Bee Culture

JANUARY 1994

TREATING VARROA – 16
Detection and Treatment is Critical

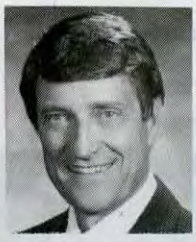
AFRICANIZED HONEY BEES IN TEXAS AND MEXICO – 26
What's Happened Since They Crossed The border?

RACES OF HONEY BEES – 30
Which Race Of Bees Is Best For Your Operation?

Janu

COLUMNS

DEPARTMENTS



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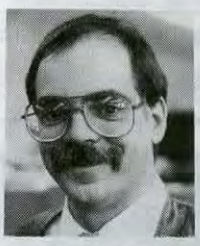

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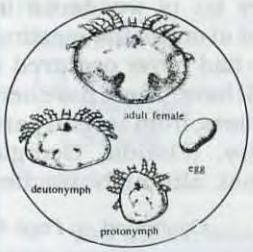

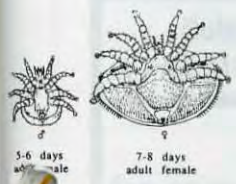

FEATURES

RACES

Kim Flottum & Diana Sammataro

You can customize your beekeeping operation . . by picking the equipment you like, and the bees that best suit your management style. But which bees are best? Find out, starting on page 30.

INNER·COVER

Another Meeting

In mid-December I had the heady opportunity to spend several days mingling with, and learning from about 2500 Entomologists from all over the U.S. and the rest of the world. Certainly most of these scientists and researchers were not focused on honey bees, but those that were had some interesting things to share. The results, with a few exceptions, had little to do with practical beekeeping, but what these people do is fill all the little gaps in our knowledge of what makes honey bees tick, and sometimes why they quit ticking.

The exceptions were the most interesting though. They focused on pollination, bees' response to smoke and tracheal and *varroa* mite controls.

So what happens when you smoke bees? Well, it knocks down their response to alarm pheromone by about 50%, definitely a significant reduction in bees in your face when working a colony. Kurt Visscher, from UC Riverside found the 'masking' effect lasts about seven minutes. Give'm smoke and they dive for honey, and they tend to leave you alone, right? It's the honey thing that's always amazed me. Why do they eat honey when they get smoked? But wasps calm down when they get smoked, too, according to this study. And they don't have honey to eat, and they don't produce an alarm pheromone. Go figure? Visscher hasn't finished this study yet, and I'm waiting for the next chapter. Do you suppose it'd work with noisy neighbors, or kids?

Frank Eishen, from Texas A & M did some work with cantaloupe pollination. Cantaloupes need bees to set fruit, but the question is, how soon after they begin to bloom do bees need to move in to set an acceptable crop? Sometimes, you just can't get there in time, or the weather doesn't cooperate, or the grower needs to spray then what? Eishen found that you can wait up to several weeks before bees are allowed in to do their job without loss of quantity or quality or delay of harvest. Good to know if you work with many of the vine corps (I suspect this works for most vine crops) on contract. In fact, you might be able to squeeze in an additional crop before you move into the cantaloupes.

There was much ado about mites, too. Keith Delaplane, from the University of Georgia did some work with *varroa* mites, thinking they may be vectoring diseases while they were feeding. This would, of course, add to the problems caused by these nasties. If they were, Delaplane reasoned, some protection against the disease coupled with treating the mites would enhance the health of the bees.

Using extender patties with terra, along with Apistan strips, he found that, indeed, the bees were healthier - bigger, ate less honey, and didn't have *varroa*.

Other researchers have found similar results when treating tracheal mites, so the lesson is pretty clear. Bees get diseases, along with pests. Treat for both for best results.

Two other aspects regarding tracheal mites came up that bear mentioning. The first was mite load (how many mites per bee) and mite prevalence (how many bees have mites). Though there is some disagreement, it appears that the more bees in a hive that have mites, the more mites those bees will each have. So, if you're worried about how many mites, just count how many bees have them. Use the easy thoracic trachea pull to see if they do. You don't need a microscope to see them but a hand lens helps.

One other bit of wonderful insight came out at one of the meetings that, I admit, had never occurred to me, but should have. There have been numerous reports, from several parts of the country, (Florida, Georgia, Michigan), that although tracheal

Continued on Page 60

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NEXT MONTH

There's probably no greater challenge than staying in the Midwest year-round, and making a living with bees. But hundreds of good, profitable operations do it every year, and they all have the same traits and skills. Want to know what they are? Next month we start a three-parter on how to thrive in the coldest, hottest, wettest, driest part of the country. If you can keep bees here, you'll do fine anywhere. And no matter where you are you'll learn something that will help your operation.

Walter Clark returns next month, after cleaning up from his Iowa flood last summer, and has some info on a definitely needed (and too-often overlooked) skill – Pollination and P.R. We all know it's needed, but far too few of our friends and neighbors know it. Here's a hands-on how-to that will help. Try Pollination P.R. this spring.

