplus.

I guess I'll be able to tell for sure next spring when I see whether my expectation of a substantial amount of unused pollen is borne out. Meanwhile, I hope other researchers will not accept Camazine's results without confirmation in a full sized, real life hive.

Dan Hendricks
Mercer Island, WA

MAILBOX

■ Misses O.B.

I was so disappointed, upon renewing *Bee Culture*, to see O.B. Wiser was no longer writing for you. After the September issue I thought about writing to tell you the value of your magazine had, for me, been reduced considerably without his practical articles. Now, your October issue carries the sad explanation.

Is there a possibility O.B.'s writings could be published? Or reprints made available? I would like to purchase reprints of his articles from the March, 1993 though the August, 1993 editions plus any other works O.B. had.

He is missed already. And yes, thanks for the wisdom from one Older But Wiser.

Kerry Cleghorn
Vinemont, AL

Editor's Note: Reprints of any recent article (1985 – present) can be obtained for $1.50 each (including postage). Pre 1985 articles are $2.00 each. Payment must accompany the order. We would be pleased to help.

■ Too Dry Honey!

During a tour of New Zealand beekeeping, I visited a beekeeper, who like Steve Magnant (October Mailbox, page 530), also produced viscous honey (12-16.5%). Advisors G.M. Reid and T. Bryant had solved the problem by directing steam into the extractor, adjusted to produce the desired moisture content based on frequent refractometer readings.

Toge Johansson
East Berne, NY

■ Deeps, or Not

Tom Bertrand's question (Sept., '93 Mailbox) whether to use deeps or mediums for the brood chamber raises once again the oft-asked question. I have not seen commented on the aspect which I regard to be decisive. That concerns the honey arch.

The bees usually construct a honey arch over the brood chamber and I believe this arch is usually the same size whether the frames are mediums or deeps. Thus it consumes a substantially larger proportion of the frame depth in a medium than in a deep. Stated inversely, a much larger percentage of the frame area is available to the queen for brood in a deep than in a medium. This makes a big difference to me. Does it make a difference to the queen? Maybe, maybe not.

I, too, much prefer the lighter weight of a medium super for honey storage. This difference is not so pronounced with the brood chamber because it seldom is full of honey and thus not so heavy as one would expect from considerations of dimensions alone.

Dan Hendricks
Mercer Island, WA

■ Bee Havers

I have a question that I think doesn't fall under *Questions & Answers*. I have yet to come up with the answer. It is what they sometimes call a sixty-four dollar question, one that has no answer.

The question is why do some people keep bees, but don't take care of them? They let the hive fall apart, won't put on any supers, cut the weeds. Don't even think about asking one of them to sell them to you.

We have a humane society that covers almost everything. I have yet to hear something said about it being crule or inhumane, to our most important factor, the honey bee.

Donald Stambaugh
Prestonburg, KY

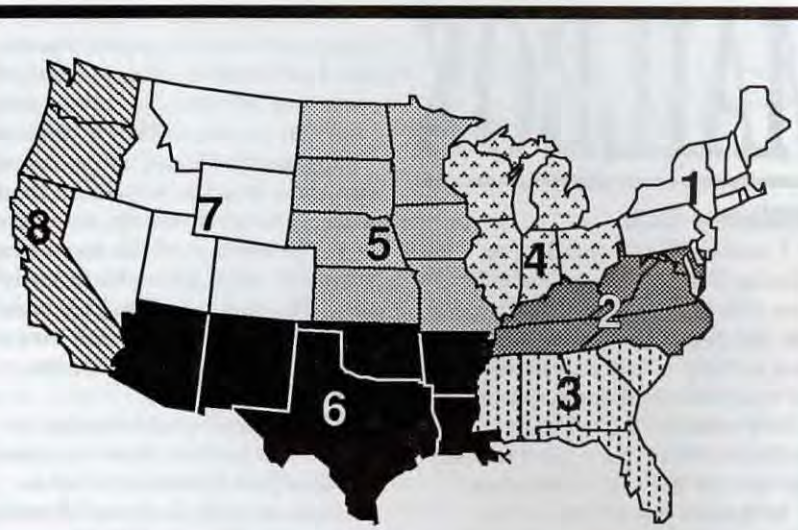
Editor's Note: I think most beekeepers feel the same when they see a neglected hive. However, honey bees don't perceive the situation the same. If they didn't like the accomodations they'd leave. You can't keep 'em if they're not happy.

DECEMBER Honey Report

December 1, 1993

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	Last
Extracted honey sold bulk to Packers or Processors									Range	Avg.	Month	Yr.
Wholesale Bulk												
60 #Light	47.10	45.86	42.00	38.00	37.51	42.55	42.60	39.40	30.60-58.00	43.22	44.85	43.16
60 # Amber	45.48	42.63	34.10	34.73	37.10	42.08	40.55	35.98	26.40-58.00	41.09	41.82	40.02
55 gal. Light	.670	.527	.505	.568	.514	.553	.505	.572	.49-.85	.560	.607	.575
55 gal. Amber	.616	.474	.473	.565	.500	.467	.485	.509	.43-.70	.512	.558	.524
Wholesale – Case Lots												
1/2 # 24's	22.06	23.75	17.83	19.39	17.96	18.08	21.75	18.50	16.00-27.00	20.98	21.93	21.18
1 # 24's	31.40	30.86	27.73	29.95	29.00	33.74	29.25	28.00	25.20-37.68	30.98	31.03	30.44
2 # 12's	29.16	29.39	25.57	27.70	25.08	27.00	28.74	30.36	22.80-32.00	28.72	30.20	28.05
12 oz. Bears 24's	29.06	28.67	28.39	25.08	26.10	24.67	27.35	22.74	20.00-38.00	27.18	27.87	26.92
5 # 6's	31.34	27.42	27.88	30.30	29.04	28.66	28.61	28.85	24.96-38.00	29.59	30.28	30.16
Retail Honey Prices												
1/2 #	1.19	1.56	1.13	1.14	1.04	1.20	1.15	1.01	.94-2.25	1.21	1.06	1.17
12 oz. Plastic	1.56	1.65	1.60	1.44	1.58	1.74	1.55	1.44	1.20-2.00	1.60	1.63	1.54
1 #	1.73	1.87	1.72	1.84	1.74	1.94	1.82	1.84	1.43-2.29	1.79	1.80	1.73
2 #	3.25	3.34	3.08	2.94	2.81	3.18	3.05	3.15	2.49-3.98	3.16	3.14	2.98
3 #	4.74	4.64	4.10	4.47	3.92	4.26	4.33	3.89	3.50-5.55	4.29	4.25	4.44
4 #	6.21	5.29	5.41	5.35	5.68	5.67	5.36	6.32	4.95-9.40	5.77	5.86	5.16
5 #	7.47	6.70	5.95	6.37	6.54	5.80	6.25	6.15	5.40-8.75	6.50	6.51	6.69
1 # Cream	2.18	2.70	2.52	1.84	2.31	2.62	2.33	2.86	1.54-3.49	2.52	2.52	2.16
1 # Comb	3.35	3.18	3.42	3.41	3.25	3.70	3.43	2.95	2.45-4.50	3.31	3.48	2.82
Round Plastic	2.53	2.53	2.92	2.10	2.13	3.40	2.35	2.85	1.99-4.00	2.78	3.05	2.46
Wax (Light)	2.03	1.34	1.58	1.55	1.51	1.84	1.38	1.40	1.10-3.50	1.61	1.72	1.63
Wax (Dark)	1.42	1.21	1.18	1.29	1.29	1.34	1.14	1.15	1.00-1.95	1.23	1.25	1.37
Poll. Fee/Col.	36.00	23.50	23.50	33.50	28.33	27.50	30.00	32.00	22.00-40.00	31.50	30.38	28.46

MARKET SHARE

The ITC hearing happens on Dec. 2, 1992. The industry will hold its collective breath until sometime in February to see what results NAFTA, GATT, the EC, the AFTA, the Loan Program, the Deficit, and internal politics will decide who gets what.

It's the last one that worries MS the most. Stay tuned. Meanwhile, prices are sliding down, wholesale, and inching up, retail. Is there no justice?

Region 1

Sales steady to strong in the retail market, but wholesale prices all over the map due to imports, increasing demand and an only adequate crop. *Varroa* mites only a minor problem, as most are treating, or not in business.

Region 2

Sales and prices steady to strong. Seasonal demand promises to push prices even higher. Generally good crop, but fewer beekeepers and reduced supply. *Varroa* widespread, some treating, some not.

Region 3

Sales increasing and prices steady to picking up a bit. Demand, especially for lighter crop strong. Even the good crop probably won't be enough. *Varroa* problems steady, but most treating so it is kept in check.

Region 4

Sales and demand slow to steady, with prices weak, and, probably getting weaker. ITC and loan program results will be felt here, and many waiting to see what happens. *Varroa* has taken out many hobbyists and many are not restarting.

Region 5

Generally poor season seems to have helped sales and prices. Demand strong, really strong at retail level, and prices are going up. Wholesale market seems steady to average, but imports not affecting retail much. *Varroa* under control when treated. If not no bees!

Region 6

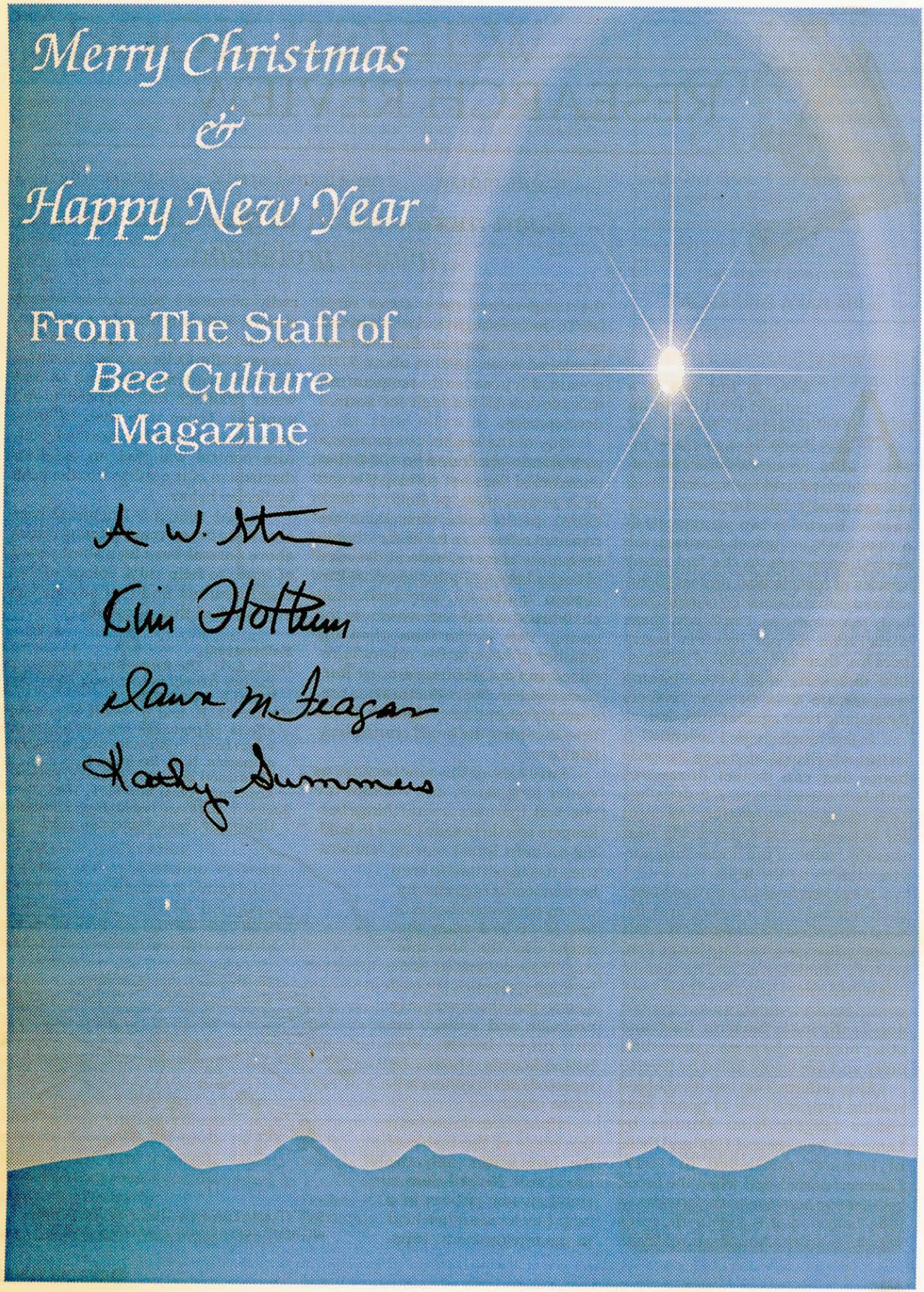
Prices and demand and sales steady. Wholesale not strong because of import competition, but retail picking up seasonally. Specialty crops doing well. *Varroa* rampant in the region. Rigorous control needed, along with strong wintering program.

Region 7

Sales and prices steady as the season begins to pick up. Large producers waiting to see what market will do. Retail faring O.K. *Varroa* hot in some areas, nonexistent in others. Treatments applied accordingly.

Region 8

Without doubt the most interesting region of the country. Lots of honey this year and lots of imports as usual have made a crazy market. Retail not doing too bad, but wholesale a mess. Pollination next year making news, as is mite control and burned-out beekeepers.


Merry Christmas
&
Happy New Year
From The Staff of
Bee Culture
Magazine
A. W. Ahn
Kim Flottum
Clare M. Teague
Kathy Summers

RESEARCH REVIEW

roger morse cornell university ithaca ny

Even more reason to give your bees winter protection.

A fever in humans is a natural reaction to an infection. When our body temperature increases we suffer but microbes such as viruses, bacteria, fungi etc. are usually killed and we usually survive. Buried in two paragraphs in a new book on insect diseases are several references to the fact many species of insects also protect themselves against disease by raising their body temperatures. Curiously, these paragraphs do not mention honey bees but there is a wealth of information indicating high brood rearing temperature in a beehive protects developing bees against infection.

A few weeks ago I attended a lecture which indicated even the lowly house flies can protect themselves with behavioral fevers. A fungus has been used as a biological control agent for houseflies. However, using heat therapy, some of the house flies survive attacks by the fungi.

It has long been known that higher than normal body temperatures (fevers) protect a wide variety of animals against disease including birds, fish, reptiles, amphibians, and mammals. There are limits as to how high temperatures an animal can survive but apparently many bacteria, fungi and other microbes have even more difficulty and are easily killed by fevers.

Our information on the brood rearing temperatures of honey bees comes largely from studies by Lammert done around 1900 and those of Himmer published in 1927 Lammert stated that when the brood rearing temperature in the brood nest falls below 93.2°F (34°C) the bees start to raise the temperature. When the temperature rises above 95°F (35°C) the bees begin to cool the brood nest. Himmer observed that few bees developed below 28°C or above 37°C presumably because the temperature was too low or too high for normal development.

One of the overlooked papers is by Maurizio who found (in 1934) that chalkbrood does not develop if brood nest temperature is held at 95°F (35°C). At the same time, there are repeated references to the fact that in temperate climates several diseases of honey bees including nosema, European foulbrood, sacbrood, and chalkbrood are all more serious in the spring. This is the time when the number of bees in the colony is reduced and outside temperature fluctuates widely. These fluctuations presumably make it more difficult for the bees to control the brood rearing temperature.

I write about this now because as winter progresses, and colonies are checked, there are several things beekeepers can do to assist bees in holding an even brood rearing temperature. It is important to keep bottomboards high and dry. Colony entrances should be free of ice and snow that might cool the hive interior. This can best be done by tipping colonies forward a bit so that the covers may protrude and protect the entrances below. Wet bottomboards should be replaced with dry ones early in the spring.

Honey bees do not keep the whole of the inside of the hive warm, only the brood nest. Nevertheless, a small cluster of bees in a large hive looses much heat to the environment, especially when the bees are in several supers. Reducing hive entrances during the cooler parts of the year reduces drafts. Colonies should be wintered in locations with good air and water drainage and exposed to full sunlight. Those who wish to know more about honey bee nest temperature control will find an excellent discussion of the subject in the book by Seeley below.

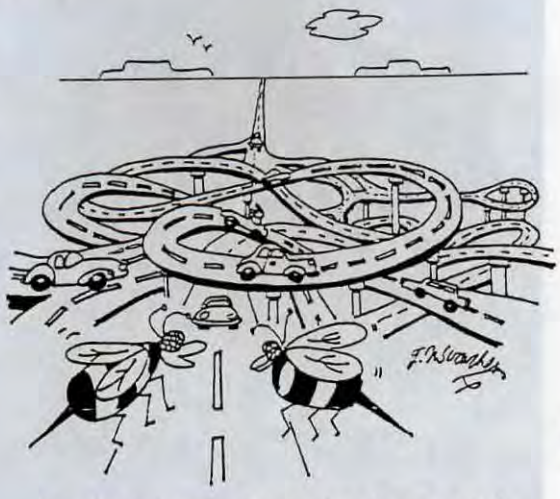
A last thought. Do honey bees ever raise brood rearing temperature above normal, even for a short period of time, to help rid a colony of disease? I cannot find that anyone has ever studied that question!

References:

Betts, A. D. *The temperature economy of the bee colony. in* Our book shelf. Bee World 5: 91-92. 1923.

Horton, D. R. and J. Moore *Behavioral effects of parasites and pathogens in insect hosts. in* Parasites and Pathogens of Insects. N. E. Beckage, S. N. Thompson and B. A. Federici, Editors. Academic Press, New York. 1993.

Seeley, T. D. *Honey bee Ecology.* Princeton University Press, Princeton. 1985.

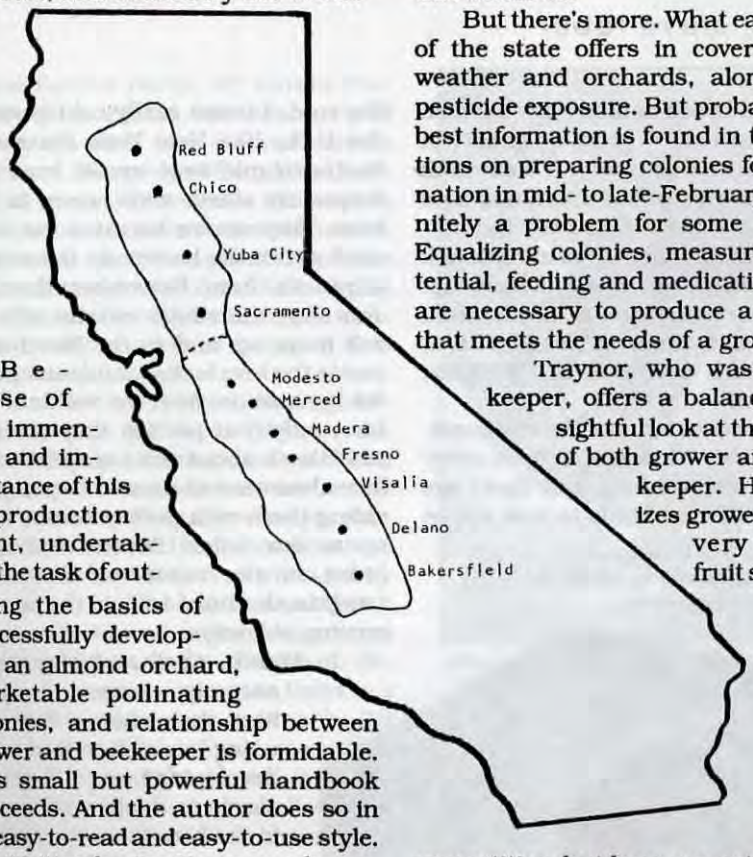


"ISN'T IT AMAZING HOW THEY FIND THEIR WAY WITHOUT PERFORMING A WAGGING DANCE."

BOOK REVIEW

Almond Pollination Handbook, Joe Traynor 86 pgs. Soft. $7.00pp.

Between the 1950s and '80s, California's almond industry went from 90,000 to 400,000 acres. Approximately 800,000 colonies are needed to pollinate this crop each spring, half of which come from out of state. This annual event is unsurpassed in the history of the beekeeping industry, and without doubt points toward the future of beekeeping and crop production in the U.S., and eventually the world.



Because of the immensity and importance of this co-production event, undertaking the task of outlining the basics of successfully developing an almond orchard, marketable pollinating colonies, and relationship between grower and beekeeper is formidable. This small but powerful handbook succeeds. And the author does so in an easy-to-read and easy-to-use style.

Written by Joe Traynor, who operates a pollination and agricultural consulting service in Bakersfield, CA, this book explores, in easily understood language requirements and responsibilities of almond grower and pollinator.

It discusses how and where to hire the right strength colonies, and what beekeepers need to do to get them to the right strength. Given several options, cost is also discussed, along with contracts.

Distribution for optimum fruit set, colonies/ac., competing bloom, placement and removal timing, bee activity and other fruit set considerations are discussed. It is made crystal clear that good fruit set requires bees, but poor set is not always due to poor pollination.

The beekeeper's perspective is somewhat different, even though the goals are the same.

Traynor addresses making contracts, existing regulations (both into CA, and back home), and information sources. Definitely worth checking out if you're interested in pursuing this business.

But there's more. What each part of the state offers in cover crops, weather and orchards, along with pesticide exposure. But probably the best information is found in the sections on preparing colonies for pollination in mid- to late-February – definitely a problem for some outfits. Equalizing colonies, measuring potential, feeding and medicating – all are necessary to produce a colony that meets the needs of a grower.

Traynor, who was a beekeeper, offers a balanced, insightful look at the needs of both grower and beekeeper. He realizes growers need very high fruit set to be competitive, but bees are not always responsible if that doesn't occur. He also realizes growers need their money's worth when renting colonies and what a colony is worth.

Even if you never intend to truck bees to CA, but do pollinate crops, this book will serve you well. And, perhaps even better, $4.00 of the $7.00 cost is donated to mite research. What could be better?

To order, send $7.00 to Kovak Books, P.O. Box 1422, Bakersfield, CA 93302.

Kim Flottum

DEAD COLONIES TELL LOTS OF TALES

steve taber

When colonies of bees die you need to examine them closely to determine the cause of death. Doing this will make you a much better beekeeper because when you know why a colony died you will know you made a mistake and will be able to avoid such mistakes in the future. In late September I picked up a dead colony which gave the appearance of being killed by mites. How did I know? I had removed honey four weeks ago and assured myself that all colonies had sufficient honey for winter stores and I had inserted Apistan strips.

The first thing I noticed on examining the dead unit was all honey had been robbed out, there was no dead brood, and there were no dead bees on the bottom board.

Conclusion: First, the bees had absconded. Second, there wasn't evidence of dead brood so no disease was present. Remember though at this time of the year yellow jackets will remove any dead brood but they can't clean out brood killed by AFB whose dried up scales will be easily seen on the bottom of cells in the brood nest. If the queen had failed, laying workers would have developed and bees would have built elongated cells to hold developing drone brood in worker cells.

Fortunately I arrived on the scene just as wax moths were beginning to attack the combs but hadn't destroyed anything. Too often this occurs and brood combs have been so mutilated that a good diagnosis of death cannot be made. If wax moth larvae have destroyed the combs send a sample of the debris from the bottom board for disease examination. If AFB killed the colony it will show up. Send your sample to: H. Shimanuki, Beneficial Insects Lab, Bldg. 476, BARC-East, USDA ARS, Beltsville, MD 20705.

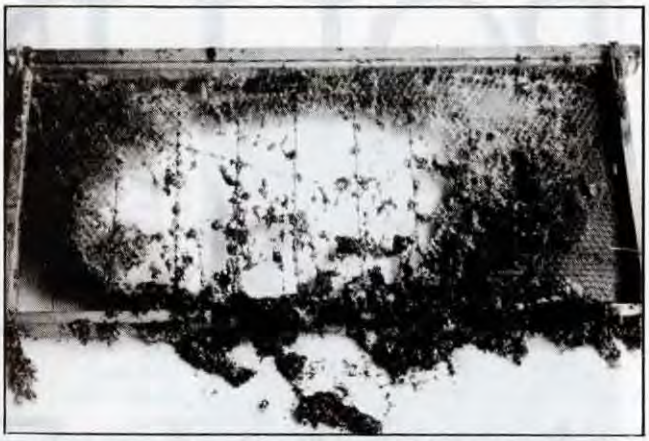
Starvation is one of the most common causes of death of bees every place I have worked, and there are several different kinds to look for. In the cold, I mean really cold parts of the U.S., like New York State and Northern mid-west areas, bees will frequently starve with honey in the hive. They starve because the bees can't get to the honey. As the winter advances from December through January, the winter cluster of bees will move up and to the Southwest inside the hive bodies. And remember the bees do not heat the inside of the hive, only that portion they occupy. Also think about the bees restricted lateral movement caused by you providing them with perfect combs with no or few holes. Several half-inch holes in the center of Standard Langstroth combs will aid the bees in moving sideways.

There are few things sadder than finding an empty colony on first inspection.

In March, April and May, bees not only consume honey to heat their cluster they are using lots of it to feed their developing brood. They can starve to death with honey in the hive then, too, for the same reason. This is why an early spring colony examination is so useful in spotting colonies that still have honey but has it located away from the brood nest. This is the time to move combs of honey from a colony with lots to those with less, or, as a last resort, feeding sugar syrup.

In the more southern states bees are more active during the winter and consume as much honey as

Finding a landing platform littered with dead bees is always a gut-wrenching experience. However, careful examination of what's left inside can help prevent the loss from occurring in other colonies.



Even a frame chewed out by wax moth can tell some tales. Don't automatically discard it.

those further north. My former Professor, C. L. Farrar, left 90 pounds of honey on each hive he wintered in Madison, Wisconsin. I found that leaving 90 pounds on colonies wintered in Louisiana or Arizona was not too much to provide good bee populations the following spring. One full depth Langstroth brood chamber will contain 50-60 pounds of honey if it is completely full.

Another type of food shortage frequently seen is not complete starvation, but only partial starvation. When it comes to survival bees are really pretty smart. They know when supplies are short and begin to take steps to aid their survival, even when honey is still left in the hive. This condition is usually noticed in the spring when beekeepers want the maximum development rate ongoing, so there is a maximum population in time for the honey flow. With partial starvation the bees first eat the drone larvae and pupae and then expel adult drones from the hive. Then they begin to eat the worker larvae and last, just before they succumb, they will eat the worker pupae. There is much written about "stimulative feeding" sugar syrup to enhance spring brood development. This feeding does not stimulate colony development at all, but prevents partial starvation by having the bees put sugar syrup in combs around the brood.

There are many areas that experience pollen shortages during March and April, too. This also prevents proper colony development. This was especially true at Madison, so every spring colonies received a pollen supplement. During summer if a pollen shortage exists it will cause severe dwindling of populations. So much so that in places like Louisiana and Texas some colonies actually died before pollen again became available in the fall. This initiated a great debate among beekeepers and was termed "disappearing disease"

When examining a colony look at bees, brood, the queen, honey, pollen and signs of disease, to avoid finding another dead colony.

It is thought by many experts that mites do not directly kill bees but rather the feeding wounds permit entry of microorganisms. Another thought is that the mites so irritate the bees they abandon their home and abscond. This would happen when the hive was invaded by the imported fire ant. That ant doesn't bite or sting but when enough of them get into the hive the bees will abscond.

Up until 100 years ago all beekeepers considered the wax moth to be the worst bee pest. Then 60-65 years ago the beekeepers in England thought the internal parasitic mite was the worst of all diseases. Then, in America, AFB was declared public enemy Number One. The internal parasitic mite caused lots of trouble for a few years but it looks now as though resistance to it has developed. Now it is the varroa mite that is the main problem. It kills most colonies unless treated with a miticide but there are signs of resistance developing to that mite too.

To summarize. When a colony is found dead or so reduced in population it will soon die, take it apart and examine all combs carefully to try and determine the cause. After you have made the best evaluation you can consult with local, experienced beekeepers so you can correct your error and become a better beekeeper. The best beekeeper does not produce the most honey, they lose the fewest colonies.

Steve Taber is a retired USDA Honey Bee Researcher, now living in France. He is the author of 'Breeding Super Bees'.

POLLINATION Is Big Business In ARIZONA

gladys jenkins bennett

Honey bee pollination is often the difference between success and failure of many crops. Without pollination, these crops would fail because cross pollination is necessary for their productivity. Pollination also greatly increases the yields of many other crops. However, some crops are detrimental to the bees because of the necessity for aerial spraying to eliminate the pests which destroy the crop. Cotton is an example of this type of crop. The beekeeper must work closely with the farmer to ensure that his bees are protected while in these fields. Many beekeepers believe they lose too many of their bees to even consider pollinating these fields because of wind drift of chemicals from nearby fields.

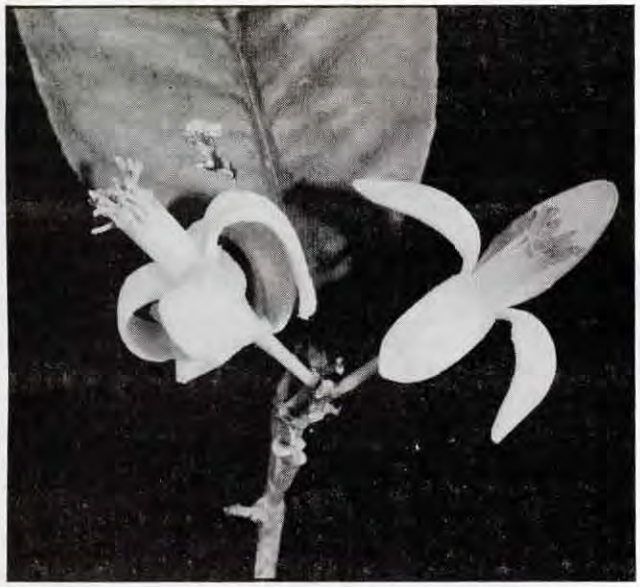
Pollination also varies according to the particular areas where crops are grown. Nowhere is this more true than in Arizona, where crop pollination is not uniform because the state is a land of contrasts. It ranges from the arid desert where the only thing that grows is mesquite, to irrigated farms where crops can be grown both summer and winter. It includes higher, cooler climates where apples can be grown profitably, then up to cold, mountainous country where commercial crop farming is not a practical consideration but where abounds the 18-mile abyss of the Grand Canyon and red rock, vegetation free mountains, the painted desert, petrified forest, and giant rock needle-like formations – which all preclude crop growing.

Since dense population is incompatible with huge beekeeping operations, beekeepers usually seek less densely populated, desert type areas. This often necessitates transporting colonies onto farms that are at a considerable distance from the apiaries. The distance involved between beekeeper and large farming operations sometimes requires huge semi-trucks and trailers to transport the colonies to the farms which need pollination. In some cases, beekeepers truck their bees into other states to pollinate crops there. A large operation in the Flagstaff region, for example, trucks bees into the almond orchards of California because Flagstaff is situated in mountainous country and no large scale crops needing pollination are grown in that area. Beekeepers in the Parker area, near the California border, also truck their bees into the almond groves of California, although they also pollinate crops on lands leased from the Native Americans grown on the reservations, and on other commercial farms in the area.

Arizona possesses about one-seventh of all Native American Indian tribes in the United States. Among the Native American reservations in Arizona are the Apache, Gila, Havasupai, Hopi, Hualapai, Kaibab, Navajo, Papago, Pima, and San Xavier. Many of these reservations are desert and abound with mesquite, but some have fertile, tillable land, which farmers lease and on which they grow crops that need to be pollinated. Mesquite honey is very popular and some beekeepers pay Native American reservations a $1.00 per colony fee to place their bees where they can make mesquite honey. Many beekeepers believe the fee makes it unprofitable for them to place their colonies on reservation lands, though mesquite itself is not a crop. Where the farmers lease reservation land to grow crops which require pollination it is necessary to bring colonies onto reservation lands but a $1.00 per colony fee is still required. Enough beekeepers believe the reservation is entitled to their share and willingly pay the required fee for crops needing pollination to make leasing land for farmers to grow crops on certain reservations worthwhile. The farmers arrange to bring bees into the fields to pollinate, but the beekeeper pays the fee to the reservation.

Beekeepers have to take all these factors into account when planning their pollinating schedules. Arizona's most productive pollinated crops are alfalfa, apples, cantaloupe, citrus, cotton, honeydew and watermelons.

The largest acreages of alfalfa are located in Maricopa, La Paz, and Yuma Counties. Maricopa leads with 44,000 acres, La Paz is second with 38,500, and Yuma follows with 32,000 acres. Alfalfa is cut several



Primarily grown in Maricopa and Yuma counties, citrus crops provide a specialty honey that beekeepers seek. This grapefruit blossom is a typical citrus flower. (Lovell photo)

Cotton provides a mixed blessing - a good honey crop can be made, but the opportunity for pesticide exposure is high. Rental prices range from $12 $25. (Casey photo)

times a year and the first cutting is generally made before the crop blooms. The first alfalfa bloom date in Arizona is in March. At each alfalfa blooming time, colonies of bees are moved into the fields. Pollination is not the goal, however. Honey is. Farmers are normally not charged for the bees being trucked into the alfalfa fields. Instead, the farmers are paid, (usually with honey), for the privilege of allowing the bees to visit the bloom.

In addition to alfalfa, citrus acreage is one of the leaders in attracting beekeepers. Citrus honey, especially orange blossom, is especially popular. In Maricopa County alone there are 31,000 acres of citrus orchards. Yuma County is second with 24,250 acres. Beekeepers provide honey to the citrus growers for allowing their colonies to be placed in orchards during bloom. (See Table).

Melons, that is watermelon, cantaloup, and honeydew, bloom in April or May, depending on when the farmer plants the crop. Melon crops are grown in Cochise, Greenlee, La Paz, Pinal, Maricopa, and Yuma counties. There are 26,000 acres of melons grown in Cochise County, 6,600 acres in Maricopa County and 3,300 in Yuma County. Melons are also sometimes grown on leased reservation land. Prices per colony for pollinating these crops range from $12 to $20 depending on proximity and difficulty in moving colonies into the field.

Melons of several varieties are grown in Arizona and all require honey bee pollination for fruit set. Rentals range from $12 20. (Flottum photo)

Apples, on the other hand, according to beekeeper Scott Hawkins who pollinates apple orchards in Graham County, actually decrease honey production. In order to profit from pollinating apples the farmer has to pay the beekeeper to place bees for pollination. Some beekeepers feed their bees one to two gallons of syrup in each hive to help them grow and produce while they are pollinating apples. The larger commercial apple growers are confined to Graham County, although there are a few scattered, small, apple orchards in the Sedona/Oak Creek Canyon area which is located between the greater metropolitan Phoenix area and Flagstaff. Hawkins's average charge to farmers for pollinating apples in Graham County is $16.00 per colony. Once again, prices depend on distance required to transport colonies to the orchards and difficulties involved.

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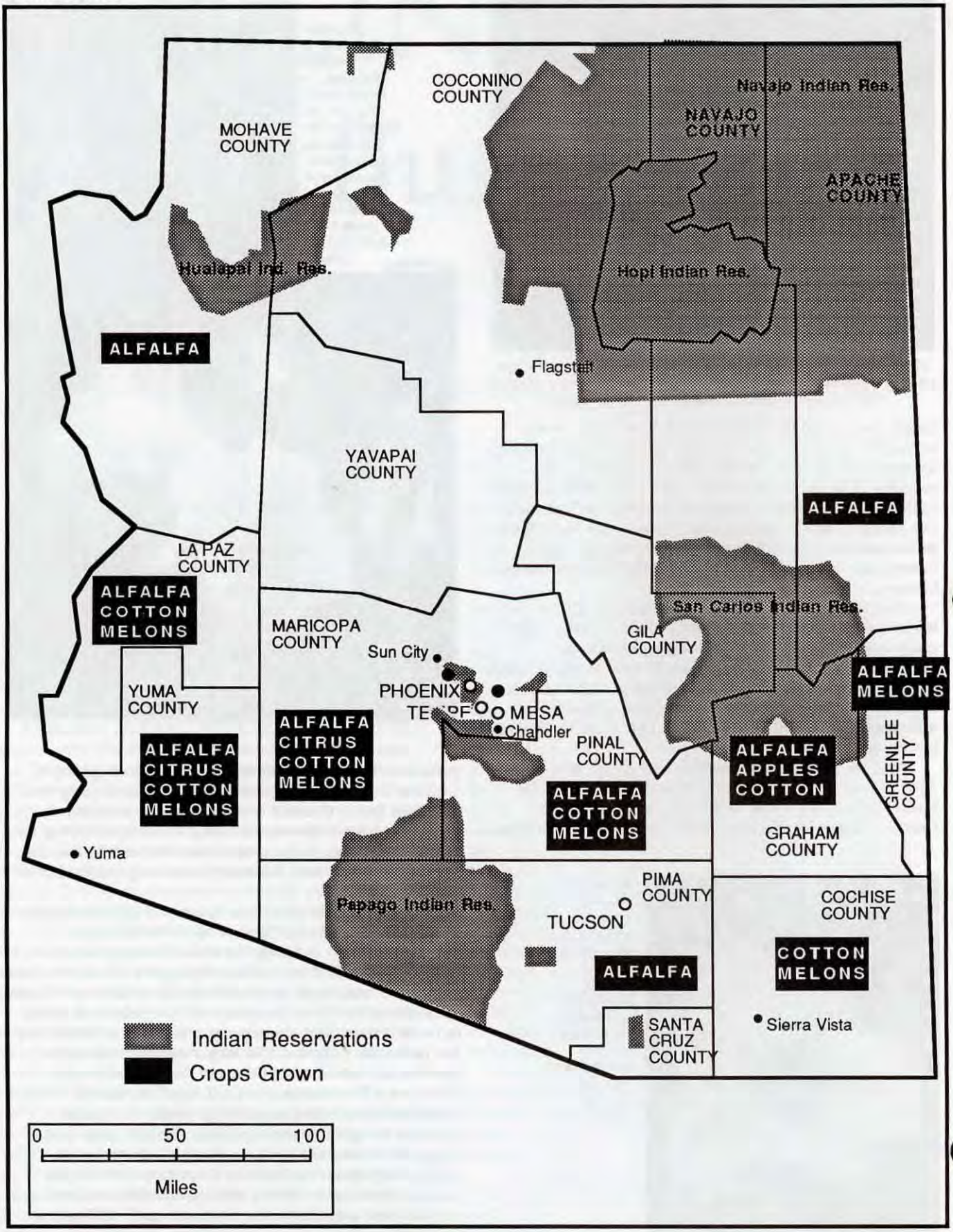
Arizona


COCONINO COUNTY
Navajo Indian Res.
NAVAJO COUNTY
APACHE COUNTY
MOHAVE COUNTY
Hualapai Ind. Res.
Hopi Indian Res.
ALFALFA
Flagstaff
YAVAPAI COUNTY
ALFALFA
LA PAZ COUNTY
ALFALFA COTTON MELONS
San Carlos Indian Res.
MARICOPA COUNTY
Sun City
GILA COUNTY
ALFALFA MELONS
PHOENIX
MESA
Chandler
YUMA COUNTY
ALFALFA CITRUS COTTON MELONS
ALFALFA CITRUS COTTON MELONS
PINAL COUNTY
ALFALFA APPLES COTTON
GREENLEE COUNTY
ALFALFA COTTON MELONS
GRAHAM COUNTY
Yuma
PIMA COUNTY
COCHISE COUNTY
Papago Indian Res.
TUCSON
COTTON MELONS
ALFALFA
SANTA CRUZ COUNTY
Sierra Vista
Indian Reservations
Crops Grown
0
50
100
Miles

Actually charges for pollinating any crop range according to the distance the colonies have to be transported and to how much benefit the pollination of the crop is to making honey. See the Table showing crops, bees, charges and acreages of pollination.

The three largest commercial farming counties are Maricopa, La Paz, and Yuma, all with extensive operations and irrigated farmlands. The areas are fertile, irrigated desert land in an area where winters are mild and two crops can often be successfully grown during the year on the same ground. For example, hot weather crops like cotton or okra, and a cool weather crop like lettuce might alternate because Arizona's winter weather is warm enough for mild weather crops to grow.

Maricopa, Cochise, Greenlee, La Paz, and Yuma counties all have farms growing melons, citrus, and alfalfa, requiring or benefiting from pollination. These counties also produce cotton which pollination benefits. How many colonies of bees are placed into the fields depends on the individual farmer. These crops require a general range from 1.5 to two colonies per acre, with an average of eight frames per colony.

There are, of course, smaller vegetable or fruit farms which require pollination but are not large enough to be included. For example, cucumbers, squash and plums are pollinated on a very small scale. The last published Arizona statistics shows 14 acres of plums grown in the state. There are probably more. Arizona has many small roadside stands where vegetables and fruits are sold during the season. Few colonies are needed to pollinate these crops, and although pollination occurs, we have not dealt with these small acreages here.

There are 428,000 acres of cotton grown in Arizona. Pinal and Maricopa counties head the list. Pinal has 158,500 acres of cotton, Maricopa has 146,000 acres. However, because of the necessity of frequent spraying for boll weevil and other pests beekeepers often refuse to take their bees near these crops. There is no doubt, however, that cotton produces a higher yield if the blooms are pollinated. In certain instances, the grower and beekeeper will agree that the farmer will notify the beekeeper when to remove the bees so they can spray their fields. Still, many beekeepers believe they lose too much to even consider pollinating cotton, even when farmers cooperate to let them know the crop is to be sprayed. This is because spraying on neighboring farms causes them to lose bees . . and colonies. But others will truck their bees in and out to benefit the farmer. They take the spray factor into account and believe it is mutually beneficial to assist the farmer to obtain a better yield. Prices received from farmers per colony range from $20 to $25.

Gladys Jenkins Bennett is a free lance writer on assignment. She lives in Queen Creek, Arizona. She writes for various newsletters and was Managing Editor for 'School Science and Math' magazine.