Easter isn't far off, and a tradition for that holiday is burning a Pascal Candle. How to make these very large, and very expensive candles is explained in an elegant and useful piece next month, too. Don't miss this candle maker's highlight.

Did you see the movie "Fried Green Tomatoes"? And did you wonder how that little girl simply reached into a bee tree and pulled out a chunk of comb? That was no stand-in, those were real honey bees, that was real honey comb and it wasn't trick photography. Find out how they did it – right here, for the first time – Next month.

There's more, of course, lots more in the coming year that you don't want to miss. For instance, there's a first hand look at York Bee Supply; Public Relations and Africanized Honey Bees; Profiles of successful beekeepers and how they made it; Managing 2 queen colonies; Smoker know-how; Honey Plants; Diagnosing queen problems; Conquering tracheal mites . . . the tradition of practical, useful and profitable ideas, stories and articles continues in 1994. In *Bee Culture*, The Magazine of American Beekeeping.

MAILBOX

■ Osmosis

It was with surprise that I found an error in Roger Morse's Nov. '93 article. In discussing osmosis he states: "That is why our hands shrink when they are in dish water for several minutes. Under these circumstances, water passes out of our hands, through the skin and into the dish water."

A brief review of the principle of osmosis shows that this explanation for the commonly seen wrinkles on hands is mistaken. A fluid passes through a semi permeable membrane in the direction of lower concentration. Water in our bodies is in lower concentration than in the water, so water actually moves through the skin into our hands. The wrinkles we observe are due to the swelling of the hands and the presence of calloused or toughened areas which do not expand easily.

Bacteria in honey are desiccated because their water content is much higher than honey's, so water leaves their bodies to enter the honey.

Douglas Baty
Dixon, MT

■ Observation Hives Are Great!

I built this observation hive and installed it in May 1990, and since then it has been one of the favorite attractions in Erna Nixon park, in FL and a center for lectures to school groups, scouts, and nature study groups. The hive produces about 60 pounds of honey per year, which is put up in plastic "Smokey the Bear" bottles and sold to benefit the park and help maintain the hive. (The hive is under a canopy of trees, and does not get much full sun, hence relatively low productivity.)

I have found that the public has a great interest in honey bees and that an observation beehive of this type serves to educate them, especially school children, on the nature of bees and their benefits to mankind. I would recommend a project of this kind to any public minded beekeeper.

The construction and operation of an observation beehive in a public park would be a worthy project for any Boy Scout troop, and would serve as a means for qualifying for Beekeeper Merit Badge.

If you wish further details about my OBH, I would be happy to provide them.

John Guyton
465 Cardinal Dr.
Satelite Beach, FL 32957

■ Slow Down?

In reference to Mr. Magnant's (see Mailbox, Oct. '93) problem – the very fine bubbles might have been caused by him running his extracting centrifuge too fast. It happened to me. Since I run my centrifuge slower I have no problem.

Dezso Merenyi
Hampstead, MD

■ A Clear-Cut Answer?

As a forester who keeps honey bees in the mountains of North Georgia, I must take issue with a point made in "Meet Bob Cole", *Bee Culture*, September, 1993. In that article Mr. Cole states that one of the problems Western North Carolina beekeepers have with producing sourwood honey is that "clearcutting and wood chipping threaten the crop every year."

Sourwood is a tree species that thrives in the full sunlight found in recently clearcut areas. It has been my experience that with the ground disturbance and increase in sunlight caused by timber harvesting using the clearcut method, numbers of sourwood trees actually increase. Proper timber management can therefore ensure the continual availability of sourwood for our honey crops.

But my greatest concern is about the spread of misinformation over our Nation's rural, agricultural activities. The same hysteria over Alar that brought financial ruin to the apple industry is now happening to the wood products industry over the issue of clearcutting. Will the beekeeping industry be next? Considering that most people live in urban areas, it is vitally important that beekeeping, or forestry, be united and support each other.

Patrick Hopton
Clayton, GA

Continued on Page 9

MAILBOX

■ Funny Bees

I read Inner Cover for November with a good laugh. I believe your story and just wanted to tell you I have my bee's working for me pushing lawnmowers! Just kidding, of course.

I once saw a bee carrying something in its mandibles showing the other bees on the platform what she had, and they were all taking turns looking at it. I could not see what it was, because the bee flew away.

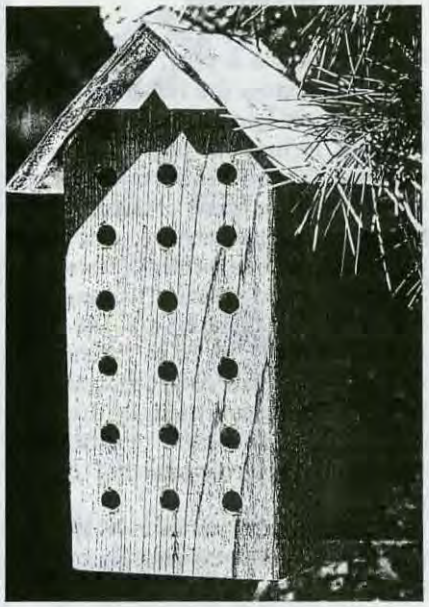
Thanks for the chuckle.