CROPS POLLINATED IN ARIZONA

COUNTY	CROPS	BLOOM DATE	COL/AC	$/COL	ACRES (000'S)
Apache	Alfalfa	March	2	No fee	1.7
Cochise	Melons	Apr/May	1.5 to 2	$12-20	26
	Cotton	May-Aug	2	$20-25	16.1
Graham	Alfalfa	March	2	No fee	3.5
	Apples	Mar/Apr	2	$16. ave.	4.5
	Cotton	May-Aug	2	$20-25	24.6
Greenlee	Alfalfa	March	2	No fee	3.3
	Melons	Apr/May	1.5 to 2	$12-20	–
La Paz	Alfalfa	March	2	No fee	38.5
	Cotton	May-Aug	2	$10-25	35.9
	Melons	Apr/May	1.5 to 2	$12-20	–
Pinal	Alfalfa	March	2	No fee	11
	Cotton	May-Aug	2	$20-25	158.5
	Melons	Apr/May	1 to 3	$12-20	–
Mohave	Alfalfa	March	2	No fee	6.5
Maricopa	Alfalfa	March	2	No fee	44
	Citrus	March	2	No fee	31
	Cotton	May-Aug	2	$20-25	146
	Melons	Apr/May	1.5 to 2	$12-20	6.6
Pima	Alfalfa	March	2	No fee	1.6
Yuma	Alfalfa	March	2	No fee	32
	Citrus	March	2	No fee	24.25
	Cotton	May-Aug	2	$20-25	25.6
	Melons	Apr/May	1.5 to 2	$12-20	3.3
Reservations	per lease of farmer	varies	varies	same as above	varies per lease

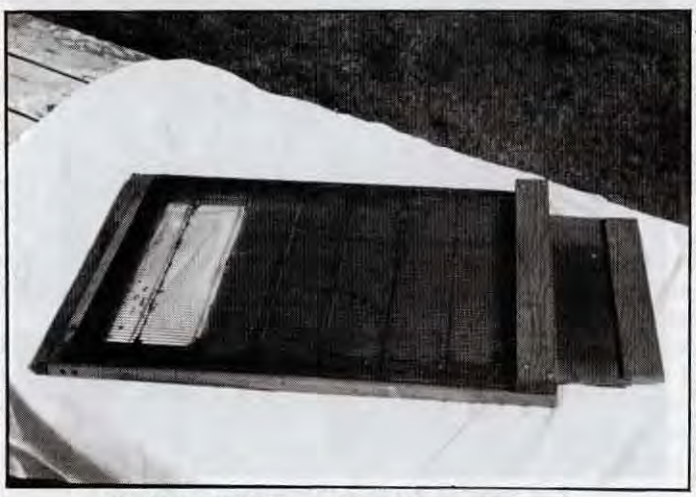
CELL DOOR

If you're raising queens next spring, this handy piece of equipment may make life easier.

vincent doyle

Shaking bees to fill swarm boxes in the spring when the weather is foul can take all the fun out of beekeeping. It is not a pleasant rainy-day task. But here in the Pacific North-West, that's the rule not the exception. If you raise queens here you learn to put up with it. Honey producing colonies suffer from the constant manipulations and build up slowly. You soon get resigned to the fact that you can have queens or honey but not both. You cannot expect the same colonies to produce both queens *and* honey. Or can you?

H. Cloake, a New Zealand queen rearer has a system that can do it. He produces thousands of queens for his apiaries in just six weeks and conditions in the far south of New Zealand in the early spring are similar to ours; wet, windy and cool. I figure he should know what he's talking about. I tried it. It works.



"Cell Door" Bottom view - slide part way out.

It's a fine idea and I'd like to share with you the essentials and some of my own experiences using it.

The heart of Cloake's system is a division board which comprises a simple open-ended frame of 3/4" x 1-3/4" (2 cm x 4.5 cm) pine stock which mounts a queen excluder and a thin slide. When in place, the slide makes the upper hive body queenless; and, when out, makes the whole hive into a queenright colony again.

Yes, that's right . . a special division board that works horizontally instead of vertically. And that fact makes a big difference *because you operate it from outside the colony.*

Here's a division board you can *operate from outside the colony* and change it from queenless to queenright in a jiffy. If there's one point of agreement among queen-rearing experts it's that cells are best started under the emergency impulse of queenlessness, and finished under the supercedure impulse in a queenright colony. That sounds reasonable to most breeders.

When in use, the queen excluder of the division board covers the brood nest, and the starter-finisher rests on top of the unit that accepts the slide. From the time that you put the bar of grafted cells into the colony until the time you harvest the ripe cells your only task is to operate that slide. In – queenless. Out – queenright. That simple.

When you try any new system you are skeptical, right? So the system is simple, but, you ask, will it produce quality queens? When you try it you will see that every cell is festooned with chains of wax-secreting honey bees. Every one of them doing her part, putting the finishing touches to queen cells that are a work of art. You will never see better-looking queen cells anywhere. Fat as fingers they hang from the bar in unbroken rows of finely sculpted wax. The bees do a great job. You will probably want to see the results as soon as possible, too. I did.

I was excited and impatient to see what the queens would be like; curious to see if I had selected the right age of larvae for grafting, and if they had developed properly. Grafting age is determined by time and color. You know whether you got it right by the color changes apparent in the developing queen. She wouldn't be out until the end of the 12th day and this was the 10th so I took a 'short cut'. If you are careful you can find out exactly what you need to know.

You pluck one of the cells off the bar and with a warm knife slice carefully around the circumference at the base just as you might cut into the bark of a willow twig to make a child's whistle. Be careful. The wax is warm and soft. Use gentle, even pressure. You'll soon have the open ended cell in your fingers like a rifle cartridge without its bullet. Tip the queen-to-be out into the palm of your hand.

Beautiful! On this day the color: head and thorax light brown; eyes a dark pink-purple; and, abdomen, legs, and antennae a light yellow color. She does not move. For her age she is perfect. By the color you know that you've selected the smallest larvae that you could comfortably graft and you've got it right.

If the eyes were black or the head and thorax a

Continued on Next Page

CELL COOR ... Cont. From Pg. 651

medium grey that would have indicated that the larvae selected for grafting were too old by a day or more. Look next at the base of the cell. If it has plenty of royal jelly (which is what I found) the nurse bees have done their job. I put her back into the cell and rejoin it to its base. She is valuable and I wouldn't hurt her for the world. Harry Laidlaw showed us this trick some years ago when he gave a queen rearing course in Nanaimo. It comes in handy.

Smoothing the joint between the cell and the base with my knife blade it occurred to me just how easy it was. The bees start and finish all the queen cells needed without fuss. Painful memories, swarm-box reminders delivered with a vengeance by reluctant and rather damp occupants, faded into the past.

I said that this division board was the heart of the system but that's not strictly true. It's only a piece of hardware to get queen cells started and finished. It is easy to work. Timing operations . that's the magic.

To explain timing and keep it simple, operations are given with respect to grafting day, **"G"** For example, instead of **'grafting day minus four weeks'** or **'one month before you graft'** or **'one day after grafting'** the text refers to **'G - 4 weeks'** or **'G + 1 day'**. Also, the starter/finisher colony is simply the 'colony' or the 'colonies'

This is how the system operates

G - 4 weeks: Equalize the colonies.
Set their entrances to face the morning sun, or about South-East (SE).
Feed them 50/50 syrup and Fumidil-B continuously.

Bees get used to flying in and out towards the SE.

This is important because the SE is where the division board entrance will be located and we want the bees to find it with as little delay as possible. Remember their entrance will be blocked and the new one (the slide out) will be halfway up the hive.

"Cell Door" on the brood chamber - slide out..

G - 1 week: Take the colony apart and rebuild it as follows:

- Reverse the bottom board so that the entrance faces the opposite way, North-West, and block it up. This entrance, unused now, must be opened whenever the slide is inserted. More on this later.
- Confine the queen to the bottom body.
- Take three or four frames of brood out of her broodnest and replace these with one frame of empty comb and two or three frames filled with pollen and honey.
- Make up the top body so that it has a maximum of seven frames comprising these three or four frames of brood plus additional frames of honey and pollen to bring the total to seven. (The 3-frame space is needed for grafted cell bars.)
- Put the brood in the center, please, not on the sides.
- Put the bottom body on the bottom board.
- Put the division board on the bottom body.
- Put the top body on the division board.
- Put the feeder on the top body. Feed syrup and Fumidil-B.
- The feeder is important. You will not get sufficient bees in the top story without it.
- Take the slide out.
- The colony is queenright.

We have reversed the main entrance to the rear, to the NW. Bees leaving the hive towards the NW are forced to work up and down from the center entrance, and in and out towards the SE which is the direction they've previously been accustomed to. All cells containing young brood are given time to be sealed. This is important because we want the nurse bees to give their undivided attention to the queen cells and get them started quickly. Nurse bees and newly emerged bees are abundant in both hive bodies. The feeder and the brood draw them up. The queen is kept down below.
There is space in the top body for bars of queen cells or more stores.

G - 1 day: Insert the slide.
Open the lower entrance, towards the north-west.
The upper body has now been made queenless without any disturbance.
Bees leave the lower body by the NW entrance but these foragers return to the front entrance. Finding access to neither the brood nest nor the queen below they are forced up by the slide to reinforce the population in the starter-finisher. If you have read Snelgrove's book on the control of swarming you'll recognize this step. It is similar to his use of the 'Snelgrove board'

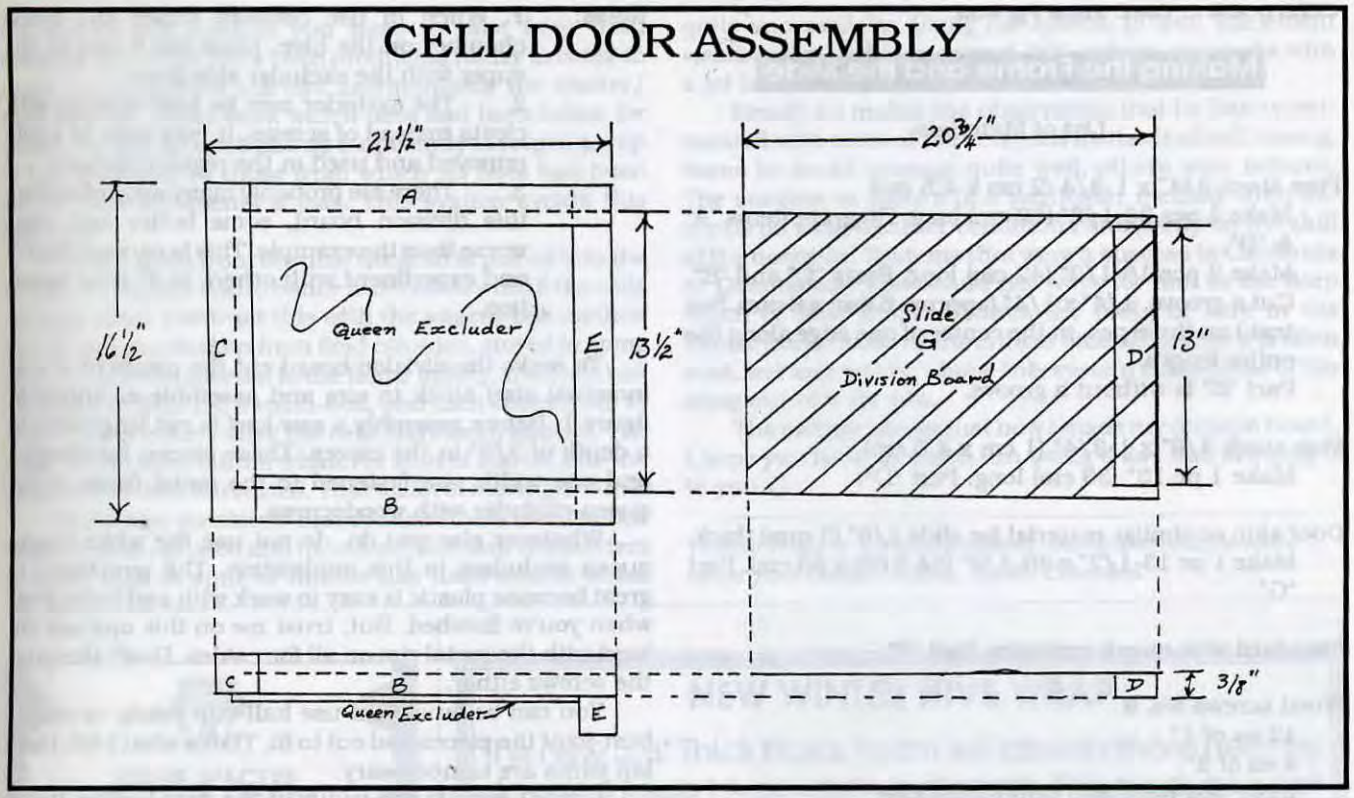
Bees now start to fly out from the rear (NW) and return, loaded with pollen and nectar. But from force of habit they return to the center front entrances (SE) and not to the entrance at the rear of the colony (NW). The separator slide forces them up to reinforce the bees in the top cell starter – finisher body. Swarming conditions of crowding, abundant stores, and an excess of nurse and flying bees are excellent conditions under which to raise queen cells.

Bees are stimulated by the sudden simulated queenless emergency and are eager to raise a new queen. The bees in the top body are queenless and their brood glands (hypopharangeal glands) are engorged. They have no brood to feed, and so, when grafting day rolls around

G = 0: [This is grafting day]

- Insert the bar with the queen cells between two frames filled with honey and pollen in the top body.
- Put other frames of brood outside these stores.

On grafting day you give them the object of their desire



(grafted larvae) they immediately feed the grafted larvae and begin to build up the cells quickly. They've been queenless for a full day and can't wait to get to work.

G + 1 day:
- Remove the slide.
- Close the lower (NW) entrance.
- The colony has been made queenright again without any disturbance.
- Normally these cells would have to be moved from the starter to the finisher colony here we use the slide.

With the slide out again this queenright finisher is totally undisturbed until all the queen cells are sealed. The well fed larvae float on a virtual pond of royal jelly. The full population of this strong colony is available to provide heat for the rapid production of wax by the cell builders, nurse bees are continually going to the feeder and the pollen stores in the top colony. (You must keep that feeder filled, and give pollen supplements if no pollen is coming in.)

G + 5 days:
- The cells are sealed.
- No action needed for another five days.

G + 10 days:
- The first cells are ripe.
- Harvest the cells and stock your nucs. Take nucs to mating yard.

Harvest your superior queens. Now you can make up your own nucs or requeen your other colonies.

For another graft: Renew the top body with three or four frames of brood making up to seven frames again with honey and pollen stores. Then repeat the steps from G 1 day. If you do this you should keep track of things on the calendar. I suggest something like this: "Graft #2 = G - 1 and Graft #1 = G + 5."

Time to renew as above if you want to go through the process again. As you can see this becomes the routine every five days.
"Graft # 3 = G - 1; Graft # 2 = G + 5."
(Graft # 1 = G + 11, and is already in the mating yard.)
Even if you don't want to graft cells (it can be tricky) you can still use this system. Give the bees some eggs that are just about to hatch and watch them go to work.

I almost forgot . . just in case you were wondering . . the queen that I examined at the beginning on G + 10 days survived to head up one of my colonies. As far as I can tell she is as good as any of the others.

G + 12: Virgin queens emerge in mating nucs late on G + 12 days.

G + 20 to 26: Mating flights.

That's it!

This fine system for requeening colonies should be of particular interest to migratory beekeepers because it fits in so well with two-queen colony operation.

Raise quality queens in any weather with minimum disturbance. Given the high probability of success, I'm sure the results will please and surprise you. Opportunity knocks. Open the door on fun and profit with your bees.

Remember that the most successful STARTER is queenless, but the best quality queen cells are FINISHED in a queenright colony under the supercedure impulse, and finally that the best results overall are obtained from a colony that has had minimum disturbance. This system makes use of these three principles.

Continued On Next Page

CELL DOOR ... Cont. From Pg. 653

Making the Frame and the Slide

List of Materials

Pine stock 3/4" x 1-3/4 (2 cm x 4.5 cm)
Make 2 pcs 20-1/2" (52 cm) long. Diagram items "A" & "B".
Make 2 pcs 16-1/2" (42 cm) long. Parts "C" and "E"
Cut a groove, 1/4" x 1/4" (approx. 6 mm x 6 mm. See text.) on three pcs, in the center of one edge along the entire length.
Part "E" is without a groove.

Pine stock 3/8" x 1-3/4" (1 cm x 4.5 cm)
Make 1 pc 13" (33 cm) long. Part "D"

Door skin or similar material for slide 1/8" (3 mm) thick.
Make 1 pc 13-1/2" x 20-3/4" (34.5 cm x 56 cm). Part "G"

Standard wire queen excluder, Part "F"

Wood screws No. 8
12 ea of 1"
4 ea of 2"
Cigar box nails and waterproof glue

Assembly

Place the inner edges of "A" & "B" 13 inches apart on a flat surface with the groves facing each other.

Lay "E" across and fasten to "A" and "B" at one end with glue and four 1" No. 8 wood screws. Make certain the ends are flush and square.

Butt joint "C" across "A" & "B" at the opposite end, groove facing inward and fasten with glue and four 2" No. 8 wood screws countersunk 1" (2.54 cm). Plug any holes with plastic wood to make frame bee tight where "C" joins "A" & "B"

"Cell Door" In position - slide out.

Lay the standard wire queen excluder, "F", on the frame so that one end lies along "E" There must be no space between the excluder and "E"

Center the excluder, evenly along sides "A" & "B" Fasten the excluder to the frame with four 1" No. 8 wood screws, by driving one screw through the excluder between the wires at each corner.

Make the slide (division board) by placing "G" over "D" check that with the slide in place within the frame, the end bar "D" fits snugly between "A", "B" and "E" Mark the position. Glue and nail through while holding in position.

Notes:
1. When in use between super and brood chamber on the hive, place the frame on the super with the excluder side down.
2. The excluder may be held in place with cleats instead of screws. It may then be easily removed and used in the regular manner.
3. There are probably many ways of making this division board, some better and some worse than the example. This is my way. Modify and experiment with others to fit your operation.

To make the division board cut the pieces of 1" x 2" (nominal size) stock to size and assemble as shown in figure 1. Before assembly a saw kerf is cut lengthwise to a depth of 3/8" in the pieces. These pieces; two lengths and one width, are fastened to the metal frame of the queen excluder with woodscrews.

Whatever else you do, do not use the white plastic queen excluders in this application. The temptation is great because plastic is easy to work with and looks great when you're finished. But, trust me on this and use the kind with the metal rim on all four sides. Don't skimp on the screws either.

You can be fancy and use half-cup joints, or simply butt-joint the pieces and cut to fit. That's what I did. Half-lap joints are unnecessary.

I didn't specify the width of the saw kerf as it will depend on what thickness of material you have on hand for the slide. I had a piece of material called a 'door skin', a kind of thin plywood veneer that is only 1/8" (3 mm) thick so it slides very loosely in the kerf. That's fine because the wood tends to swell up with moisture. You want it loose so it doesn't stick. You could probably use sheet metal for the slide, or even a thin sheet of plexiglass. Anything will do as long as it slides smoothly and easily.

Mount piece "D" to the slide "G" so that when the slide is in place there will be no way bees could possibly make their way into the bottom brood chamber, but will have easy access to the top hive body.

The position of the saw kerf is important. If it's not in the right place you can get too little space between the queen excluder and the slide. What you end up with, is a very efficient bee-killing device. A bee guillotine. You don't want the slide to be that kind of separator. Best cut that kerf exactly dead center and leave the guillotining to 'Les Miserables.'

Don't worry about too much bee space or too little. My own experience is that the slide is in for such a short time it never gets propolized, and the large entrance gets little if any burr comb – at least no more than usual.

There are some really neat things about this system that may not be readily apparent. Usually, when you use

the swarm-box method you have to take bees from colonies that could have been producing honey in order to stock the queenless starters and reinforce the starter/finishers. The hives from which bees had been taken for queen rearing did not build up sufficiently to return a crop of honey similar to those from which no bees had been taken. This represents a loss. This system avoids this difficulty.

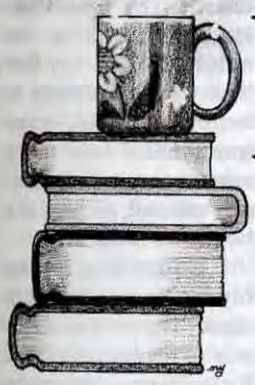
Also note that from the time the graft is placed into the colony, no further disturbance is necessary until the cells are harvested. Contrast this with the swarm-box method where bees are shaken from field colonies, stored in some fashion and transported to the home apiary, then shaken out again to form the swarm-box, and then shaken out in front of their colony after the cells have been started. The graft is then moved from whatever kind of starter into the finisher and then harvested. That's a lot of moving around.

Cloake also mentions that confined bees (swarm-box bees) become agitated and therefore reluctant cell starters at times. But in spite of this he has used swarm-boxes quite successfully. Using his system in wet, unclement weather, he is able to raise 4,000 cells in six weeks with a lot less hassle.

Finally he makes the observation that he has experimented with most of the accepted methods of cell raising. Some he could manage quite well, others were failures. The success or failure of a particular method often depends on local weather conditions and partly on the skill of the operator. Systems that were a success in California or Queensland just would not work for him in the deep south of New Zealand.That's the problem here in the Pacific north-west. At the critical time of the year it is often cold, wet and windy. I hope this system takes some of the sting out of it for you.