Vince Diak
Andover, NJ

■ Bee Condominium

Maybe one of your columnists or your editorial department would like to comment on the weird advertisement for "a condominium for bees" which appears on page 30 in the Nature Company Catalogue. Only $25. Call 1-800-227-1114 for catalog.

John McKelvey, Jr.
Richfield Springs, NY



■ Plastic or Wood?

A couple of years ago I experimented with some of the molded plastic inner covers from Walter T. Kelley Co. Although I don't have any solid scientific evidence to back up my observation, I began to notice that I was suffering significantly higher winter losses among hives using the solid plastic inner covers. In virtually every case, water seemed to be condensing on the plastic and dripping back into the hive.

This winter, I decided to replace the plastic inner covers with more traditional wood ones. I called Mann Lake Supply and talked to Shawn. After explaining my experience with the plastic Kelley inner covers, I placed an order with Mann Lake for real wood inner covers. When the covers arrived some two weeks later, I was dismayed to find that, although constructed of wood, the side facing down into the hive was covered with a plastic laminate, complete with various floral patterns. (It appeared to be recycled wall paneling.)

As much as the bees will no doubt enjoy the elegance of the trailing grape vines and rows of cornflowers in their hives this winter, I'm concerned about yet more plastic. By ordering wood inner covers, I was hoping to use the wood's water absorbing properties to help mitigate the moisture problem. When I called Shawn to express my concern/surprise that he shipped me plastic laminated inner covers when I clearly had specified that my objective was to *replace* plastic inner covers, he told me this would not be a problem. Honestly, I can't say I don't believe him but I am definitely a doubter.

Is my concern valid? Isn't the use of a plastic laminated wood inner cover not unlike covering the hive top with a Hefty trash bag? Have any other *Bee Culture* readers had any experience with these plastic laminate inner covers from Mann Lake? Or other suppliers, since there are some on the market?

Larry Miller
P.O. Box 360
Wagontown, PA 19376

Editor's Note: We've never heard one way or another – complaint or compliment. We would appreciate either though, to clear the air.

■ Menthol Q.

There is a warning about the danger of handling menthol used in treating bees for mites. Is this the same menthol used in products such as Mentholatum and if so, why the warnings on the Menthol packages?

Charles McDonald
Baton Rouge, LA

Editor's Note: The menthol used in honey bee colonies is in its pure, concentrated form. Contact with mucous membranes can be extremely uncomfortable, and possibly dangerous. Menthols in cough drops is in very low concentrations.

BOOK REVIEWS

The Dance Language and Orientation of Bees. Karl von Frisch. Harvard University Press. $29.95 Soft. 566 pgs.

Harvard University has reprinted the classic work by von Frisch in a paper back edition. They have added an introduction by Tom Seeley, from Cornell, but otherwise they have reprinted the text and diagrams exactly as in the original.

If you have ever wondered where all the information on dance language, on foraging ability, on all the different kinds of dances on all the original science of honey bee communication this is the source.

True to the original in every detail, (size, margins, charts, graphs and photos) the only problem is that the original photos must not have been available and they were reprinted from a print.

Perfect as a reference, and resource, (and finding out how to fool bees), this is a must for every serious beekeeper's library.

Kim Flottum

Practical Beekeeping In New Zealand. Revised Edition, by Andrew Matheson. GP Publications Ltd. Archives House. 10 Mulgrave ST. P.O. Box 12 - 052 Thorndon, Wellington, New Zealand. NZ$34.95.

Andrew Matheson has revised his original work published several years ago while he was still a beekeeping consultant in that country. Though now the Director of IBRA in England, his ties to home remain strong, and this book proves his connection.

The book covers nearly every aspect of beekeeping in NZ, and most of the information is applicable anywhere temperate climate beekeeping is practiced.

Chapters include an overview of NZ beekeeping industry; biology; nectar and pollen sources (most of which are not native to the U.S.), starting with bees, colony management (including moving, feeding, uniting and dividing and generally how to handle bees); queens and rearing them; harvesting and extracting honey and its properties plus other hive products.

The chapter on pests and diseases is informative from an information stand point, put control measures recommended are for NZ and many do not fit the U.S.

An excellent glossary, information source (good on an international level) and index round out the book.

Overall, this would be a good book to add to your library because it contains much basic information on beekeeping that can be applied anywhere. The exotic chapters on local nectar and pollen sources and some of the rules and regulations would be informatiive, and entertaining.

The book is well written and easily understood and beginning and commercial beekeepers alike would benefit from parts of it.

Like all books that attempt to cover all aspects of beekeeping this one leaves out some aspects that you may, or may not consider important. Matheson admits this up front when he wrote, "Any book which gives a recipe for beekeeping is doomed to failure. A colony is a complex and dynamic organization, and is subject to the normal variations of natural systems rather than a calendar or rule book. It is essential to understand bees, before becoming a beekeeper"

This book will certainly help you understand bees better, and in the process make you a better beekeeper.