The picture shows just how I made my division board. I hope you have as much fun using it as I had bringing it to you.

Vincent Doyle is a queen producer, beekeeper and freelance writer from Cowichan Bay, British Columbia.



Bee School 2

richard bonney

By December you should have most things under control.

Last month we discussed getting our bee school organized. This month we will fill in some of that organizational framework with course content.

Bee schools are nothing new. They have been going on all over the country for many years, and announcements, outlines, and descriptions have been published regularly. I have read many of these, and I have been teaching bee schools for quite a few years. I have developed some prejudices.

Two areas exist where we could do better. These are in the actual content of the material presented, and in the qualifications of the instructors. And these two areas are the heart of a bee school. First, let's look at course content.

It is in no way easy to become a competent beekeeper, and the nature of the hobby (it is a hobby or pastime for almost all beginners) is such that it is necessary to gain a substantial part of the required competence during the first season. However, exposure to everything doesn't have to come during beginner bee school. There is a whole summer before us. So, let's take it easy on those students and think in terms of the whole season.

Without question, experience and competence are added over the years, but enough understanding must be gained in the first season so that the beekeeper can bring his or her bees through the first winter. And that should be the goal – successful wintering, not a complete beekeeper. I know of no statistics on success rates but my observations are that each year the colonies belonging to a very large percentage of new beekeepers do not make it through that first winter. The bees die for any of several reasons. Some of these novices try again, others don't. I suspect that right now, because of this high attrition rate, we have more ex-beekeepers than active beekeepers countrywide, and it hasn't been so much a loss of interest as it has been a lack of success from insufficient knowledge. More precisely, it has been a lack of the right knowledge at the right time.

As beekeeping times get tougher, it is in our best interests to retain a much larger percent of those new beekeepers, and encourage them to become knowledgeable and proficient. This starts with carefully selected course content. We should concentrate on building a solid foundation during those bee schools, not on giving a broad overview of every aspect of beekeeping. Additional information comes later – sometimes a little later, sometimes much later – but as it is needed. In an initial bee school for beginners, do not think beyond the first two or three months of hive ownership. Before your students even have bees, do not fill them up with information about queen rearing, about extracting and selling honey, about splitting colonies or making nucs, all things that they are not likely to do for a year or more, if then. Concentrate on the basics.

Content And Instructors Are Critical

The initial goals should be to give the students confidence to open a hive, to handle the bees, and to help them know what they are seeing in the hive. They should be able to recognize eggs, larvae, and pupae. They should recognize the queen, workers and drones. They should know something of the life cycle of a bee and of the colony. The mechanics of hive manipulation and the techniques of hive management will come more easily if the novice understands the bees themselves and has some understanding of why we do things as we do. We should be very careful not to impart the idea that beekeeping is done by rote.

Rote, of course, should not be confused with a schedule of activities. Rote is blind: do it now because it is time and don't worry about why. Recognition of a schedule, at least the way I am using the term is something entirely different. In this instance the schedule is a reminder to think about specific things at specific times. Think about it now because it is time, and after due thought, do it if it needs to be done. For example, in the fall we don't feed simply because it is fall. Instead, we recognize that it is fall and check to see if the colony needs to be fed. Does this colony need feed to get through winter? Every colony is different, and only the keeper knows the condition of his or her own hive. A beekeeper who cannot answer such questions about her own colony has not been properly schooled.

Back to the basics. Start with an informational framework. What is the scope of beekeeping? What is the cost

Continued on Next Page

SCHOOL ... Cont. From 657

of beekeeping? Where do you get things? What are the facts about stings? What are the legal considerations in your state or province? The first session of a bee school should be used to answer many of the questions the student didn't even know he had. Then ease into the bees — their life cycles, their duties, some basic activities and behavior. Explain throughout why things are as they are.

Keep in mind that these new beekeepers will be starting (most of them) with new colonies. These new colonies are unlikely to swarm in their first season. They may not make surplus honey. They should not need requeening. There should be no thoughts of splitting or making nucs. Do not burden these novices with techniques of swarm control and prevention, with complex schemes for supering, or of methods for making increase. These are topics for regular club programs, or for the intermediate level classes that you are going to offer later.

Do give these new students a thorough exposure to basic equipment, starting with the concept of bee space. Beekeepers might not so often put inner covers on upside down if they understood bee space better, and they would be less likely to put only eight or nine frames of foundation in a super or hive body. (I'm not talking about drawn comb.) Explain such things as the difference between grooved and slotted bottom bars on frames and the fact that each uses a different size foundation. Be sure that the student understands that just because a piece of equipment is in a catalog, it is not necessarily good or useful. The Boardman feeder is a prime example. It is of very limited use, especially to beginners, but many are misled into using one because it is usually offered as part of a beginner's outfit.

Equipment assembly is also an important topic. The proper methods of frame assembly, for instance, are not intuitively obvious, and too often equipment is supplied without assembly instructions. Even when instructions are supplied, they may not be complete or logical.

Of course, in all of this, the instructor must be careful not to be dogmatic. The emphasis should be on guidance and on imparting principles, not on presenting the one and only method. (There are very few absolutes in beekeeping.)

Once the student has some basic understanding of the bees and the equipment, move on to location. Where can bees be kept? Locating a hive on a given property and within a neighborhood or area are both important. It is all a part of the public relations of bees, as well as being a part of the beekeeper's safety and convenience.

Acquiring and installing bees are obvious topics. Where do you get the bees, and then how do you get them into the hive? Here is the opportunity to offer some real hands-on experience. Slide demonstrations or videos are good, but a live demonstration is best. Get the class out to the bee yard. Let the students handle bees in an

SUGGESTED OUTLINE

Week 1 ◊ Introductory answer questions, set the stage, build a foundation.
- What is a honey bee?
- Bee stings
- Books and publications
- What is beekeeping?
- Costs of beekeeping
- Legal considerations

◊ Introduction to honey bees - slides or video

Week 2 ◊ Occupants of the hive - the queen, the workers, the drones - lecture and slides
- Elementary biology
- Life cycle of a worker
- Life cycle of queen and drones

◊ Colony life cycle - including an overview of swarming (why bees swarm), but not swarm control and prevention.

Week 3 ◊ Equipment - demonstration, discussion, participation
- The parts of the hive
- Bee space
- New vs used equipment
- Sources
- Assembling and preparing equipment

◊ Placing the hive
- Locating hives on a property
- Locating a bee yard

Week 4 ◊ Acquiring bees - lecture, slides
- Packages, nucs, over wintered hives, advantages and disadvantages of each.
- Sources
- Installing bees
- Initial management (the first two weeks)

and . . .

Week 4 ◊ At the hive - live demonstration
- Demonstrate smoker
- Demonstrate hive opening techniques.
- To the extent possible, see queen, workers, drones, eggs, larvae, pupae.

Week 5 ◊ Spring and summer management
- Ongoing feeding.
- Expanding the hive.
- Supering

and . . .

Week 5 ◊ At the hive
- Demonstrate smoker (again)
- Demonstrate hive opening techniques (again)
- Have the students handle frames and bees.
- Install a package

Week 6 ◊ Nectar flows, honey plants - lecture and slides

◊ Diseases and mites - lecture and slides, and live demonstrations if possible.

over wintered hive. Then let them see first hand how quickly and easily a package can be installed. Do you remember what it was like when you installed your first package? There you were, all alone out there at the hive surrounded by creeping, crawling, buzzing little creatures, each one determined to do you in (you thought), and your family and neighbors all in the house peeking through the windows, laughing. Make it a little easier on the students. Take them to the bee yard. Show them how it is done. This, of course, does require that classes be coordinated with the start of the season.

Most of the students will ultimately install their own bees while working alone (except for those faces in the window.) After it is all over they will stand there and wonder what to do next. Again, interleaving the package arrival date with the last class or two allows you to get them all back into the class room before a week is over, where you can tell them what to do. Told a week or a month earlier, much of the information will not have been retained. Told now, with the experience of their own hive and their own bees behind them, everything will be so much more meaningful.

Follow this all up with some of the other information they will need to make the bees' activities more understandable. Every area has its own particular set of nectar and pollen plants and its own pattern of seasonal bloom. The new beekeeper needs a sense of these. Without such information it is never clear whether a colony is idle because of a basic problem, or because there is nothing available.

Finally, disease and mites cannot be ignored. Mites are an ever increasing problem for all of us, and diseases are still with us. Some beekeepers have been so overwhelmed with mite problems that disease has taken a back seat. It won't stay there in the back for long, though. To get beginners up to speed and to impress on them the seriousness and reality of these problems, live demonstrations of diseased and infested hives are invaluable if they can be arranged.

Before we finish here, let's give some further thought to the instructors. Most bee schools do use several. Pick them with care. Consider that years of experience do not necessarily give a person the capability to teach effectively. Further, a good story teller may not be able to convey a balanced picture of a particular topic. And be careful about individuals who ideas are fixed, or out of date, or simply wrong. A good test of an individual is, can he or she present a coherent and informative program at a club meeting? If yes, then that person will probably do all right as an instructor. Do give it careful thought, though.

Dick Bonney is Extension Apiculturist in Massachusetts, and has just published 'Beekeeping, A Practical Guide.'

HOW AM I DOING?

One of the larger questions that a new beekeeper has, or should have, is – how is my colony doing? Without experience, or without another hive to compare with, it is hard to know. We can tell the new beekeeper to find a beekeeping buddy, someone else with a hive with whom to compare notes, or we can suggest starting two hives so there is a basis for comparison. But, these possibilities are not always the answer.

One of the biggest causes of failure for a new colony is that it did not build up adequately during that first summer. As winter approached, it lacked population, or had insufficient drawn comb in which to store the requisite amount of honey, or simply did not bring in enough honey. The novice, without a basis of experience, may not realize the shortcomings. A session or two at a hive with an experienced beekeeper can help overcome this problem.

Consider, as a part of the bee school, having a club hive, started from a package at the same time as most of the class start theirs. (There is an assumption here that most novices start from packages.) Schedule follow-on sessions at this hive periodically during the season. At these sessions, open that hive and discuss its progress. Give the students a basis for comparison. Monthly intervals starting from the initial installation might be appropriate. In the absence of a club hive, find a club member who will volunteer the use of his property and a hive.

Given the availability of a demonstration hive, here is a possible schedule of follow-on demonstrations showing approximate dates. Modify it to meet the particular requirements of your area. This one assumes a package installation date in late April and the final regular bee school class around May 1.

May 15 - Demonstration 1

Observe progress. Don't let the colony lag in the early weeks. It is hard to catch up later.

June 1 - Demonstration 2

Observe progress, discuss placing the second hive body. (This assumes that the demonstration hive was started from a package, with a single hive body.) Discuss need for continued feeding.

July 1 - Demonstration 3

Observe and discuss progress. Discuss possibility of supering. Relate hive progress to nectar flows.

August 15 - Demonstration 4

Observe and discuss progress. Discuss preparation for winter. Demonstrate as appropriate – mouse guards, insulation, wrapping – perhaps on a dummy hive.

August is not too early to start thinking about winter. This demonstration can be done on the same day or in the same time period as a more formal class session on fall management and preparation for winter.

?DO YOU KNOW?

Final Exam

clarence collison

The first 48 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. ___ Honey bee queens lose weight as a colony prepares to swarm.
2. ___ Larvae with European foulbrood usually die after the cell is capped.
3. ___ Honey bees are native to North America.
4. ___ The presence of larval skins in front of the colony is an indication that the queen is failing.
5. ___ Sucrose is the predominant sugar found in honey.
6. ___ Wax moth larvae are a continuous threat except when temperature drops below 40° F.
7. ___ Neither queens or drones produce the alarm pheromone isopentyl acetate.
8. ___ For most crops honey bee colonies should be moved into a target crop needing pollination 24 to 48 hours before the flowers open.
9. ___ U.S. Grade A Honey cannot contain more than 17.5% moisture.
10. ___ There is a reduction in foraging activity approximately one week prior to swarming.
11. ___ Colonies headed by young queens are least apt to swarm.
12. ___ All three types of brood-cells found in a honey bee colony are reused for brood production.
13. ___ Royal jelly is fed to queens throughout their life and to early instar worker, drone and queen larvae.
14. ___ Any fertilized egg laid by the queen is capable of becoming a queen.
15. ___ The position of the sun is used as a compass by foragers.
16. ___ Mandibular glands in both queens and workers produce queen substance (9-oxodec-2-enoic acid & 9-hydroxydec-2-enoic acid).
17. ___ Venoms of Africanized and European honey bees are chemically different.
18. ___ Immature queens in sealed cells secrete a pheromone that depresses the production of additional queen cells.
19. ___ PDB (paradichlorobenzene) crystals kill all stages of wax moth.
20. ___ Bees are packed tightly together in the center of the winter cluster.
21. ___ Laying workers behave like normal queens; they cease doing typical worker duties and spend all of their time laying eggs.
22. ___ Pathogens associated with American foulbrood, Sacbrood, Nosema and Chalkbrood all produce spores.
23. ___ During the summer, the hypopharyngeal (brood-food) glands shrink as the bees change from nursing activities to foraging, whereas, in the winter bees of all ages have large glands.
24. ___ Storage of honey below 50°F will prevent honey fermentation regardless of yeast and moisture content.
25. ___ Low moisture honeys granulate faster than high moisture honeys.
26. ___ Varroa mites normally overwinter in colonies as eggs laid in the bottom of cells in the broodnest area.
27 ___ The various races of the European honey bee, *Apis mellifera* can interbreed.
28. ___ The intensity of dancing in the hive is related to the quality and quantity of the food source.
29. ___ American foulbrood-killed larvae are seen as coiled or twisted remains and are easily removed from the cell.
30. ___ Primary swarms are normally composed of a mixture of bees of all ages, the old queen of the parent colony, a few drones and 50-60% of the workers.
31. ___ Wettable powder insecticide formulations are often more hazardous to bees than either emulsifiable or water-soluble concentrate formulations.
32. ___ Chalkbrood is considered to be a "stress disease" and rarely kills a colony.
33. ___ 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.
34. ___ All honeys will darken and loose flavor in time.
35. ___ The vegetative stage of Bacillus larvae is the infective stage of American foulbrood.
36. ___ Nurse bees begin visiting cells as soon as eggs are laid.
37 ___ Worker honey bees can discriminate between sister and half-sister workers and queens in both the larval and adult stages.
38. ___ When splitting or dividing colonies, it is best to let the new divides raise a queen from the brood that is provided.
39. ___ Honey is a vitamin and mineral rich source of food.
40. ___ Each colony of honey bees possesses an odor which is shared by all of its members and differs from those of other colonies.

Africanized honey bees in comparison to European honey bees:

41. ___ have a higher incidence of swarming.
42. ___ exhibit greater hoarding behavior.
43. ___ respond faster and in larger numbers to alarm stimuli.

Continued on Next Page

FINAL EXAM ... Cont. From Pg. 661

44. ___ have a higher tendency of absconding.
45. ___ are slightly larger in size.
46. ___ build combs that are made up of slightly smaller cells.
47. ___ have faster developmental rates.
48. ___ fly at lower temperatures and at lower light intensities.

Multiple Choice Questions (1 point each)

49. ___ Menthol begins to evaporate at a temperature of:
A. 55° F
B. 75° F
C. 60° F
D. 65° F
E. 70° F

50. ___ Chronic bee paralysis and acute bee paralysis are caused by a:
A. Fungus
B. Rickettsiae
C. Protozoan
D. Virus
E. Bacterium

51. ___ The honey bee larva undergoes ___ stages of growth during its development.
A. Six
B. Four
C. Seven
D. Five
E. Three

52. ___ The round dance is used to indicate the location of food sources at distances less than ___ meters from the hive.
A. 200
B. 25
C. 100
D. 150
E. 75

53. ___ Terramycin feeding should stop at least ___ before a surplus honey flow in the spring.
A. 4 weeks
B. 1 week
C. 3 weeks
D. 5 weeks
E. 2 weeks

54. ___ Beeswax melts at a temperature of:
A. 170° F
B. 132° F
C. 112° F
D. 120° F
E. 145° F

55. ___ In order to have the maximum number of field bees present at the time of a major honey flow, the queen should reach her maximum daily egg-laying rate during the period ___ weeks prior to the honey flow.
A. 3
B. 6
C. 5
D. 4
E. 7

56. ___ Terramycin is registered as a preventative treatment against:
A. Chalkbrood, American foulbrood
B. American foulbrood, European foulbrood
C. European foulbrood, Sacbrood
D. American foulbrood, Chalkbrood
E. American foulbrood, Nosema

57. ___ Piles of dead adult bees with a full complement of hair found in front of a hive may signify:
A. Robbing
B. Nosema disease
C. Starvation
D. Poor queen
E. Pesticide poisoning

58. ___ The male part of the flower where pollen is produced is known as the:
A. Style
B.Ovule
C.Sepal
D.Anther
E. Stigma

59. ___ Drone honey bees normally become sexually mature at the age of:
A. 6 Days
B. 12 Days
C. 3 Days
D. 15 Days
E. 9 Days

60. ___ If a virgin queen is prevented from going on her mating flight, she will loose the urge to mate in approximately:
A. 3 Weeks
B. 5 Weeks
C. 2 Weeks
D. 4 Weeks
E. 1 Week

61. ___ During mating, drones are attracted to the queen after she enters the mating altitude which is over ___ feet above the ground.
A. 8
B. 12
C. 20
D. 15
E. 5

62. ___ The environmental factor that has the greatest impact on nectar secretion is:
A. Temperature
B. Wind speed
C. Soil moisture
D. Relative humidity
E. Solar radiation or sunlight

63. ___ Larvae used for grafting in the production of queens should be ___ hours of age.
A. 30-36
B. 24-30
C. 36-42
D. 12-18
E. 6-12

64. ___ Strain of honey bees that are known for rapidly reducing brood production when the honey flow ceases:
A. Italian
B. Caucasian
C. Midnite

D. Buckfast
E. Carniolan

65. ___ In an emergency, the shortest possible time that a colony could successfully replace a queen would be:
A. 8 Days
B. 14 Days
C. 16 Days
D. 10 Days
E. 12 Days

66. ___ The central broodnest during the summer is normally maintained at temperatures of:
A. 89°-91° F
B. 97°-99° F
C. 86°-88° F
D. 92°-94° F
E. 95°-97° F

67. ___ Which one of the following metals will discolor beeswax during the rendering process:
A. Aluminum
B. Stainless steel
C. Iron
D. Pure tin
E. Nickel

68. ___ Fume boards are used to:
A. Protect stored combs from wax moth
B. Treat colonies with varroa mites
C. Kill diseased colonies
D. Remove bees from honey supers
E. Prevent chalkbrood

69. ___ Larvae are no longer susceptible to American foulbrood after they are ___ hours old:
A. 24
B. 53
C. 36
D. 48
E. 30

70. ___ Adult honey bee workers and queens are most susceptible to tracheal mites when they are:
A. 1-2 days old
B. 4-5 days old
C. 7-8 days old
D. 10-11 days old
E. 13-14 days old

71. Name two ways in which the honey bee colony uses water. (2 points).

72 Rate of development (egg to adult) in the honey bee colony varies with caste and temperature. Please indicate total developmental time in days for the three castes. (3 points).

73. Explain what happens when a colony absconds. (1 point).

74. Many factors are believed to influence the queen's egg laying rate; please name three. (3 points).

75 What two factors determine "division of labor" within the honey bee colony? (2 points).

76. Name three situations in which you would find a queen outside of a hive. (3 points)

77 Why is it recommended that a beekeeper should oversuper their colonies in late spring and early summer. (1 point)

78 Name three honey products that require thin surplus foundation. (3 points).

79 Name four ways of removing bees from honey supers. (4 points).

Please match the following disease symptoms with the correct disease.

A) Chalkbrood
B) Sacbrood
C) European Foulbrood
D) American Foulbrood
E) Nosema Disease
F) Honey Bee Tracheal Mites (Acarine Disease)
G) Septicemia
H) Amoeba Disease
I) Varroa Mite (Varroatosis)

80. ___ Common adult symptoms are disjointed wings, distended abdomens, and swollen whitish appearance of the midgut.
81. ___ Larvae die at about four days of age while still in the coiled stage in uncapped cells.
82. ___ Dead brood undergoes gradual, uneven color changes.
83. ___ Death occurs during the prepupal/pupal stage after the cell is capped.
84. ___ After death the consistency of the body gradually thickens as it dries to the scale condition and when using a toothpick to try to remove a dead larva, the skin ruptures easily and the gluey matter sticks to the toothpick. When the toothpick is pulled out from the decaying larva, the sticky matter is drawn out like a thread.
85. ___ The larva dies with the head end in an upright position.
86. ___ Dead larvae dry up to form a solid mummified mass.
87 ___ Can result in deformed adult bees.

ANSWERS ON PAGE 677

WHAT'S THE POINT?

An Overview Of Bee Stings

dewey caron

For the beekeeper, bee stings are a fact of life. Stings hurt and they are unpleasant. For the bee, the sting is its defense – it is used to protect the nest or the individual. A honey bee without a sting would be defenseless. What we must do as beekeepers is to provide as few opportunities as possible for bees to release defensive behaviors.

Bee stings are not bites. The sting is a highly modified part of the female reproductive organs. Anatomically, the sting is in ovipositor. Thus only female bees have stings. In most female insects the ovipositor is used to deposit eggs in or on food sources but in bees and wasps it doesn't do this – it has the unique function to sting.

Insects that have a sting belong in the insect order Hymenoptera. Within the Hymenoptera there is a wide range of uses and modifications of the female ovipositor. Some Hymenopterans use the ovipositor to deposit eggs. Female sawflies, for example, use their ovipositor to place eggs in host plant material, such as pine needles. Horntail females, another hymenopteran, use their ovipositor to place eggs deep within wood branches and into trunks of trees. In these two Hymenopterans, the ovipositor performs its true function – the placement of eggs.

In many Hymenopterans however, the ovipositor is modified. In the paralyzing wasps, the ovipositor is used to sting and immobilize a victim. In the mud dauber wasp, for example, the ovipositor stings a spider which is then paralyzed. Paralyzed spiders are alive but are unable to escape. The female mud dauber carries the spider back to the mud nest, places it inside and before sealing in the paralyzed prey she places her egg on the immobilized spider. This insures a "fresh meat" supply for the wasp larvae when it hatches from the egg.

In the Hymenopterans that we are most familiar with – bees and wasps – the ovipositor is the sting. The sting does not paralyze but rather serves for defensive purposes. Hymenopterans with an ovipositor modified to sting lay their eggs without using the ovipositor as it has been completely modified and no longer assists in laying of eggs.

Some hymenopterans may also bite. The bite of hymenopterans is harmless. Biting insects, like flies and mosquitos, release a material that causes pain while biting. Although the bite of a mosquito or the sating of a honey bee both cause pain, they are entirely different.

It has been estimated that 100,000 individuals are stung annually in the U.S. This number is well above the 1500 individuals annually bitten by a venomous reptile. Present statistics indicate that some 40-50 people die annually from an insect sting in the U.S. In a study in the early 70's, Barr determined the identity of the stinging insect from patients reporting stings. Some 35% could identify the stinging insect with reasonable certainty, 34% could questionably identify it while 31% could not identify it at all. Of the insects identified, 47% were yellow jackets, 27% honey bees, 14% wasps, 6% bumble bees and 6% were hornets. The identification of honey is aided of course by the fact that the honey bee sting typically remains in human skin after the bee stings. Sting autonomy is not confined exclusively to honey bee workers however as most people believe. Some wasps have stings that remain in human skin.

Sting Reactions

Human reactions to a bee or wasp sting may be classified into two general categories – normal or allergic. For humans, the material in the sting is injected beneath the sting directly into the person's body. This is a very efficient method of entry compared with someone breathing in a material to which he/she may be allergic. If there is to be an allergic reaction, it usually will show up very quickly after the individual is stung.

Five features of a normal reaction are: pain, inflammation of a wheal, redness developing around the wheal, swelling and, finally, itching. The amount of pain an individual expresses varies a great deal. Some locations are more painful than others. Some persons have a higher tol-

Continued on Next Page

STINGS ...Cont. From Pg. 665

erance for pain than do others. A sting is an open wound and material is injected that does cause pain – this is normal.

An elevated white round wheal usually begins forming within the first few minutes after a sting is received. Redness will radiate from the wheal depending on the sting site. A puncture mark is usually visible at the center of the wheal. The wheal will feel hard and may persist for a matter of hours.

The amount of swelling and discomfort due to itching varies a great deal in a normal reaction. The extent to which the sting is scratched may effect the amount of swelling. Scratching may prolong the itching sensation. if the swelling is confined to the site of the sting, generally it's classified a normal reaction. If the swelling moves to other parts of the body then it is an indication of something more than a normal reaction. The extent of swelling may be nothing more than a bump or it may be a large amount of swelling.

The treatment for a normal reaction is to help the individual forget about the initial pain and then to provide some comfort from swelling and itching. Something cool on a sting site will help alleviate the pain and the psychology of someone helping will be of value. The person that is stung should receive plenty of sympathy. A cold compress may reduce the amount of swelling but few individuals will suffer the discomfort of keeping a cold compress on a sting site long enough to be effective.

The itching reaction following the decrease is usually the greatest discomfort from a normal sting reaction. An ointment or lotion that reduces scratching and irritation will greatly speed up total recovery. A first aid cream or antihistamine ointment can usually be applied to provide relief. Since there is an open wound, it may be of value to reduce scratching to avoid an infection at the sting site.

Sting Allergy

Allergic reactions following a sting can be grouped into two types of responses. A true allergic reaction occurs in less than 1.0% of the population. An allergic reaction is generalized itching and hives throughout the body. Redness and itching on parts of the body other than the sting site are common. Generalized swelling, especially swelling in the neck or face regions, and difficulty breathing are also an indication of a true allergy. Patients may have a wheezing sound, sound like they are gagging or show hoarseness in speech. Dizziness or drop of blood pressure that results in shock may also occur. A sting reaction may be fatal.

The large local allergic reaction may include some of the above symptoms. There may be swelling and hives at the sting bite, some wheezing, faintness, dizziness and even such disorders as vomiting, abdominal cramps or diarrhea. The person may feel like they have a fever with aching of joints and a flushed feeling. Swelling may move from the site of the sting and may be extensive.

The treatment for an allergic reaction depends on the severity of the reaction. For the large local reaction, the application of an oral antihistamine such as Benadryl or Chlortrimeton is usually of value. These materials may make the patient sleepy but will reduce the severity of reaction. The absorption of the venom may be slowed by the application of ice to the sting site. In the serious allergic reaction, the prescribed medication is an injection with a syringe and needle of adrenalin (epinephrine). A physician can prescribe a kit containing epinephrine that an allergic individual may carry with them (an emergency kit or an epipen). If the reaction is severe, an individual should go to a medical facility immediately.

Persons with serious allergic reactions may have to undergo testing for sensitivity and immunization. Desensitization may be prescribed for some individuals. If an individual has had a serious reaction, the chance of another, if stung again in a reasonable amount of time, is about 60%. After desensitization, the chance is less than 5%.

Desensitization studies are currently underway. We do not know the value of desensitization for the large local reaction. We do know that all treatments should be done with an extract of pure venom. Older treatments were with whole body extracts (WBE) and studies have shown that these are not effective. With our current knowledge, we believe that once desensitization shots are taken they must be continued as the immunization is not permanent.

Toxic Reaction

A third type of response to a bee sting is a toxic reaction. A person can tolerate a certain level of a foreign material introduced into his/her body. If too much gains admission over too quick a period of time, such as may happen with multiple stings, a toxic reaction may occur. This is apparently the situation with some deaths attributed to the African bee in Africa and South and Central America.

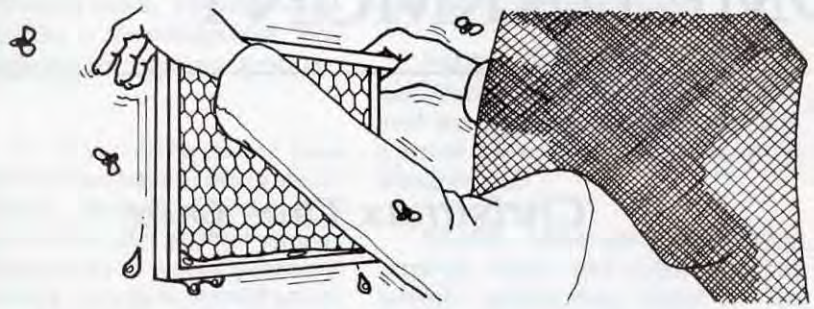
Healthy individuals can tolerate several hundred bee or wasp stings without this life threatening toxic reaction. One individual received over 2,200 and survived. Factors such as a person's health and body weight are interrelated. Certainly it is best to try to not incur a large number of multiple stings at one time.

As beekeepers we often become complacent about stings because they occur all the time. It is important to recognize the normal fear and hesitation other people have around bees and to be prepared to respond if someone appears to be having an allergic or toxic reaction to bee or wasp stings.

The most important aspect of all this is the favorable public relations beekeepers can gain by being able to explain about bees/bee stings. People can avoid or reduce the chances of being stung while outdoors, and beekeepers are the perfect message carriers for this information.

Dewey Caron is Extension Entomologist at the University of Delaware in Newark. He is also the Chairman of the Eastern Apicultural Society.

N·E·C·T·A·R



RECORDS

tom sanford

Most beekeepers don't keep adequate records. It's that simple. Comprehensive long-range bee management and financial record keeping systems are essential to maximize efficiency and maintain profitability.

A visit to any beeyard usually reveals colonies marked by sticks, stones or other readily available materials placed on each colony's cover. The specific arrangement of these materials may indicate everything from status of the queen to whether a colony requires food.

Two problems arise with this kind of record keeping. It is short-range; once the status of the colony changes and the materials are rearranged, the previous information is lost. The system is also unique to each operator, rendering it non-transferrable and non-translatable to others. Part-time employees or inspectors are unlikely to know the meaning of such records.

Perhaps the biggest problem with record keeping is deciding what information to save. The sheer volume of potential data that can be collected is staggering. Therefore, you must carefully choose what is most important for each particular enterprise.

At a minimum, records of queens and beeyards should be retained to help track honey production. Marking queens permits you to judge the productivity of individuals purchased from different breeders, to determine a queen's age and whether supersedure has occurred.

An international queen marking system exists that correlates colors to specific years, but a simpler system is to keep track of when the queen was purchased, from whom, and that she was marked. Kits of small numbered plastic disks may also be purchased from some suppliers.

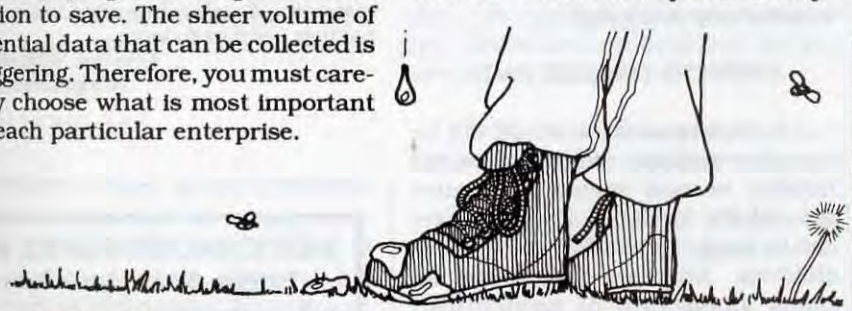
Queens can be marked with model airplane paint and/or typewriter correction fluid. These substances are quick drying and may be applied with the end of a straightened out paper clip, a nail or small brush. It is critical that the marking fluid be applied only to the thorax. Never allow it to come in contact with the head. Err toward the rear. An alternative system is clipping the queen's wing. If you requeen every other year, the right wing can be clipped for odd years, the left for even. Queens are picked up by the wings and gently held between thumb and index finger. A small scissors should be used and never clip more than half the wing.

Beeyard information should also be kept on the kinds of pollen and nectar flows experienced each year correlated with weather conditions and honey production. In order to determine the potential quality of a certain location, at least five years of solid data are necessary. It is fairly easy to weigh the amount of honey taken from each yard. Even an aggregate number derived from all supers in a yard would provide a baseline production figure that could be compared among different locations and across seasons.

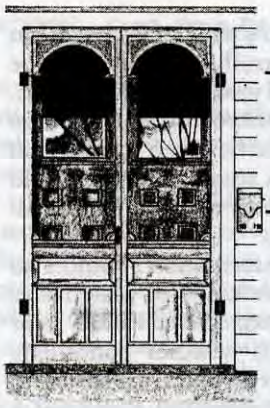
Many beekeepers monitor the weight of colonies. Keep a colony on a platform scale in every apiary and record the weight changes on a regular basis. Unfortunately, records from a single colony are often not satisfactory. Those from several hives in each yard would be more desirable.

Financial information is also important. Many beekeepers don't know how much it costs to produce a pound of honey. Pricing becomes difficult under these circumstances. Budgeting costs and returns from each bee-related activity allows a better view of the profitability of a beekeeping venture.

Only if records are written will they have any historical value. This is an important point because setting them on paper takes precious time. Unfortunately, there is no substitute. Record keeping is just as necessary as visiting the beeyard if you want to have any more than a superficial idea of the current status and long-range productivity of your operation.



ON·MY·BOOTS



HOME HARMONY

ann harman

Christmas Time Quiz

Nobody ever associates cooking and quizzes. So here's a complete surprise – a cooking quiz. Sharpen your pencils, wipe the flour off your hands and see how you fare with these questions. Some questions will have more than one answer. Answers are supplied but try not to peek until you've made your choice.

1. For short-term storage, honey is best kept:
   a. on the kitchen table.
   b. on the dining table.
   c. by the stove.
   d. in the refrigerator.

2. For long-term storage, honey is best kept:
   a. in a cool basement.
   b. on top of the furnace.
   c. in a freezer.
   d. in the garage or shed.

3. If a recipe calls for honey to be mixed with another liquid, mixing will be quicker and easier if:
   a. the honey is well heated before mixing.
   b. the honey is not heated before mixing.
   c. the honey is slightly warmed before mixing.
   d. both the honey and the liquid are slightly warmed before mixing.

4. Squeeze containers, such as a bear, are useful for:
   a. measuring small quantities, such as a tablespoon of honey.
   b. adding a small quantity of honey to vegetables.
   c. writing your name on the kitchen table.
   d. filling up the holes in waffles.

5. Large jars of honey are useful for:
   a. filling squeeze containers.
   b. measuring large quantities, such as a cup of honey.
   c. storing honey in freezer.
   d. giving to a honey-loving friend.

TRUE or FALSE

____ Granulated or creamed honey is as useful in cooking as liquid honey.

____ Whipped honey needs to be liquefied before measuring.

____ Mildly fermented honey can be used in cooking.

____ Honey can be universally substituted for sugar.

____ Strong, dark honey will affect both flavor and color of the cooked food.

____ Best results with honey cookery come from using a good honey cookbook.

____ Honey can take the place of sugar in yeast breads.

____ Coating measuring spoons and cups with oil makes measuring honey easy.

____ Unusual-flavored honeys, such as buckwheat, can be used in any recipe.

____ Everyone should use honey every day in some way.

Bonus question (worth 10 points):
___Yes ___No I use honey in some way every day.

ANSWERS ON NEXT PAGE

A Christmas issue would not be complete without recipes since the holiday season seems to revolve around the kitchen. These cookies can be made by children and grandchildren. Although kids are sometimes suspicious of unidentified lumps in foods, if the children make these cookies, they might well enjoy eating them. These cookies keep well and are great to have on hand throughout the holidays. Make several batches so that you can give some as a gift (with the recipe and some honey, of course). One nice thing about this recipe is that if you haven't had time to make a fruitcake, these cookies will be a great substitute.

Fruitcake Cookies

1/4 cup butter
2 eggs
1/2 teaspoon salt
1/2 teaspoon **each** cloves, cinnamon and nutmeg
1 cup glacé cherries
1 cup diced glacé pineapple or mixed glacé fruit
1/2 cup honey
1-1/2 cups sifted flour
1 teaspoon soda
2 tablespoons milk
1 cup seedless raisins
2 cups coarsely chopped walnuts
1/3 cup pineapple juice or dark rum

Cream butter, continue creaming while adding honey in a fine stream. Add eggs, beating until well blended. Measure flour; set aside half to coat prepared fruits and nuts. Sift in balance of flour with salt, soda and spices. Add to honey mixture. Add milk. Stir flour-coated fruits and nuts into dough. Add pineapple juice or rum. Dough will be soft. It is important to chill 1 hour or longer. Drop by rounded teaspoonful onto greased baking sheet. Bake at 250° (slow) 20 to 25 minutes. *Do not overbake.* Keep remaining dough refrigerated between bakings. Makes 6 dozen.

Cooking With Honey
Marge Davenport

ANSWERS TO QUESTIONS

1. a,b,c. If you keep honey handy you and your family will be sure to use it in many ways. Honey should never be kept in the refrigerator. The cool temperature hastens granulation.

2. c. If you keep honey in a freezer you do not have to worry about granulation. Second-hand freezers are easy to find and are not expensive. Honey kept in a cool basement will probably granulate, as will honey kept in the ever changing temperatures of a garage or shed. If the top of the furnace is warm, honey sitting over the heat for months will not spoil the honey but will injure the flavor.

3. c. and possibly d. Honey should not be heated to a high temperature just to mix with another liquid. Flavor of honey can be harmed by heating too much. Most other liquids can be warmed gently along with the honey for better and quicker mixing.

4. a,b,c,d. I am not certain why anyone would want to write their name on the kitchen table, but the squeeze container is a perfect way to do that. Honey can be put into measuring spoons so easily with a squeeze container. A squeeze container of honey by your stove means that you can give your vegetables a small amount of honey – not enough to be sweet but enough to enhance the vegetable's flavor. Filling holes in waffles seems to be a popular pastime and what better way to do that than with a squeeze container of honey.

5. a,b,c,d. Yes, two kinds of containers are necessary in a honey-using household – a squeeze container for small quantities and a large, say 1 or 2 pound, container for large quantities.

TRUE or FALSE

TRUE. There is no difference between measuring and using granulated or creamed honey in place of liquid honey in recipes. However, for a smooth salad dressing, liquid honey would be preferable.

TRUE. Honey that has had air whipped into it needs to be liquefied to get an accurate measurement. Heat the honey gently to liquefy, then measure the quantity you need.

FALSE. Never use honey that has fermented, even slightly. The food you prepare will carry the fermented flavor which can be quite disagreeable.

FALSE. Although honey is very versatile, some cake recipes will not tolerate substituting honey for the total quantity of sugar. Cookies that are meant to be crisp, such as gingersnaps, will taste delicious with honey instead of sugar, but will not "snap" A cake that is supposed to be white will be slightly off color with a tinge of the color of the honey.

TRUE. The flavor of the prepared food can be influenced by the choice of honey. A strong honey will dominate other flavors. A dark honey will darken cookies, cakes, salad dressings and some sauces.

TRUE. A good honey cookbook means that the recipes have been tested and will indeed be successful.

TRUE. You can substitute honey for sugar in any of your yeast bread recipes.

TRUE. If the recipe calls for butter or margarine or oil, honey will slide out of measuring spoons and cups that have been coated from the butter wrapper or wiped with oil.

FALSE. It is best to match the honey flavor with the type of recipe. For example, a barbecue sauce would be a good match for buckwheat honey; fruit is delicious with orange blossom. The mild honeys such as clover and alfalfa are universal and can be used in any recipe.

TRUE. Honey is so versatile that it belongs in every meal and snack.

BONUS QUESTION: I hope you said YES. Honey is too good to be ignored.

HONEY DEFINED

Definition

Honey is the nectar and sweet deposits from plants as gathered, modified and stored in the honeycomb by honey bees.

Types of Honey

Comb honey Honey presented in its original comb or portions thereof.

Extracted honey Honey removed from the comb and presented in several forms, as defined in the United States Department of Agriculture Standards for Grades: (1) liquid, (2) crystallized or granulated, or (3) partially crystallized.

Designation of Honey Sources – the source of honey determines many of the attributes of honey, e.g., aroma, flavor, color and composition.

Floral Indicates the primary flowers from which bees gathered nectar to produce the honey.

Non-Floral Indicates sources other than flowers such as extra-floral nectaries and honeydew.

Seasonal Natural mixtures, which occur in the hive, may be indicated by season, e.g., "spring, summer, autumn" honey.

Geographic Origin The name of an area of production (state, region) may be included, provided the honey has been produced entirely within that area. Blends containing honey of foreign origin must be labeled to indicate their origin(s), in accordance with the Code of Federal Regulations (CFR).

Forms of Honey

Blended Honey A homogeneous mixture of two or more honeys differing in floral source, color, flavor, density or geographic origin.

Churned Honey See Cremed honey.

Cremed Honey Honey physically processed by controlled crystallization to a smooth spreadable consistency. Also called "Creamed Honey," "Spun Honey," "Whipped Honey," "Churned Honey," or "Honey Fondant."

Crystallized Honey Honey in which part of the natural glucose content has spontaneously crystallized from solution as the monohydrate. Also called "Granulated Honey."

Filtered Honey Honey processed by filtration to remove extraneous solids and pollen grains.

Honey Fondant Cremed honey.

Honeydew A sweet deposit, secreted usually by aphids or scale insects and sometimes fungus, found on the leaves of many plants.

Organic Honey Honey produced, processed, and packaged in accordance with State and Federal regulations on honey and organic products, certified by a State Department of Agriculture and/or an independent organic farming certification organization.

Pasteurized Honey Honey which has been heated under time and temperature conditions that destroy spoilage microorganisms.

Raw Honey Honey as it exists in the beehive or as obtained by extraction and settling or straining without applied heat.

Spun® Honey See cremed honey.

Typical Composition

As a natural product, the composition of honey is highly variable.

	Average	Range	Standard Deviation
Fructose/Glucose Ratio	1.23	0.76-1.86	0.126
Fructose, %	38.38	30.91-44.26	1.77
Glucose, %	30.31	22.89-40.75	3.04
Minerals (Ash), %	0.169	0.020-1.028	0.15
Moisture, %	17.2	13.4-22.9	1.46
Reducing Sugars, %	76.75	61.39-83.72	2.76
Sucrose, %	1.31	0.25-7.57	0.87
Total Acidity, meq./kg.	29.12	8.68-59.49	10.33
True Protein, mg/100g.	168.6	57.7-567	70.9

Strained Honey Honey which has been passed through a mesh material to remove particulate material (pieces of wax, propolis, other defects) without removing pollen.