Kim Flottum

Orion Magazine celebrates the human relationship with bees and the rich tradition of beekeeping with a special section of the Autumn 1993 issue, entitled "Hum and Buzz." Some highlights of this issue:

- John Crompton's essay, "A Hive of Bees," describes the pleasures and trials of his first year of beekeeping,
- Mark Winston investigates the effect of human agriculture on wild bees in "Where's the Buzz,"
- In "The Echo of the Bees," Jim Armstrong explores the use of bees as metaphors in legend and literature,
- Douglas Whynott examines how bees have captured our imagination for at least 50,000 years,
- Sixteen full-color photographs of bees from around the world,
- Drawings by Stephen Sagarin and reproductions of bee art from the Middle Ages,
- A cover featuring a color photograph of male Eucerine bees sleeping in a buttercup,
- A "Literary Bee" section featuring quotes from Shakespeare, Charles Darwin, Emily Dickinson, William Blake, and others.

Four times a year, Orion Magazine illuminates the relationship between people and nature in an award-winning format. In the 12 years of existence, Orion has become an unrivaled forum for many of the country's foremost nature writers, scientists, poets, educational philosophers, photographers and artists. The magazine has been nominated by the Utne Reader Awards as Best Publication for four years in a row. Orion is published without advertising by the Orion Society, a non-profit organization dedicated to environmental education.

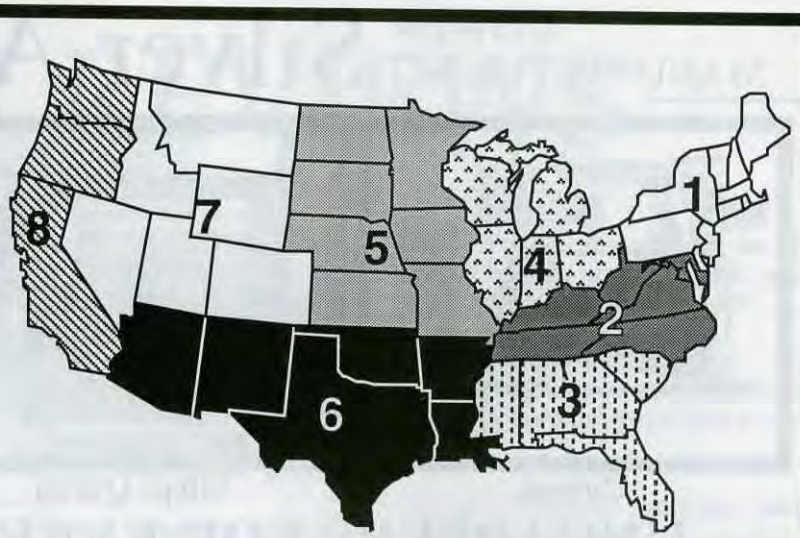
Beekeepers can receive the Autumn 1993 issue by sending a check for $5.00 per copy to The Orion Society, "Hum and Buzz" 136 East 64th St., New York, NY 10021. Membership in The Orion Society is $25 per year which includes a subscription to Orion.

For more information contact Todd Schongalla at (212) 758-6475.

JANUARY
Honey Report
January 1, 1994

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	46.72	43.31	38.53	38.75	39.90	40.53	40.90	41.07	31.20-54.00	42.46	43.22	42.13
60 # Amber	42.80	42.05	35.40	32.73	39.00	38.62	34.29	38.47	23.40-50.00	39.46	41.09	40.58
55 gal. Light	.628	.541	.495	.522	.531	.559	.513	.562	.46-.85	.552	.560	.576
55 gal. Amber	.550	.505	.460	.450	.520	.493	.483	.496	.42-.73	.502	.512	.530
Wholesale – Case Lots												
1/2 # 24's	20.58	22.84	17.83	18.24	21.50	19.38	19.83	18.40	16.50-28.60	20.52	20.98	20.96
1 # 24's	29.25	32.48	27.00	29.96	31.03	30.51	31.68	28.00	26.00-42.50	30.26	30.98	30.67
2 # 12's	26.49	30.39	25.30	27.40	27.18	27.75	26.60	27.66	22.80-41.50	28.24	28.72	28.12
12 oz. Bears 24's	26.02	28.08	21.63	25.43	20.97	25.40	29.35	22.74	16.32-35.00	25.65	27.18	26.60
5 # 6's	29.51	30.60	28.95	30.54	29.04	27.88	27.63	28.85	25.80-33.45	29.35	29.59	30.12
Retail Honey Prices												
1/2 #	1.17	1.38	1.04	1.05	1.07	1.15	1.03	1.10	.82-1.79	1.17	1.21	1.17
12 oz. Plastic	1.51	1.69	1.66	1.49	1.43	1.47	1.41	1.42	1.19-2.00	1.54	1.60	1.55
1 #	1.63	1.91	1.72	1.81	1.76	1.78	1.92	1.82	1.43-2.00	1.79	1.79	1.80
2 #	3.03	3.27	2.58	3.02	2.71	3.10	2.78	3.18	2.39-3.79	3.00	3.16	3.09
3 #	4.10	4.56	4.07	4.45	3.88	3.90	4.02	4.40	3.50-4.99	4.22	4.29	4.34
4 #	4.84	5.53	5.09	5.02	4.84	5.56	4.91	5.41	4.39-6.45	5.38	5.77	5.25
5 #	7.03	6.83	6.00	6.40	6.36	6.05	5.98	6.11	5.50-8.75	6.49	6.50	6.47
1 # Cream	2.42	2.76	2.43	1.84	1.95	2.26	2.04	2.32	1.74-3.25	2.29	2.52	2.21
1 # Comb	2.91	3.32	1.98	3.37	2.74	3.58	2.60	3.33	1.20-4.00	3.09	3.31	3.25
Round Plastic	2.39	2.29	2.61	2.53	3.13	3.46	2.71	2.53	.99-4.25	2.89	2.78	2.53
Wax (Light)	2.80	1.30	1.52	1.30	1.37	2.06	1.83	1.35	1.10-3.80	1.83	1.61	1.83
Wax (Dark)	1.93	1.22	1.31	1.20	1.31	1.60	1.17	1.10	1.00-2.25	1.42	1.23	1.45
Poll. Fee/Col.	32.50	23.33	29.33	30.00	25.50	24.50	30.33	32.00	20.00-40.00	29.20	31.50	30.53