Whipped Honey See cremed honey.

Honey Products

Honey products do not meet the compositional criteria for honey.

Deionized Honey A honey product (manufacturing ingredient) which has been processed to remove selected ions.

Deproteinized Honey A honey product (manufacturing ingredient) from which protein has been removed by appropriate processing.

Dry Honey Honey from which substantially all of the moisture has been removed, without the use of drying adjuncts, and which can be returned to its original state by the addition of water.

Dried Honey A dehydrated honey product (manufacturing ingredient) in which edible drying aids and processing adjuncts have been included to facilitate processing and improve product stability. Dried honey may be reduced to a powder.

Honey Extract A natural flavoring product derived entirely from honey by appropriate processes.

Honey Spread A variety of edible, extremely viscous honey products made from honey or cremed honey and sometimes blended with ingredients including fruits, nuts, flavors, spices or margarine but excluding refined sweeteners.

Powdered Honey See dried honey.

Ultrafiltered Honey A honey product (manufacturing ingredient) from which all materials not passing a specified membrane pore size less than 0.1 micron under pressure have been removed. Material removed includes most proteins, enzymes and polypeptides. Evaporation required in the processing may also remove some volatile flavor and aroma constituents.

NOTE: Imitation or Artificial Honey is a mixture of sweeteners, colored and flavored to resemble honey. This product does not meet the definition of honey.

Grading

Current U.S. Standards for Grades of Extracted Honey and Comb Honey are herein incorporated by reference. The grades of extracted honey include factors such as color, clarity, absence of defects, moisture, flavor and aroma.

Methods of Analysis

The official methods of analysis for honey of the Association of Official Analytical Chemists International are herein incorporated by reference.

References:

F:G ratio, Fructose, Glucose, Sucrose: White, J.W.Jr. *Detection of Honey Adulteration* by Carbohydrate Analysis, Jour. Assoc. Off. Anal. Chem. 63 (1) 11-18. 1980.

Reducing Sugars: Calculated from data in White, J.W. et al. *Composition of American Honeys.* Tech. Bull. 1261, Agricultural Research Service, U.S. Department of Agriculture, Washington, D.C. 1962.

Protein: White, J.W. Jr., and Rudy, O.N. *The Protein Content of Honey.* Jour. Apicul. Res., 17 (4) 234-238. 1978.

Moisture, Total Acidity, and Minerals: White, J.W. et al. *Composition of American Honeys.* Tech. Bull. 1261, Agricultural Research Service, U.S. Department of Agriculture, Washington, D.C. 1962.

Honey Board's REQUIRED REPORTS

During the past year, many honey producers have received requests from the National Honey Board for reports. Many may still be wondering whether the reports really apply to you, what you are required to provide or why the Honey Board needs this information.

The National Honey Board requires such reports for three primary reasons:

* To collect assessments in accordance with the provisions of law (the Honey Research, Promotion and Consumer Information Act and Order). These funds are used for honey advertisements, public relations, research programs and more.
* To insure fair and consistent assessment collection.
* To maintain accurate information about the industry.

First handler?

The key to understanding whether you are required to provide reports and collect assessments for the Board is to determine if you act as a "first handler" of honey. Everyone who produces and packs even a small portion of his/her honey for resale, purchases honey from other producers/importers for packing or resale, or imports honey, is considered a first handler. Producers who sell all of their honey in bulk to a packer and don't buy any honey from other producers are not first handlers.

Required reports

First handlers must send in a report called the **Transaction Report**. This report is used to show honey processed or purchased. It takes approximately five minutes to complete. One **Transaction Report** should be filed each month on one's own production packed and one for each purchase from another source. Importers are also required to file monthly reports. All reports must be sent in by the 15th of the following month.

For low volume first handlers, two other applications are available to minimize reporting even further: The **Exemption Application** and the **Reduced Reporting Application**. In response to industry recommendations, the Honey Board has reduced both the number of forms

Continued on Next Page

INNER ... Cont. From Pg. 634

of time to collect all the reports, and any other information they can and make their report to the President (due Jan. 7) who also has a 60-day limit to consider all he is given. By early March the die will be cast.

The President's decision can go in several directions. A quota can be set, so that only a set amount of Chinese honey can come into the country thus limiting supply and raising the price. Or, a fairly stiff tariff can be placed on imported honey, forcing up the price. Or some combination of the two could be made; or, nothing could happen. Time, as the saying goes, will tell.

If this were simply an unfair trade practice I think it would be pretty straight forward. A balance would be struck, and a more or less favorable free market would prevail – with enough protectionism in place to keep things going.

But the political climate in Washington, relative to trade with China (and trade in general) isn't quite that clear. China's status as a Most Favored Nation (MFN) is up soon, and retaining that privilege hinges, according to the present administration, on their domestic improvement in the human rights arena. It appears little has changed. So any decision regarding trade with China should be simple, again, right?

Well, of course it's not. If China's MFN status is recinded there are a hundred other willing customers waiting in the wings to take advantage of China's sudden bad fortune (or maybe ours, depending on your point of view). And the feeling is, can the U.S. afford to lose yet another trading advantage on the international front?

And then there's Hong Kong waiting to change hands, and philosophy, a few years down the road. That also must be considered.

So it is not as simple as it might seem, and it is keenly apparent that no matter how much we wish to avoid it, we are merely players in a global chess game. Pawns, probably, considering the meager value of honey on the world's trading block.

But perhaps the insignificant size of the dispute will be in our favor. Perhaps our so-small amount won't get in the way of the larger issues at stake. And with capitalism growing at light speed in China's cities and farms, perhaps it will all be moot in five years, when any restrictions enacted elapse. One can only hope common sense, and the profit motive will eventually reign.

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There is one aspect of this international trade event that absolutely must not be overlooked, not be forgotten, not be slighted. I'm referring to the unparalleled public cooperation between the American Honey Producers and the American Beekeeping Federation.

It's no secret that when the goals were the same these two groups could pull in the same direction. They have for years. But it's never been a photo op' thing, just 'let's not step on each others toes' sort of deal.

But this ITC business has really got the cooperative juices flowing. There's no doubt that *every* U.S. beekeeper stands to gain from the relief of unfair trade practices and both of these groups know it. Whether you sell 50 pounds out the back door or a million pounds to a packer, you are competing with a foreign economy that has a significantly

Continued on Page 674

REQUIRED REPORTS ... Cont. From Pg. 671

you need to fill out as well as how many times per year reports must be submitted.

If you produce and pack less than 6,000 pounds annually you are eligible to fill out the **Exemption Application** at the beginning of each year for your estimated crop. Honey sold locally will be assessment-free, honey sold to a handler or put through the ASCS loan program will be assessed.

If you produce and pack less than 20,000 pounds annually you are eligible for reduced reporting. To qualify, you must fill out the **Reduced Reporting Application** (the application is good for two years). Then, you need to file only two **Transaction Reports** each year on your own production packed: one for January-June and one for July-December. You must still file a **Transaction Report** for each honey purchase from another source. Honey sold in bulk to another first handler should not be reported by you – the purchaser should fill out the report.

Questions and Answers

Q: Is compliance voluntary?

A: No. Every producer and importer who sells honey is required to pay an assessment for honey research, advertising and promotions and every first handler is required to submit reports on these payments. Non-compliance with the Act and/or Order is a federal offense.

Q: Since ASCS collects the assessment, why do I need to complete reports?

A: Although you may not actually send in the money for the assessment each time (because ASCS did), you still must report on the transactions as explained above. It's been great that ASCS has collected the majority of Honey Board assessments, but this may not always be the case. In addition, some producers are not using the loan program. The first handler is responsible for collection and filing **Transaction Reports.**

Q: I'm only a hobbyist. Do I need to file anything.

A: Even those who produce and sell under 6,000 pounds must apply for exemption from the assessment and reports.

Q: If I only sell bulk honey directly to a local bakery, am I a first handler?

A: In this case you are defined as a producer-packer, and as such are your own first handler.

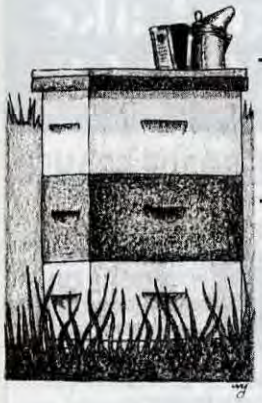
Q: If I buy honey from other producers but I don't pack it, I just resell to another packer, am I a first handler?

A: Yes. As soon as you purchase honey and title passes, you become the first handler.

Q: Should I notify the Board when my name or address changes?

A: The National Honey Board needs to maintain correct name and address information for accurate assessment collection and dissemination of information. This information is used for all mailings including the newsletter, special promotions and ballots. Please keep the Honey Board informed.

If you have further questions about the National Honey Board assessment, call or write Julia Pirnack at the National Honey Board office, 303-776-2337. ○



BEE TALK

richard taylor

"Resourceful beekeepers will survive . . . and rejoice."

The period comprising approximately the first decade of this century has been called "The Golden Age." The honey extractor and comb foundation had become perfected, and the moveable frame hive had become pretty much standardized. The basic biology of the honey bee colony was by this time well understood. Best of all, the hitherto undreamt of possibilities of huge honey crops began to be realized. Resourceful beekeepers here and there became moderately wealthy from their craft, and a significantly large number of these were women. Sweet clover, which had been considered a pestiferous weed, was suddenly discovered to be a valuable crop, for forage and soil renewal, and vast fields of it came into bloom across the midwest. Beekeepers became delirious with joy at the resulting honey crops. I started keeping bees in 1935, sort of at the tail end of all this, but I remember those fields of sweet clover, hardly ever seen anymore outside of the Dakotas.

I think the present decade will be remembered, by beekeepers, as the age of the plagues. Africanized bees have spread in the southwest and are moving right along. Three new bee diseases have sprung up in just the past few years and are now ubiquitous – chalkbrood and two parasitic mites.

Discouraging? I suppose. But there is a brighter side to all this, and I, for one, firmly believe that the worst is over and better days now lie ahead.

First, consider Africanized bees. Evidence strongly suggests that these are a tropical race. They have spread into Argentina only to the edges of the temperate zone, and there they seem to have stopped. On this continent most of the great honey producing regions are in the north, and it is very likely that the Africanized bees will never invade them. These bees seem to have trouble with the winter cluster, which would explain their vulnerability to cold climate.

So I'm not going to worry about Africanized bees. Whatever happens, we know that there is an intimate relationship between any organism and its environment, so I fully expect the aggressiveness of these bees to become moderated in time, just in the natural course of things.

Next, consider American foulbrood. This has long been with us, and is probably the most insidious of bee diseases, because it leaves the hives themselves contaminated. Yet we have found ways to cope with it. And now comes some truly exciting news. It has been discovered, quite by accident, that a natural substance, linoleic acid, seems to inhibit both American and European foulbrood. This substance occurs naturally in oils derived from peanuts, corn, soybeans, sunflowers and so on, and is thus harmless to both bees and people. Indications are that it can be incorporated into routine feeding of bee colonies, and there is reason to believe that it will solve the problems of foulbrood.

With respect to chalkbrood, I know of no encouraging breakthrough. Chalkbrood is not, however, a very serious problem, at least not in my experience. Every year I find a few hives that have it, and I don't get much honey from those, but the bees usually get over it in time, and meanwhile, it does not spread easily from one colony to another. I have often seen colonies side by side, sharing the same hive stand, one of which had chalkbrood and the other of which never got it. This is a fungal disease, and should in time lend itself to effective control.

Now the mites. Tracheal mites were the first to appear, a few years ago, and they created much needless hysteria. I do not worry much about these, at least with respect to the long-term outlook. These mites, which attack the adult bees, are quite selective with respect to their hosts. They tend to avoid bees having certain gross characteristics; for example, those races of bees that are especially fuzzy. Bees in England, where these mites, known as acarine, have long been familiar, have developed a degree of resistance to them. The same will surely happen here. Meanwhile, it has been discovered that the so-called extender patties that beekeepers use to inhibit American foulbrood are to some extent effective against tracheal mites, too. The explanation of this is that such patties have, as their carrier substance, vegetable fat – usually Crisco. This is, of course, harmless to both bees and people, but the bees pick up minute quantities on their bodies and that tends to repel the tracheal mites which would otherwise seek to deposit their eggs in those bees.

My own experience with tracheal mites has been varied. One year I lost quite a few colonies to them, but then, without taking any preventive measures whatever, they disappeared from my apiaries, and I had the two best seasons of honey getting that I have ever had. So I do not lose any

Continued on Next Page

BEE TALK ... Cont. From Pg. 673

sleep over tracheal mites. I am, in any case, quite certain that there is no point in testing your colonies for their presence. Such a test requires microscopic dissection of many bees – 50 or so – and then, even if a mite is found on the fiftieth bee you still have no clue as to how bad the infestation is. You'll know you have tracheal mites if you find a colony with honey in it and virtually no bees, dead or alive. Just install a package or nuc, and you're back in business.

Varroa is something else, and serious. Once one of your colonies gets it you can be sure the entire apiary is infested. There are various tests for *Varroa*, involving quite a bit of fooling around, but the simplest test is just to uncap a patch of drone brood. If the bees have *Varroa*, you'll see it there. It is controlled with Apistan strips. But the good news is that progress is being made with resistant strains. I believe – and the people who really know about this say so too – that we'll have resistant strains in 10 years or less, and treatment for this mite will no longer be called for.

So, maybe it is the decade of the plagues, but I am, at this point, nevertheless encouraged. Resourceful beekeepers, fortified with a bit of courage and optimism, will survive and, better than that, they will rejoice. ❑

INNER ... Cont. From Pg. 672

lower standard of living, and a different philosophy of business.

Personally it is very satisfying to see these two groups work so well together. I have long advocated more cooperation because we are too small an industry to be split, philosophically or emotionally. We stand to lose much more than gain presenting two faces to anyone interested in what we have to say.

So once again I make a proposal that to date has been met with, at best indifference from the groups mentioned above. That being, a joint national meeting.

My argument in the past was that there isn't that much difference in the meetings, per se, but because of costs and time, many venders and attendees must pick and choose one above the other. So why make a choice? Why not have a joint meeting *all* venders can attend (saving big, big bucks on their part, thus lowering *your* prices!), able to attract even more of the speakers that make these meetings worth attending? And, more importantly, more American beekeepers?

I offer this challenge, again, to the two groups. We are a small, though very important cog in American Agriculture. Please, take advantage of this once-in-a-lifetime opportunity. We will all be the beneficiaries.

Kim Flottum

QUESTIONS?

Nectar Sources

Q. The honey my bees have been getting has a very peculiar taste, and I suspect it is from the ornamental holly bloom. I have several holly trees and the bees go wild over the bloom. Have you any information on this?

Hershel E. Ramey
Nickelsville, VA

A. Finding foraging bees on a particular bloom is a very unreliable guide to the source of a particular honey, even when the bees are seen there in abundance. I have often gotten good crops from an easily recognizable source, such as basswood, even in seasons when I could find no bees on those blooms, and have sometimes gotten no honey from another easily recognizable source, such as buckwheat, even when I had seen lots of bees on those blooms.

Not Tasty!

Q. My bees filled the supers with the most beautiful light honey, before the Black Locust bloom, but it tastes and smells terrible. It would make one sick to eat it. Another beekeeper here had the same experience. What is it?

Donald Stambaugh
Prestonsburg, KY

A. There are such things as bad-tasting honeys, but they are rare, and usually they come from the tropics. This is the second report I have had of such honey from your region, and the other was accompanied by a sample, which was indeed awful. I have no idea what its source is, and would be grateful for information from other readers.

Extender Patties

Q. Are Terra-patties, or extender patties, as effective in controlling American foulbrood as dusting with Terramycin and powdered sugar?

Henry L. Yoder
Flemingsburg, KY

A. Yes, more so. Terramycin inhibits American foulbrood by tiny amounts being fed to the larvae, so it has no effect upon any sealed brood that may be infected. The patties, releasing the antibiotic over an extended period of time, thus inhibit the development of the disease in subsequent generations of larvae. The same result is achieved, however, by a succession of dustings - at least three, over intervals of about three weeks each.

TM Confusion

Q. The 6.4 oz. packet of Terramycin I purchased says "This packet contains 10 g. Terramycin." Does this mean it is TM-100? There are directions for its use with cattle, swine, sheep and mink, but nothing about bees.

Duane Wald
Interlaken, NY

A. One would think it must be TM-10, wouldn't one? But no. If you get out your calculator and multiply 6.4 times 2.5, you will get 16. Then if you multiply 10 times 2.5, you get 25. So your packet is formulated at 25 grams of terra per pound of mix. That means that it is TM-25. Confusing, isn't it?

AFB!

Q. Last year I found AFB in some of my hives. This spring I am getting packages and would like to install them on drawn comb. Can I feed packages of Terramycin, and if so, how much? And should it be fed as patties or with powdered sugar?

Edwin McMahon
Brushton, NY

A. Package bees cannot be installed on combs that have been exposed to AFB, even with the use of Terramycin, for they will only get AFB all over again. Such combs must be burned. The hives, without contaminated combs and frames, can be reused provided they are first sterilized by scorching. (Anyone wishing instructions on this may please send me an addressed stamped envelope.) Packages installed in clean equipment need not be given terra, but if one wants to use terra with them, as a precaution, the powdered sugar mix should be fine.

Crystallized Honey

Q. Is it okay to feed combs of crystallized honey to package bees newly in a hive?

Rick Reakoff
Lucas, IA

A. Yes. When colonies are lost to tracheal mites there is almost always honey still in the combs, often granulated. Go ahead and use those combs with the package bees.

Birds & Bees

Q. The flight path of my bees takes them right past a purple martin house, but the birds seem to pay no attention to them. Do purple martins eat bees?

Wayne Gretencord
Woodbridge, VA

A. This question keeps coming up. The authorities I have checked say that purple martins do not eat bees, and your observation seems to confirm this.

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

ANSWERS!

Richard Taylor

?Do You Know? Answers

1. **True** During swarming preparations, the queen is placed on a strict diet and loses approximately 1/3 of her weight which enables her to fly when the swarm leaves.
2. **False** Death due to European foulbrood normally occurs in uncapped cells with the larva still in the curled stage.
3. **False** Honey bees were not present in North or South America prior to the migration of Europeans to these continents.
4. **False** The presence of larval skins in front of a colony is an indication that the colony is starving.
5. **False** Fructose and glucose are the predominant sugars found in honey.
6. **True** Below 40°F, no larval wax moth feeding or growth occurs.
7. **True** Even though a queen has a sting, she does not produce isopentyl acetate. Drones lack a sting and do not produce or respond to alarm pheromones.
8. **False** Honey bees should not be moved into a crop until some of the blossoms have opened and the flowers are attractive to them. Otherwise they get locked in on other floral sources. (Movement timing into areas where other floral sources do not occur is not as critical.)
9. **False** U. S. Grade A Honey cannot contain more than 18.6 % moisture.
10. **True** Colonies preparing to swarm have a reduction in foraging activity approximately one week prior to swarming. This behavioral change is associated with honey engorgement related to wax gland development and scouts searching for a new homesite.
11. **True** Older queens either produce less queen substance as they age or enter a cycle of production with periods of lowered secretion that are more conducive to swarming.
12. **False** Both worker-size and drone-size cells are reused for brood production in the honey bee colony. Queen cells, however, are destroyed by the workers after the queen emerges or is killed by rival queens prior to emergence.
13. **True** Royal jelly is fed to queens throughout their larval and adult lives and also to young worker and drone larvae.
14. **True** Any fertilized egg laid by a queen is capable of becoming a queen; whether an egg develops into a queen or a worker depends upon the food received during its larval life.
15. **True** The honey bee uses the position of the sun as a compass in both flight and while performing a communicative dance indicating directions to a new food source or home site.
16. **False** Queen substance is not produced in the mandibular glands of the worker honey bee.
17. **False** No significant chemical differences between venoms of Africanized and European honey bees are known.
18. **True** Not only does a mature queen produce queen substance that inhibits the rearing of new queens, immature queens in sealed cells will also depress the production of additional queen cells.
19. **False** Paradichlorobenzene crystals kill wax moth adults and immature stages, but not eggs.
20. **False** Bees located on the surface of the winter cluster are packed tightly together forming an insulating shell which varies in thickness from 1-3 inches. The bees within the cluster are much less compact and generate heat through metabolic processes.
21. **False** Laying workers behave like normal worker bees, participating in all other hive activities in addition to laying eggs.
22. **False** Spores are produced by the pathogens that cause American foulbrood, Nosema and Chalkbrood, but not Sacbrood (which is a virus).
23. **True** During the summer, hypopharyngeal glands change rapidly in size as the honey bee ages. The glands shrink after the worker switches from nursing activities to foraging in the field. In the winter, all bees have large hypopharyngeal glands.
24. **True** Honey yeasts will not grow at temperatures below 52°F, thus storage of honey below 50°F will protect it from fermentation, regardless of moisture content.
25. **False** Low moisture honeys normally granulate slower than high moisture honeys.
26. **False** Only adult female varroa mites are found on adult bees and can live outside the brood cells. This behavior allows the mite to survive the winter when the colony is not rearing brood.
27. **True** Races in bees are like breeds in animals and varieties in plants. Being of the same species, these races can interbreed and produce viable offspring.
28. **True** The number of foragers dancing in the hive is related to the quantity and richness of the food source. The sweeter the sugar content of the food source, the more vigorous are the dances.
29. **False** European foulbrood, not American foulbrood-killed larvae are seen as coiled or twisted remains within the cell. Scales of dead larvae are easily removed unlike AFB scale which is firmly attached to the bottom of the cell.
30. **True** Primary swarms are normally composed of the old queen, a few drones and 50-60% of the workers; a mixture of bees of all ages.
31. **True** Pesticide spray formulations vary significantly in their toxicity to honey bees. Wettable powder formulations, which can leave a powder-like residue, are often more hazardous to bees than either emulsifiable or water-soluble concentrate formulations.
32. **True** Research has shown that a larvae fed the spores that cause chalkbrood will only develop the disease if they are physiologically stressed in some way.
33. **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.
34. **True** All honeys will darken and lose flavor in time while in storage. This deterioration involves both chemical and physical changes that are speeded up by high temperatures.
35. **False** Only the spore stage of Bacillus larvae is capable of initiating the disease.