MARKET SHARE

The trend isn't so much down as it is static. Look at prices this month, last month and last year. Glaciers move faster. Much ado about big, big packers commanding shelf space from every area this month. Cheap prices mean low margins. Don't stretch too far, guys. Volume isn't the last word.

Region 1

Prices steady to down a bit, especially on the wholesale side. Some major outlets getting real tough on price. Colonies in fairly good shape, though many are concerned about the light fall crop, and hungry bees in the spring.

Region 2

Prices and demand steady, but that's only an average. Both wholesale and retail prices are being dropped in some areas. Competition for large chain shelf space is fierce. Colonies in generally good shape. Good fall flow in most spots will reduce feeding. Mites still around, causing losses.

Region 3

Prices, demand and sales steady to a bit higher, but only a bit. Competition here, too, is keen on the retail shelf, but back-door sales are brisk and profitable. Colony conditions generally good, but *Varroa* causing problems that won't go away. Watch for re-treatment requirements.

Region 4

Prices staying steady to a tad lower, but that's mostly on the wholesale level. Demand seasonally strong. Colonies in good to fair shape. Mites still a problem, but lots of bees last fall, plus regular treatment should mean a good spring.

Region 5

Prices steady to lower, especially wholesale. Big packers moving into area in metropolitan stores. Competition is stiff. Colonies in pretty good shape, but spring will tell. Last year's losses may be made up this year.

Region 6

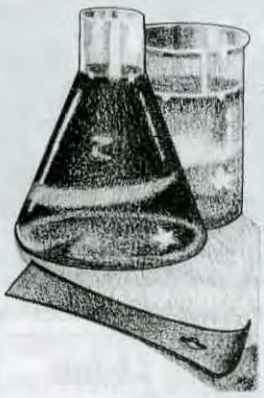
Prices and demand steady. Some wholesale price cutting, but most have hit bottom by now. Colonies in good shape, but *Varroa* needs checking as early as possible. Spring holds promise if rains keep up.

Region 7

Prices steady, but holiday and seasonal sales have increased in some places, decreased in others. Colonies in good shape, but weather will be the final factor.

Region 8

Prices steady, but retail will climb by spring, and wholesale, with foreign competition, will probably fall - unless something turns the tide. Colonies have mites, and treatment is required very, very few exceptions. Watch out.



RESEARCH REVIEW

roger morse cornell university ithaca ny

"It takes a lot of honey to raise a pound of bees."

Placing synthetic scent gland pheromones in bait hives makes them more attractive to swarms. However, "adding queen pheromone to bait hives with the three Nasonov components did not increase their attractiveness relative to bait hives that had the three Nasonov components only." These studies were an outgrowth of efforts to make bait hives more attractive to bees to study migration of Africanized honey bees.

The bait hives used in these tests were 31 liter wood-pulp hives and pheromones were placed in thin-walled polyethylene vials that allowed slow release. The synthetic scent gland stuff contained equal portions of the three chemicals. Citral and geraniol were in one tube and a second tube contained nerolic/geranic acid.

I am aware that many beekeepers use bait hives to capture swarms to increase their colony numbers. A variety of boxes, even cardboard, have been used successfully. However placing an odor attractive to honey bees, even a piece of old comb, is helpful. It is not clear to me, nor am I aware of any data to show if the odor merely helps scouts find the hives, or if indeed it makes the hive more attractive.

How Much Honey is Needed to Grow a Worker Bee?