Continued on Next Page

ANSWERS ... Cont. From Pg. 677

36. **True** Nurse bees begin to visit cells as soon as eggs are laid and continue at frequent intervals throughout the duration of the egg and larval stages.
37 **True** Worker honey bees can discriminate between sister and half-sister workers and queens in both the larval and adult stages.
38. **False** In order to have a high quality queen, new splits should receive either a new queen or queen cell rather than have them raise an emergency queen from the brood provided.
39. **False** Honey is primarily a source of carbohydrates with 95 to 99.9 percent of the solids being sugars. Even though honey contains some minerals and vitamins, it cannot be considered vitamin and mineral rich.
40. **True** Each colony has a distinctive odor which is shared by all of its members. Odor differences are used by guard bees to recognize robbers, new queens and individuals that have drifted to the wrong colony entrance.
41. **True** Africanized honey bees have a greater tendency to swarm than the European honey bee: 3-4 times annually in comparison to 1-2 times.
42. **False** European honey bees hoard significantly more sugar syrup (honey) than Africanized honey bees.
43. **True** Africanized honey bees are highly defensive. They respond to colony disturbances more quickly, in greater numbers and with more stinging than European honey bees.
44. **True** In response to adverse conditions, Africanized honey bees frequently abscond and migrate long distances to new nest sites. European colonies rarely abscond.
45. **False** The Africanized honey bee is just slightly smaller than the European honey bee.
46. **True** Africanized worker cells in natural comb are smaller in diameter than the comb cells of European honey bees.
47 **True** Development time from egg to adult is shorter for Africanized than European honey bee workers: 18-20 days in comparison to 21.
48. **True** African bees forage at lower temperatures and light intensities, and fly earlier and later in the day than the European honey bee.
49. E) 70° F
50. D) Virus
51. D) Five
52. C) 100
53. A) 4 weeks
54. E) 145° F
55. B) 6
56. B) American foulbrood, European foulbrood
57 E) Pesticide poisoning
58. D) Anther
59. B) 12 Days
60. A) 3 Weeks
61. C) 20 Feet
62. E) Solar radiation or sunlight
63. D) 12-18 Hours
64. E) Carniolan
65. D) 10 Days
66. D) 92°-94° F
67 C) Iron
68. D) Remove bees from honey supers
69. B) 53 hours
70. A) 1-2 days old
71. Honey bee colonies use water for temperature regulation (cooling), to dilute thick honey, and liquefy crystallized honey. Water is also needed in their own diet and to raise brood.
72. Worker 21 days, Drone 24 days, Queen 16 days
73. Absconding is when an entire colony of bees abandons the hive because of disease, wax moth, or other maladies. Even though some brood may be left behind, no provision for the replacement of the queen occurs.
74. Quantity and quality of food fed the queen
Number of nurse bees present in the colony
Availability of fresh pollen and nectar
Temperature of the hive or in the brood area
75. Age of the worker bee
Needs of the colony
76. Orientation flights
Swarming
Absconding
Mating flight
77 Empty comb stimulates the hoarding instinct and should result in greater honey production.
78. Cut comb honey
Section comb honey
Chunk honey
79. Chemical Repellents (Benzaldehyde or Bee-Go®)
Porter bee escapes
Shaking or brushing the bees from the combs.
Bee blowers
80. E) Nosema Disease
81. C) European Foulbrood
82. B) Sacbrood or C) European Foulbrood
83. D) American Foulbrood or B) Sacbrood
84. D) American Foulbrood
85. B) Sacbrood
86. A) Chalkbrood
87 I) Varroatosis (*Varroa* mites)

There were a possible 100 points in this final exam. Check the table below to determine how well you did. If you scored less than 60 points, do not be discouraged. Keep reading and studying- you will do better in the future.

Number Of Points Correct
90-100 Excellent (A)
80-89 Good (B)
70-79 Average (C)
60-69 Fair (D)

DO PESTICIDES AFFECT LEARNING?

carolyn gonzales

What would happen to agriculture if honey bees and other insects "forgot" to pollinate crops? Such an idea may seem like science fiction, but maybe not.

Actually, no one knows for sure how everyday pesticides affect the learning and memory of insects, or other living organisms for that matter, says Dr. Charles Abramson, an OK State University assistant professor of psychology, who is pioneering experiments that will study the effect pesticides have on the learning and memory capacities of invertebrates.

Changes in animal behavior due to the presence of pesticides or other chemical pollutants can be important for a number of reasons. Not only do we depend on certain creatures such as insects to pollinate our crops, but we might also use invertebrates as early warning signs of chemical toxicity levels which may affect humans, says Dr. Abramson.

"Many of the rules of the learning process are the same for us as for them. That's why a big area of research, called simple system research, looks at the nervous systems of invertebrates to get an idea of the mechanisms involved in learning and memory. We're at the forefront of this research," he says.

"Too many people rely on lethal dose curves – whether or not a chemical kills an animal," Dr. Abramson adds. Although an animal may not die from a toxin, subtle changes that affect its behavior could be occurring.

The use of toxins in this country is overwhelming, but very little is known about how they affect the nervous system. "With the invertebrates, we can actually get a handle on this," he says.

Before looking at the effect pesticides have on his invertebrates, Dr. Abramson and his student researchers have had to develop new procedures that determine the learning and memory capacities of animals before they are exposed to pesticides.

Honey bees, flies, earthworms and crabs are used. Eventually, he will study animals all the way from single cell protozoa to fish. He will not be able to study human beings in his lab due to limited facilities, but he says he may collaborate with others in this area.

The next step in Dr. Abramson's work will be to use his new procedures to see how pesticides disrupt learning and memory in a freely moving animal.

Next, the researchers will make more refined measurements with the animal restrained, which allows the pesticide to be applied in a more controlled fashion. At this point, the researchers will not be looking at behavior per se, but at the neural activity associated with certain behavior.

The final step will entail extracting portions of the animal's nervous system and looking at how the chemical directly affects the system. Dr. Abramson says possible results from gaining more knowledge about behavioral changes caused by toxins could include the development of other chemicals that block or reverse the effect of the toxins.

"Also, the more you know the behavior of invertebrate pests, the less toxin you're going to use and the more efficient the application can be. Instead of poisoning the environment, you can target the pest because you know more about them," he says.

Carolyn Gonzales is the Communications Coordinator at Oklahoma State University.

Gleanings

DECEMBER, 1993 ALL THE NEWS THAT FITS

FEDERATION MEETS IN ORLANDO

The ABF will meet in Orlando, FL January 18-23, 1994 at the Sheraton World Resort Hotel.

Program topics include Status of the ITC; Beekeeping Research, Dr. H. Shimanuki; European Beekeeping Research, Susan Cobey; A New Diagnostic Technique for Varroa, Dr. Eric Erickson; The New USDA Honey Program; Africanized Bees in TX and AZ, Soon to Be in CA and FL.

Workshop topics include Honey Promotion Opportunities and Methods; Using Computers; Packing Your Own Honey; Negotiating toward a Win-Win Result; The Basics of Beekeeping; Being a Better Businessman; Beeswax Candles and Ornaments.

For information contact ABF at (912) 427-8447. For hotel reservations call 1-800-327-0363 or (407) 352-1100. The rates are $79 per night single/double/triple/quad.

LOOSESTRIFE FINDS A FRIEND

Some folk remedies for diabetes appear to be based on fact rather fiction. That's what ARS researchers are finding in studies to identify foods that may help control diabetes in lieu of drugs. They used a well known test-tube assay of insulin activity to screen extracts of 24 plants that have a reputation for antidiabetic properties. The assay measures the ability of a substance to enhance glucose oxidation in the presence of insulin. Nine of the 24 plants boosted insulin activity from two to 4.5 fold. The common weed, loosestrtife (*Lythrum salicaria*), produced the biggest increase. Others were bearberry (*Arctostaphylos uva-ursi*); hops (*Humulus lupulus*); lavender (*Lavandula stoechas*); oregano (*Origanum vulgare*); sage (*Salvia offininalis*); dandelion (*Taraxacum officinale*); sweet bay (*Laurus nobilis*); and birch (*Betula lenta*). These substances are generally prepared as teas or tinctures. Sage and oregano are common herbs used in cooking. Hops and lavender are food additives generally recognized as safe. Earlier assays found several spices, such as cinnamon and tumeric, to be effective. The researchers ultimately hope to test the most effective compounds in human studies.

EAS STARTS RESEARCH FUND

EAS has established a foundation to fund research on bees, beekeeping, or related topics.

The EAS Foundation has been endowed by funds from the 1992 Conference at Guelph, Ontario and by a generous donation from past Board Chairman Bob Cole of North Carolina. The fund will annually solicit proposals to assist research of importance in apiculture. A distinguished panel of beekeeping specialists, under the direction of the EAS Board, will evaluate the proposals and select those worthy of funding. EAS expects to award one or more research grants beginning with the 1994 Conference in Pennsylvania.

A tax-deductable donation to the EAS Foundation for Honey Bee Research will help make relevant and important honey bee research possible. The goal is to match the initial $2,500 established in the fund before the annual conference in July, 1994. An anonymous donor has pledged $500 toward the second $5,000 if member donations will double the $2,500 now available. All funds will be used to further research of interest to beekeepers.

Dewey Caron, EAS Chairman

Please join in support and send your tax-deductible donation to: EAS Foundation for Honey Bee Research, c/o Don Chirnside, 201 Briarbrook Drive, North Kingstown, RI 02852.

HONEY BOARD RECIPES

The National Honey Board has developed new bulk honey recipes for noncommercial food service operators such as schools, business and industry cafeterias and colleges.

The recipes are printed on cards which feature other ideas for using honey and usage tips. Recipes include Honey-Lemon Butter for baked fish or chicken, Honey Tomato Sauce for open-faced sandwiches, a pear and honey dessert and Honey-Orange Peanut Butter Spread.

Recipe cards are available on request from the National Honey Board.

Beekeepers on the List

ANIMAL RIGHTS GROUPS CHALLENGED

A government report conveyed to the leaders of Congress in September draws a dramatic, chilling picture of the growing negative impact of animal rights violence on U.S. food production. After months of investigation, the U.S. Department of Justice and the Department of Agriculture released in September their "Report to Congress on the Extent and Effects of Domestic and International Terrorism on Animal Enterprises" The report demonstrates that attacks against U.S. food/agriculture enterprises are second only to those leveled against biomedical research.

"We applaud the incredible effort of the Justice and Agriculture Department investigators in researching and compiling this ground-breaking study," said Animal Industry Foundation (AIF) President Steve Kopperud.

"Animal rights extremism was found to have compounding effects that often can be substantially disruptive to the commercial or professional operations of a victimized animal enterprise, or in some cases, can be threatening to an individual's safety", the Justice and Agriculture Departments said in a letter conveying the report to Vice President Al Gore and House Speaker Thomas Foley.

"While chilling – and to those who've not followed the violence, perhaps frightening – the report confirms what agriculture has known for a decade, namely violence against farmers, ranchers, meat processors and retailers in the name of animal rights is intensifying, and if left unchecked will seriously affect U.S. food production, and possibly the personal safety of those who work to feed this country", said AIR Ex, Director Laurie Eller.

The report to Congress was mandated as part of PL 102-346, the Animal Enterprise Protection Act of 1992, which for the first time creates a section of the federal criminal code dealing expressly with animal rights terrorism.

The study covers 1977 through June, 1993, and shows 28 animal user types were targets of animal rights terrorism during that period. In all, 313 violent incidents were documented through media reports and interviews with law enforcement authorities, with the caveat that many more are unreported.

While the confirmed incidents were attributed to 23 "extremist entities", the report found all extremist animal rights groups are believed to be linked by "leadership, membership, or both" The report describes People for the Ethical Treatment of Animals (PETA) as the oft-time publicist of the Animal Liberation Front, considered the leading animal terrorist organization by the study. PETA is the group most concerned with beekeeping as a violation of animal rights.

"Taken together, the biomedical research community, the food industry (food production and retail) and the fur retail industry represent almost 82% of all animal enterprises victimized these three industries have been targeted systematically and persistently by animal rights extremists", the report states.

Rep. John Boehner (R., Ohio), member of the House Committee on Agriculture and co-chair of the Congressional Animal Welfare Caucus, said of the report:

"While I commend the efforts of Justice and USDA, this study paints a sad picture. It's infuriating that the men and women who feed this country are targets of this unmitigated terrorist activity. I am gratified our FBI will continue to monitor these crimes, and I urge their swift investigation and prosecution"

SEND YOUR MEETING NOTICES AT LEAST TWO MONTHS IN ADVANCE

But Production Down

CANADA'S COLONIES INCREASE

Canadian beekeepers are reporting a mixed season with some areas recording above average production, others coming in below long-term production figures.

The good news is that in many areas the number of hives has increased.

The Manitoba Keepers Association said preliminary estimates indicate the province's beekeepers have increased their colony numbers for the first time since 1985.

The 12% increase over 1992 levels put the number of colonies at about 85,000.

Early reports on honey production in Manitoba indicated considerable variation among regions.

However, when all figures are put together, the association estimates a 10-20% drop on the province's long-term average production.

The association said if the early indications hold this would translate into a drop in provincial production of about 1.5 million pounds to about 11 million pounds. In 1992, total production was 12.5 million pounds.

Preliminary reports from Saskatchewan, Alberta and British Columbia, indicate a similar situation.

There has been an increase of about 10% in producing colonies over last year and an average honey production that was down on the long-term western Canadian average.

Early reports from Ontario, Quebec and the Maritime provinces in eastern Canada indicated an above average production.

Overall, analysts said total honey production for 1993 would probably come in lower than in 1992 with a continued shortage of colored honey.

Elba Quintero Moves On

AHB STATION SHUTS DOWN

This will be the last update I write from my office in Harlingen, Texas. I will be on a special assignment in Washington, D.C. from October 18 thru December 16, 1993. During my absence Mr. Bob Brittingham will respond to your questions and needs. Mr. Brittingham can be reached at 301-436-8247, and his office is located at 6505 Belcrest Road, Federal Building, Room 641, Hyattsville, Maryland 20782. At the beginning of 1994, I will be transferred to Phoenix, Arizona.

I would like to thank everyone from the Central Region for the support they provided me during the duration of this program. I also, want to thank each and everyone from Texas A&M University, Texas Department of Agriculture, Extension Service, County Agents, Health Departments, Fire Departments and the Beekeepers Association for all your cooperation and support.

The Arizona Department of Agriculture (ADA) reported two additional finds during the month of September, 1993. The most recent find and the closest to the California border was picked up in a trap located approximately four miles west of Yuma, Arizona. The ADA immediately began to place additional traps in the area. The second swarm was picked up in a tree near Arizona City. Arizona City is located about 10 miles southeast of Casa Grande, Arizona. There are now 12 confirmed AHB finds in the state of Arizona.

BORROW CAREFULLY

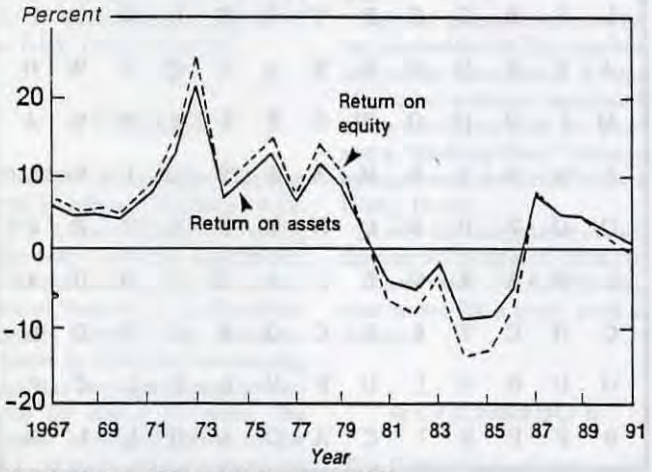
Though farmers generally benefited from borrowing in the 70s, you need to carefully analyze your operation and assess your situation before investing borrowed funds today. You'll note from the graph that the average producer's return to equity exceeded the return on assets prior to 1981, but since then, except for 1987, it has been below the return to assets.

For borrowing to be profitable, the return to equity must exceed the return on assets. For this to occur, the return on assets must be greater than the cost of borrowing money.

As revealed by a study of 100 farms in the NE Farm Business Assoc. from 1982-88, borrowing can pay. The 10 most profitable farms had higher debt-to-asset ratio than the group average. They incurred debt for productive purposes and paid it off. Managers of unprofitable operations often accumulate debt, substituting it for cash flow from the business.

(From Doane's)

AGRICULTURAL RETURNS ON ASSETS AND EQUITY



USDA National Financial Summary, 1991.

EXPORTS ENHANCED

The Gulf Standards for Honey have been revised. The previous standards were non-tariff trade barriers which restricted the entrance of U.S. honey into the Saudi Arabian market. The new standards lower the diastase enzyme level from eight to three and increases the standard for HMF from 40 mg/kg to 80 mg/kg.

This revision was initiated following a technical seminar conducted by the National Honey Board (NHB) on May 25, 1992. The NHB, the USDA's Foreign Agr. Service and the Saudi Arabia Standards Cooperation Program conducted a technical seminar in Saudi Arabia to deliver information on U.S. honey standards, quality control and testing procedures. Attendees included Saudi Arabian government officials, Gulf Cooperation Council country representatives and key Saudi Arabian trade representatives.

"There was resistance and opposition to changing the standard from the other major global honey exporters to Saudi Arabia" said Bob Smith, executive director from the National Honey Board. "However, Saudi Arabia was anxious to allow quality U.S. honey in the market." This revision represents expanded opportunities for U.S. honey exporters to the gulf states, said Smith.

KILLS WASPS NOT BEES

A New Zealand researcher has reported success with the development of a poisoned bait that kills wasps, but doesn't effect bees.

Dr. Eric Spurr, an entomologist with Landcare Research, a government experimental science institute, said the bait will cut wasp numbers in a given locality by 90% in 10 days.

Spurr told a national conference of the Plant Protection Society that the bait uses a sardine-based catfood to attract.

Elliot Chemicals, an Auckland company, has applied to the New Zealand Pesticide Board to register the poison for use this year. Spurr said the intellectual property rights belong to Griffin Corp. in the United States.

Spurr said the combination of bait and poison was a breakthrough because wasps in rural areas take the poison back to their nest where it kills several generations of wasps.

New Zealand is described by ecologists as being the country with the worst wasp problem in the world and Spurr said the breakthrough would be a relief for beekeepers and other rural operators.

Spurr has tested the bait for the last two years in beech forests in the Canterbury area of the South Island. He said the wasps – which normally feed on the honeydew on the beech trees – took the poison back to their nests.

The bait was effective up to a distance of about 450 feet – the maximum wasps usually range from their nests. It took 10 days to cut the wasps down by 90%.

Spurr said this was slower than the highly toxic 1080 poison now used for wasps, which took two days to achieve a 90% kill. But 1080 is a threat to mammals and its use is restricted to approved operators.

The new bait would be the first effective wasp killer available for public use. It will be marketed in New Zealand under the name Finitron.

He said there was little chance the poison would kill non-target species because few found it attractive and baits were to be used in feeders on above-ground poles.

"The compound is not very toxic to mammals and birds, so there is little risk it will affect humans, dogs and cats," Spurr said. "It is 10,000 times less toxic than 1080 poison to rats."

The bait is less effective on wasps in urban areas because wasps there have access to a wider variety of foods, but Spurr said he hoped to develop a bait for use in urban areas which would attract wasps but repel bees.

RARE PLANTS CATALOGED

In early 1994 the World Conservation Monitoring Centre (WCMC) will publish the first global list of threatened plants. This is a culmination of 15 years of data gathering and analysis, and attempts to incorporate all Red Data Books and Red Data Lists as well as other published and unpublished information on threatened plants. Information on approximately 70,000 taxa is maintained in BG-BASE, a PC-based RDBMS application. This 1,000+ page book will comprise around 36,000 taxa (ca. 15% of known vascular plants) that are threatened at either the country or world level and will include the scientific name, Red Data Book category at the world level, inclusion on CITES Appendix, distribution by country and Red Data Book category within each country. Data sources for nomenclature, distribution, and conservation information will also be included. Due to space constraints, synonymy, life form, common names, and presence in cultivation will be excluded.