Only about 1.3 pounds of honey is needed to rear a pound of worker bees. While this figure may seem unreasonable it should be remembered that honey is about 20 percent water while a worker bee is about 85 percent water. These figures do not take into account that pollen is also necessary for brood rearing. However, some of this honey is used to keep the brood nest warm, to feed nurse bees and for other hive activities related to brood rearing and good housekeeping.

The studies resulting in these conclusions were made in January and February in Baton Rouge, LA in an area where there was an abundance of pollen "but no nectar in the field for the bees to collect."

During the first spring brood rearing cycle the length of the adult workers life was not affected by the work involved in brood rearing. However, there was a "greater adult mortality during the next brood cycle" In other words, rearing brood can be a strain and drain on a colony and cause adult bees in the colony to live for a shorter period of time.

Drone Behavior During Swarming

We are aware that when a colony swarms some drones go with the swarm. However, recent data indicates that the percentage of drones accompanying a swarm is small, averaging only 18% of those in the hive. Although on average, 65% of the worker bees will leave the hive with the new swarm. This last percentage varies a great deal.

These data were obtained from observations on 13 swarms that emerged naturally from five or ten frame colonies. It had been determined earlier that the average swarm in a tree occupies a small space, on average, the volume of a single 10-frame Langstroth super. As an interesting aside in this study, it was also observed that bees would allow the drones in their swarm to starve if there was bad weather.

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?DO YOU KNOW?

Brood Diseases

clarence collison

Everytime a beekeeper breaks down a honey bee colony, it is important that the brood area be checked for any symptoms that might be associated with an unhealthy condition. Being able to recognize the early symptoms of a serious brood disease and knowing what to do about it is an important aspect of successful colony management. Prior to the introduction of the parasitic mites, brood diseases were always considered to be more devastating than adult bee diseases. How well do you know your brood diseases? Please take a few minutes and answer the following questions to determine how well you understand this important topic.

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

1. ___ American foulbrood spores germinate in the midgut approximately one day after ingestion by the larva.
2. ___ Brood odor is a dependable and effective method of distinguishing between American and European foulbrood.
3. ___ European foulbrood kills quicker than American foulbrood.
4. ___ Powdery scale disease is caused by a virus.
5. ___ Spore cysts are produced with chalkbrood disease when the pathogen reproduces asexually.
6. ___ Pure cultures of *Melissococcus pluton* are typically isolated from European foulbrood diseased larvae.
7. ___ Healthy worker larvae are light tan in color.
8. ___ Sacbrood, chalkbrood and European foulbrood are normally most prevalent in the spring of the year.

Multiple Choice Questions (1 point each)

9. ___ Chalkbrood disease is caused by:
   A. *Melissococcus pluton*
   B. *Bacillus larvae*
   C. *Aspergillus flavus*
   D. *Ascosphaera apis*
   E. *Nosema apis*

10. ___ The recommended treatment for a colony suffering from a serious chalkbrood infection is:
    A. Give the colony 2 treatments of Terramycin®, approximately two weeks apart.
    B. Hang two Apistan® strips in the brood chamber.
    C. Place a packet of menthol crystals on the top bars of the brood chamber.
    D. Requeen the colony.
    E. Feed the colony two gallons of sugar syrup medicated with fumigillin.

11. ___ The pathogen that causes chalkbrood is a:
    A. Fungus
    B. Bacteria
    C. Protozoan
    D. Virus
    E. Spiroplasma

12. ___ Each larva infested with American foulbrood produces approximately _____ spores.
    A. 1 million
    B. 2.5 billion
    C. 50 million
    D. 200 thousand
    E. 1,000

13. ___ *Morator aetatulas* is the scientific name of the pathogen that causes sacbrood and is an example of a:
    A. Bacterium
    B. Fungus
    C. Virus
    D. Protozoan
    E. Spiroplasma

Please match the following brood diseases with the appropriate symptoms. (8 Points)

A) Sacbrood B) Chalkbrood C) Stonebrood D) European Foulbrood E) American Foulbrood

14. ___ Removal of the cell cappings exposes dead larvae as formless masses of tan to brown gelatinous matter. A toothpick inserted into such cells will cause the sticky gelatinous residue to string out in a thread when the toothpick is removed.
15. ___ Larvae that die from infection are easily removed by house bees and do not serve as sources of infection. Brood dies in the coiled uncapped stage.
16. ___ Larval skin remains intact but the internal tissues are watery. Larvae are killed for the most part in the capped stage.
17. ___ Larvae become mummified in appearance and are easily removed by house bees.
18. ___ Larvae die with a characteristic darkened raised head.
19. ___ Most widespread and persistent of the brood diseases.
20. ___ If the larvae pupate before death, a pupal tongue is visible as a fine thread from the bottom to the top of a cell.
21. ___ If the dead larvae are not removed from the cell, the larval remains dry into scales that adhere tightly to the cell wall.
22. Name 3 ways in which American foulbrood spores are spread within an apiary. (3 points)
23. Please explain why Terramycin is normally mixed in confectioners (powdered) sugar and not in sugar syrup. (1 point)