In the late stages of this project, WCMC is attempting to fill the obvious gaps and would appreciate hearing from anyone who would be willing to help supply new or update existing information. There are, of course, many errors, inconsistencies, and gaps – inevitable in a data set of this size – but WCMC is attempting to correct as many as possible before going to press. If anyone is willing to supply either geographically or taxonomically based information in a very short time frame, or if there are any questions about this project, please contact Kerry Walter by e-mail(Kerry.Walter@wcmc.co.uk) or call 44 22 327 7314. Please state the region(s)/taxonomic group(s) for which you would be willing to provide data, and how quickly you could review or supply information.

FIND THE HIDDEN WORDS
BEE PLANTS

ALFALFA
ASTER
BASSWOOD
BERBERIS
BUCKWHEAT
CITRUS
CLOVER
COTTON
CROCUS
DAHLIA
ERICA
FIREWOOD
FUCHSIA
GALLBERRY
HOLLY
MALLOW
MIGNONETTE
NEPETA
POPPY
RIBES
SAGE
SOYBEANS

M	U	P	Y	R	R	E	B	L	L	A	G	N
W	I	K	O	I	J	E	N	Y	U	X	E	Z
O	N	G	B	P	R	S	V	S	L	P	D	R
L	V	E	N	B	P	O	Q	O	E	L	O	H
L	S	R	E	O	B	Y	P	T	L	D	O	I
A	P	R	U	G	N	B	A	C	Q	C	W	H
M	I	D	O	O	W	E	R	I	F	B	S	A
S	N	S	T	E	H	A	T	T	O	J	S	L
O	U	T	H	W	Q	N	Y	T	C	T	A	F
L	O	R	K	C	R	S	A	G	E	H	B	A
C	H	C	T	S	U	C	O	R	C	P	D	L
G	U	B	O	I	U	F	V	L	S	L	C	F
B	K	E	R	I	C	A	D	A	H	L	I	A

1993 YEAR-END INDEX

TITLE INDEX

AHB - The Change ..... 442 Aug.
Alternative Financing ..... 255 May
Am I Too Sensitive? ..... 58 Jan.
Arkansas Bee Spill ..... 382 Jul.
Assembling Equipment ..... 34 Jan.

Basics For Extracting Honey ..... 426 Aug.
"Bee" Creative Curriculum ..... 494 Sept.
Bee Man of Owensboro ..... 149 Mar.
Bee Spill Emergency ..... 283 May
Bee Talk ..... 46, 108, 169, 220, 287, ... 337, 391, 458, 508, 569, 621, 673
Black Locust ..... 320 June
Brambles ..... 211 April
Bring It On Home ..... 216 April
Build A Better Business Plan ..... 387 Jul.
But for the Living ..... 153 Mar.
Butterflies That Make Sugar ..... 472 Aug.

Cell Door ..... 651 Dec.
Choosing an Apiary Site ..... 285 May
Cox Honeyland: An Innovative Honey Business From Utah ..... 608 Nov.

Day in the Life ..... 137 Mar.
Dead Colonies Tell Lots of Tales ..... 644 Dec.
Dealing with the Dead ..... 152 Mar.
Do I Feed Now? ..... 140 Mar.
Do You Know? (monthly quiz) ..... 16, 74, 136, ... 198, 253, 314, 364, 425, 486, 535, 661
Do Pesticides Affect Learning ..... 680 Dec.

Excluders ..... 42 Jan.
Extracting Honey ..... 426 Aug.

Fall Requeening ..... 365 Jul.
Fateful Sting ..... 200 Apr.
Fire! ..... 103 Feb.
Firebees Have Promise ..... 300 May
First AHB Colony in Tucson ..... 548 Oct.

Georgia On My Mind ..... 207 Apr.
Get Rich Quick ..... 184 Mar.
Getting There ..... 204 Apr.

Harvesting & Packaging Round Comb Honey ..... 393 Jul.
Herbal Honey Recipes ..... 28 Jan.
Home Harmony ..... 43, 98, 166, 280, 333, ... 385, 454, 505, 619,668
Honey Bee Spill Handled With Soapy Water ..... 382 Jul.
Honey Bees of Santa Cruz ..... 272 May
Honey Defined ..... 670 Dec.
Honey Labels for Today's Market ..... 444 Aug.

In English, Please ..... 236 Apr.
Inner Cover (Editorial) ..... 4, 64, 124, 188, ... 240, 304, 352, 412, 476, 526, 586, 634
Inspector, The ..... 144 Mar.

Jar Tags ..... 545 Oct.
Just for Fun ..... 408 Jul.
Just Who Are Those Honey Reporters? ..... 247 May

Keeping "Pure" in Pure Honey ..... 162 Mar.

Laying Workers. A Primer ..... 369 Jul.
Letter to Bill ..... 118 Feb.
Loosing Loosestrife ..... 374 Jul.

Man Who Loved Mysteries ..... 34 Jan.
Mann Lake Supply ..... 437 Aug.
Marketing ..... 258 May
Meet Andrew Matheson ..... 86 Feb.
Meet Bob Cole ..... 501 Sept.

Ode to the Hive Tool ..... 348 Jun.
Oregon Ordeal ..... 22 Jan.
Other Stinging Insects ..... 372 Jul.

Packers, The ..... 92 Feb.
Perfect Rounds ..... 393 Jul.
Pesticides & Honey Bees ..... 383 Jul.
Phenology ..... 164 Mar.
Plastic Again ..... 131 Mar.
Pollinating Cranberries ..... 600 Nov.
Pollination In Arizona ..... 646 Dec.
Promoting Honey ..... 488 Sept.
P.R. From The Beeyard ..... 540 Oct.

Queen and You, The ..... 76 Feb.
Questions and Answers ..... 47, 109, 172, 224, ... 289, 339, 397, 460, 510, 570, 622, 675

Race Relations ..... 282 May
Record Keeping ..... 38 Jan.
Records II ..... 83 Feb.
Removing Bees. I ..... 268 May
Required Reports ..... 671 Dec.
Research Review ..... 14, 72, 134, 196, 250, ... 312, 362, 422, 484, 534, 598, 642
Running A Bee School - Starting Out ..... 617 Nov.
Running A Bee School – 2 ..... 657 Dec.
Russian Beekeeping ..... 612 Nov.

Sealing Wax ..... 489 Sept.
Shine On! ..... 160 Mar.
Some Thoughts On Bee Removal ..... 379 Jul.
Spray Kill in February ..... 24 Jan.
Springtime in the Rockies ..... 145 Mar.
Sting Stories ..... 520 Sept.
Stop! Bees in the Road ..... 324 Jun.
Supering and Bee Behavior ..... 329 Jun.
Swap Meet ..... 451 Aug.
Swarm Calls ..... 265 May
Swarm Retriever ..... 157 Mar.

Take the Bite Out of Tracheal Mites ..... 100 Feb.
Taste of Mead ..... 430 Aug.
Texas Tale ..... 336 Jun/
Thai Farmer's Wife, The ..... 615 Nov.
Transferring Bees ..... 450 Aug.

Continued on Next Page

TITLE INDEX ... Cont. From Pg. 689

Understanding Drones ..... 316 Jun.
Uniting Colonies from an English Perspective ..... 276 May
Up Close and (very) Personal ..... 262 May
Upward Ventilation ..... 567 Oct.
Using Honey Vinegar ..... 433 Aug.

Valentine for My Bees ..... 80 Feb.
Varroa Facts ..... 17 Jan.
Visit to Heifer International ..... 41 Jan.

Wax Worm Fritters ..... 448 Aug.
What About Wax Moth? ..... 604 Nov.
What Did I Do Last Time? ..... 213 Apr.
What Is IBRA? ..... 87 Feb.
What's a Beginner to Believe? ..... 536 Oct.
What's The Point? ..... 665 Dec.
Winter Prep ..... 491 Sept.
Winter Well ..... 551 Oct.
Wintering Your Bees ..... 498 Sept.
Word Search 459, 576, 684

SUBJECT INDEX

American Beekeeping Federation (ABF) 49
American Foulbrood (AFB) 220, 534
African bees 14, 442
Africanized bees 30, 196, 548
Agriculture
  Census 53
  Clinton's role 52
Apiary location 285

Bait hives 287
Bears 50
Bee behavior 329
Bee inspector 144
Bee school 617, 657
Beekeeping museum 228
Bee removal 268, 379
Bee spills' 283, 324, 382
Beeswax polishes 160
Beginner beekeeping 536
Blueberries
  a native plant 333
  pollination of 72, 422
Brazilian beekeeping 196
Bumble bees, raising 362
Business plan 387
Business profile
  Mann Lake Supply 437
  Cox Honey Land 608

Canada 51
Cape bee 534
Colony health 253
Comb honey, handling and packaging 393
Cooking with honey 563, 619

Dance language 250
Dance language controversy 169
Dead Colonies 152, 644
Drones, understanding 316

Equipment 34, 74, 131, 157
Extracting 426

Feeding bees 80, 140
Financing your operation 255, 387
Fire 103

Georgia beekeeping 207
Getting started 16
Government Research Agencies 217

Hive managemet
  fall 365
  spring 108, 145, 152, 153, 569
  winter preparation 337, 551, 552, 555, 558, 559, 560, 567
Honey bee biology
  a mystery 458
  pollen press 263
  body temperature 642
Honey
  and garlic 466
  herbal 28
  keeping it pure 162
  properties of 598, 670
Honey labels
  appeal of 294, 444
  new rules 173
Honey packers 92
Honey plants
  black locust 320
  brambles 211
  loosestrife 374
  phenology of 164
  saw palmetto 134
Honey reporters 247
Honey sales 545, 615
Honey vinegar 433

IBRA 87
Industry Organizations 217
International Organizations 217
Interview with
  George Jones 149
  Orley Taylor 30
  Andrew Mattheson 86
  Jerry Schwanke 391

Laying workers, a primer 369

Marketing 258, 540
Mead
  American Mead Ass'n 176
  making 431
  new journal 294

National Honey Board Reports 671
Nectar 198
Nectar flows 621

Ohio Ag. book 53

Pests 136
Pesticides
  coping with 383, 680
  in honey 72
Pheromone, artificial 228
Plastic comb 131

Pollen 198
Pollination 204, 600, 646
Propolis 46
Public relations 540

Queen excluders 42
Queens
all about 314
and honey production 422
and you 76
development 423, 458, 651

Recipes, honey 43, 98, 166, 280, 385, 448, 454, 668
Record keeping 38, 83, 213, 661
Requeening 365
Research, a day in the life 137
Royal jelly 72
Russian beekeeping 612

Santa Cruz, honey bees of 272
State and Provincial Organizations 211
Sting reaction 200, 665
Supering 329, 422
Swap meet 451
Swarm collection 216, 265, 324, 336
Swarm retriever 157

Terramycin 220
Tracheal mites 22, 24, 100
Transferring bees 450

Uniting colonies 276
USDA
and mite resistant bees 110
news of 50, 176

Varroa mites 17
Varroa resistant bees 312

Wasps, yellow jackets, hornets 372
Wax moths 586, 604
Wax worm fritters 448

AUTHOR INDEX

Bambara, Stephen 28
Beach, Steve 200
Bennett, Gladys 646
Bonney, Richard 34, 76, 140, 204, 300, 316, 365, 426, 491, 545, 617, 657
Boretz, Harold 236
Burgett, Michael 558, 615

Caron, Dewey 41, 501, 555, 665
Collison, Clarence 16, 74, 136, 198, 253, 314, 364, 425, 486, 535, 661
Clark, Walter 258, 444, 540

Dalby, Richard 320
Damerow, Gail 448
Delaplane, Keith 207, 560
Doyle, Vincent 651
Drummond, Mike 58

Eakins, B.J. 612

Filbeck, Bruce 536
Flottum, Kim 4, 30, 64, 86, 92, 124, 137, 188, 240, 304, 352, 374, 412, 437, 476, 526, 586, 634

Geissel, Nell 472
Goltz, Larry 103, 451
Gonzales, Carolyn 680
Grahl, Cindy 372

Hendricks, Dan 408, 630
Harman, Ann 43, 98, 166, 280, 333, 385, 454, 505, 563, 619, 668
Hutchison, Paul 324

Kime, Shawn R. 283

Matheson, Andrew 162
Morse, Roger 14, 17, 72, 134, 152, 196, 250, 312, 362, 369, 422, 450, 484, 534, 551, 598, 642

Nellis, Caroline 149

Ott, Jeff 38, 83, 157, 216, 430

Popinchalk, Peter 494

Ratnieks, Francis 608
Royce, Lynn 262

Sames, Bill 604
Sammataro, Diana 393
Sanford, Tom 42, 144, 282, 442, 488, 567, 667
Scott, Howard 118, 348, 520, 580, 600, 694
Showler, Karl 276
Simon, Charles 184, 268, 379
Smallman, Corey 459, 576, 684
Smith, Bob 25, 387
Stringer, B.A. 164, 211, 262
Seubel, Linda 382

Taber, Steve 131, 285, 498, 644
Taylor, Richard 46, 47, 108, 109, 169, 172, 220, 224, 287, 289, 337, 339, 391, 397, 458, 460, 508, 510, 569, 570, 621, 622, 673, 675

Waller, Gordon 548
Whetzel, Dennis 100
White, Elaine 160, 433, 489
Wenner, Adrian M. 272
Wiser, O.B. 24, 80, 145, 213, 265, 329, 383

NEW PRODUCTS - 1993

Fager Wax Melter 11
Half Comb Cassettes 244
High Pressure Washer 11, 418
Hive Carrier 308
Honey Light 594
KevLok Tiedown Straps 193, 244
Killer Bee T-shirt 594
Nongrafting Queen Cell Cup 11
Pollen Cleaner 308
Stinger Suit 193
Super Hive Mobile 359
Wine and Food Library Catalogue 594

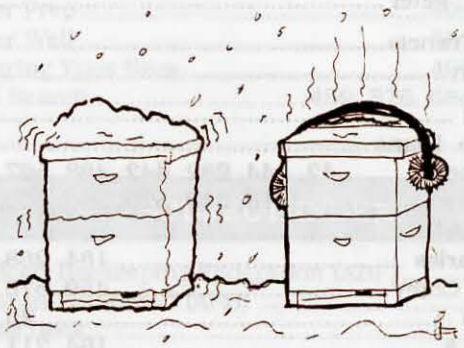
1993 Year End Index Continued on Next Page

BOOK AND VIDEO INDEX

Almond Pollination Handbook 643
Beekeeping: A Practical Guide 593
Endangered Species, Endangered Wetlands: Life on the Edge 175
Flora of West Virginia 358
Living With Killer Bees 593
Living with Varroa 359
Super Formulas 358
View from the Tower, The 53

OBITUARIES

Wadlow, Ralph 50



Display Index

Bees & Queens

Glenn Apiaries 669
Hardeman Apiaries 655
Hawaiian Queen Co. 688
Holder Homan 674
Koehnen, C. F & Sons 674
Kona Queen Co. 686
Martinsville Bee Farm 655
Miksa Honey Farm 686
Pendell Apiaries 669
Plantation Bee Co. 669
Rossman Apiaries 636,664
Shuman's Apiaries 674
Strachan Apiaries 664
Weaver Apiaries, Inc. 666
Weaver, How. & Sons 636
Wenner Honey Farms 668
Wilbanks Apiaries 664
York Bee Co. 638

Education

American Honey Producers 639
Fields Afar 660
WICWAS Press 655

Equipment

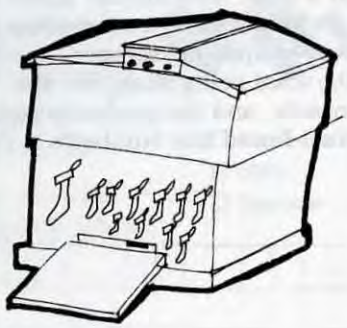
Better Way Wax Melter ... 663
CC Pollen 650
Cowen Mfg. Co. 684
Dakota Gunness 636
Mid-Valley 683
Miller Wood 686
Plastools 679
Pierco Inc. 679
Stoller 655

Related Items

Beehive Botanicals 678
Candlewic 678
Cricket Science 664
Custom Labels 660
Howalt-McDowell Ins. 660
Nature's Kick Honey Stix ..... Inside Front Cover
Pourette 639
R. M. Farms Labels 686
Randall's Wax Works 639
St. Simons Trading Co. ... 679

Suppliers

B & B Honey Farm 643
Better Bee 650
Brushy Mtn. Bee Supply . 660
Dadants .... Inside Back Cover
Jones, F W. 660
Kelley, Walter 693
Mann Lake Supply ... 674,679
Maxant Industries 650
Mid-con 650,656,664
Perma-Comb Systems 667
Root Publications 676,679,686, 692
Ross Rounds 669
Scentry 636
Zoecon .... Outside Back Cover



Dear Diary

howard scott

In the middle of winter, let me ask you – how do you manage without bees? I have my bee diary, which I can update, reminisce over, and study the past year to spot successful strategies as well as tactical errors. Like a family album, a bee diary links past to present with the amber glow of linked memories.

My bee diary is a simple gregg-ruled, green-tint steno notebook. It's been my bee diary since 1981, which is when I took a beekeeper's course at the local grange hall. The cardboard cover is affixed with the University of Pennsylvania crest, which is where I went to school some 25 years ago. The price clearly marked as 29¢ confirms that notebook was something I had purchased but never used, then pulled out when I felt the need to write about my hobby. Across the top in thick magic marker is the word 'Bees.'

At the beginning of each season, I put the year in big letters at the top of the page. For each entry, I put the date in parentheses, and then the comment, which might be as short as three lines, or as long as two pages. Typically, I'll write anywhere from 10 to 20 entries each year. In 1983, I used five pages. In 1991, I used seven.

What does my diary include? Certainly I record each years main events – catching sight of the first bees emerging from winter's hibernation, opening the hive, adding a second tier, getting the first sting, catching and replanting a swarm, spotting the queen, adding the honey super, harvesting honey, extracting honey, and closing up the hive.

I also include expenditures, just so I can keep track of my costs. At the start of the season, there are purchases of additional frames, bottom boards, wax sheets, bottles, glove replacement, etc. From these records I could tell you that I spent $124.35 in 1981 to get started with my first hive. I could tell you that, on the average, I've spent under $40 a year for my hobby. I could tell you that only twice did I have to buy new packages.

At the end of each season I put final tallies: two beehives, both healthy. Honey harvest – 64 pounds, 41 and 23. One swarm lost from hive #2. Harvest date: September 29.

I also include strategies tried. For example, in 1984, I found my bees not filling up the second tier, so I "managed" the hive, without much luck. But in 1988, when I had a similar problem, I replaced a full frame in the center of the upper hive body, with much better results. The day I used a queen excluder in 1990 ended my annual ritual of being stung several times during the harvest.

Philosophical ramblings and observations are there, too. One entry is about a stationary bee sitting on the hive roof. She didn't move, even when nudged. I mused – was she dying? Resting? What kind of chemical response – the equivalent of feelings – does this bee have at the end of her life? Another entry, I wrote how watching bees go in and out of the hive on days when I wasn't too energetic always made me feel better. Another entry had me reflecting on the pile of dead bodies beneath the hive, and approximating how many bees die every day (if bees live six weeks in summer, and there are 80,000 bees in a hive, then almost 2,000 bees die daily). In yet another entry, I whimsically drew a modern glass beehive that resembled a trapezoid-shaped skyscraper. Another time, I tried to accurately describe what being stung felt like – "Slow motion in-worming of a knife-needle, and the gradually radiating realization of pain"

When I read Sue Hubbell's *A Country Year*, a book about the author, a middle-aged, ex-librarian New Yorker becoming a commercial beekeeper in the Missouri Ozarks, I wrote a review. The book was well-written, but I disagreed with some of her approaches. No I didn't send my comments off to Ms. Hubbell (I didn't have her address), but it was quite satisfying getting down the objections. You see, a diary needs no other audience but its keeper.

One entry was about an argument I had with a non-beekeeper (citizen?)over the usefulness of bees. He claimed bees didn't really pollinate flowers, but that the wind did. I claimed that if we didn't have bees, we wouldn't have flowers. We both marshalled our facts. After awhile, he became furious and slammed out of my house, never to be heard from again.

And so it goes. I like the diary because I can review these things each year, and get a feel of the rhythm of a beekeeper's season before it begins. I like the diary because it provides leisurely entertainment, during the long, dark, cabin-bound winter months. I like the diary because it gives me a guide of when to do things and what results I can expect. I like the diary because it helps me formulate strategies, based on previous years' results.

The steno notebook is now half full. Half-full in 13 years of beekeeping. In 13 years, I'll probably have to begin a second steno notebook. With luck, I'll be 62 years old. My full diary will contain 26 years of beekeeping. I wonder what's in store?

Meanwhile tonight, sitting by the crackling fire, I want to re-read about that sweltering hot, humid day in August when I opened the hive and smelled the rich full perfume bouquet of heavy harvest. It helps me get through this barren season.

BOTTOM·BOARD