ANSWERS ON PAGE 58

VARROA MITES

PAST • PRESENT • FUTURE

The Present— Dectection & Treatment

eric mussen • california apicultural extension

Varroa infestations arise when a mated female mite arrives in your colony. She crawls around on the combs searching for larvae of the right age upon which to reproduce. Finding a fully fed larva (preference for drones>workers>queens), she crawls into the cell and gets capped over by the bees. The mother mite lays an egg every day and a half or so on the side of the cell. The newly hatched mites crawl to the larva/pupa and feed on it by puncturing its exoskeleton with their mouthparts. They suck the blood of the immature bee and become nearly identical to the host antigenically.

The first-laid egg is usually a male, which develops rather quickly into a soft-bodied individual, not well suited for life outside the cell. The succeeding eggs hatch into female mites that feed, grow, molt, and develop into replicas of their mother.

When the new female mites are adequately mature, they mate with their brother. About now, the bee has completed its development and emerges from the cell. The adult female mites either ride out on the bee or crawl out of the cell on their own. The mother mite is likely to search, again, for another host in a nearby cell. After feeding on adult bees for several days, daughter mites may search the combs for new hosts or they may take a ride on an older bee to a spot where they can find a host bee from a different colony. This type of distribution by hitch-hiking is called "phoresy" when it is practiced by invertebrates. Drifting drones and robbing bees are capable of distributing mites many miles from the 'home' hive.

Mite population increase is a relatively slow process. Each time a mother mite enters a cell, she probably will raise three to five daughters, depending on how long it takes for the host to complete it's development to an adult. Not all daughters start raising more broods, immediately. Not all eggs hatch when laid (in fact, this seems to be extremely critical to the reproductive success of the mites). Obviously, mites die of old age. Therefore, total numbers of mites in the colonies tend to increase slowly over time.

When mites become so numerous that immature host bees are infested by two or three mother mites, then the host bees are killed. Observant beekeepers will first notice that drone brood is diminishing or gone when it still should be present in the hive. Later, when there are no replacement worker bees, the colony will die out at the end of the normal lifespans of the current adult worker bees. This knowledge led to tell people they had about two years after the arrival of the mites in their bees before their colonies were likely to collapse.

> Detection and treatment of *Varroa* is critical to colony survival today

That prognosis turned out to be quite inaccurate. *Varroa* mites move from colony to colony within an apiary on drifting bees. They are also carried around the country by migratory beekeepers whose bees became infested at some point in time. Not considered was the problem of dealing with infestations and reinfestations from reservoirs of infested bees that were more distant from the hives. This information was trumpeted in Europe, but somehow we just ignored it in the U.S.

As a colony of honey bees reaches the point of total collapse from infestation of either tracheal or *Varroa* mites, the remaining adult bees tend to stage a mass exodus. They leave the hive over a period of hours to days. In the case of *Varroa*, many adult bees are still capable of flying. They take off, carrying as many as 10 or more *Varroa* mites, and fly to neighboring colonies. How do they find other honey bee colonies either close by or miles away? Apparently by smell. Bees flying downwind of a colony can pick up the smell and be attracted to it. I also think it is possible that bees can find "scent trails" in the air where other worker bees are flying between foraging areas and their hives. Once on these trails, foreign bees can find their way to new apiaries and colonies. Regardless of how they get there, infested bees can change the status of a colony from non-infested to heavily infested in a very short time. You can not wait two years to treat.

In order to control *Varroa* mites, it is essential that you know when you have them, and at what level, in

your bees. This can be determined only by periodic monitoring of your honey bee populations for mite infestation. I recommend the following frequency of surveying for mites:

1. twice annually – when mites are **not thought** to be around

2. every other month – for a three or four year period when mites are **known** to be around

3. twice annually – when **reservoirs finally disappear.**

There is a great variety of methods to survey for *Varroa* mites in your bees, many which sacrifice bees, but some are less destructive. A method promoted by some Europeans is uncapping and examining larvae and pupae, especially drone brood. A cappings scratcher can be run horizontally along the comb face, just below the surface of the wax. This uncaps the cells and the bees are speared and removed all in one motion. Bee bodies and empty cells are examined carefully for adult and immature mites. Usually 100 individuals and their former cells are examined to be pretty sure what the level of infestation really is. This is a very good method for finding mites in the spring and preventing a fall disaster.

By simply sliding a sheet of white paper onto the bottom board of a hive you are likely to find a mite or two on it in a few days, if they are present on the bees. Bees tend to clean off or even chew up and remove the paper, so it is best to check within a few days. Also, hive debris accumulates quickly in an active colony and mites can be hard to see in the mess.

Sheets of paper or shirt cardboard are more effective if they are formulated as "sticky boards." Though available commercially, these boards can be made by smearing a thin layer of sticky substance (insect-sticking goop; spray non-stick cooking material or petroleum jelly (in very cool weather) on the paper. Since bees can get stuck, too, it is a good idea to make a frame that holds an eight mesh (per inch) screen just above the sticky surface. The bees cannot reach through the screen to remove mites. Remember, a screen or reused sticky board might convey mites to a previously uninfested colony, if appropriate precautions are not taken to remove them from the equipment.

You can enhance the effectiveness of the sticky board by applying

Ways to Check for *Varroa*

Uncapping larvae, sticky boards, pesticide strips, tobacco smoke, ether roll, washing bees

a treatment to the colony population that induces mites outside the brood cells to fall from the bees and frames. Apistan® strips do this well. One strip in the brood nest will dislodge most mites that are out in the open in a couple of days. Another product that also surveys the total adult population is a few puffs of tobacco smoke. Specially labelled, high nicotine tobacco is added to the smoker and puffed into the hive entrance which is then blocked with grass for a half hour or so, enhancing the effect. A little too much of this smoke narcotizes the bees, too, so be careful! After an hour or two, the sticky board can be removed and examined. Remember to use all registered pesticides as instructed on the product label.

One of the earliest forms of mite surveying to be used in the U.S. was the "ether roll" method. Just as the name suggests, 150-300 bees (**Not the Queen!**) are collected in a screw top jar. The bees are sprayed with a two-second blast from a can of ether-based automobile starter fluid. Quickly cover the jar and shake the bees very hard for 30 seconds. Any *Varroa* mites should have been separated from the bees. They are likely to be stuck on the inside surface of the jar in the syrup regurgitated by the dying bees.

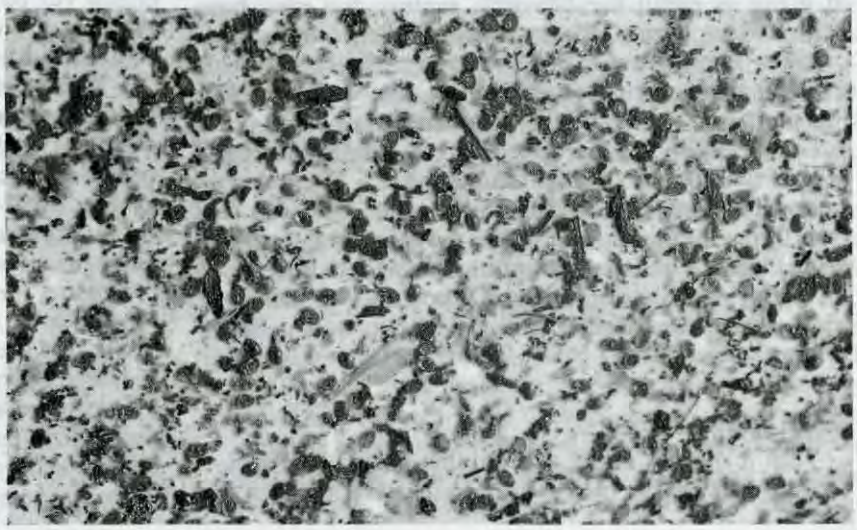
Another form of sacrificial surveying includes the "washing" techniques. Approximately 150-300 adult bees are collected as above into either detergent water or an alcohol solution. The bees are shaken vigorously, as above, then the bees and liquid are poured through sieves. A top sieve collects the bees. Bee bodies are stirred and rinsed well with water. A second sieve, often covered with white cloth, catches mite bodies below for counting.

Simply finding a certain number of mites does not necessarily help that much in mite control. The next step is to interpret your results. When brood is present in a colony, only about 20% of the *Varroa* mites are out on the adult bees or combs. The rest are buried in the brood. Only the uncapping method can tell you what is going on in the brood. Other approaches need more interpretation.

The Apistan® and tobacco smoke methods are supposed to survey whole adult bee populations. In those cases, you would multiply the number of mites found on your board by five. I believe that Apistan® would give more reliable results.

Continued on Page 20

A heavily infested colony will drop hundreds of mites when tested with an Apistan strip, even in an hour or so.



PAST & FUTURE

roger morse • new york apicultural extension

The most serious of all of the known bee diseases is caused by the Asian mite, *Varroa jacobsoni*. On September 25, 1987 these mites, that infest larval, pupal, and adult honey bees were found for the first time in the U.S. in a colony of bees in Wisconsin. The infested bees belonged to a Florida-Wisconsin migratory beekeeper. Within days searches made in Florida, New York and several other states showed that the *Varroa* mites were widespread in the United States. By the time the mites were discovered it was too late to prevent their further spread.

History and distribution

Varroa mites are widespread in the world, though until a few decades ago they were found only in Asia. Their native host is the small Indian honey bee, *Apis cerana*, which is found throughout Asia. *Varroa* mites were discovered and named in 1904. They are found in all colonies of the Indian honey bee whenever beekeepers search for them. However, infestations in Indian honey bee colonies are always low, and the mites appear to pose no economic threat to these bees.

Biology and life history

Mated female *Varroa* mites ready to lay eggs move into brood cells with mature worker and drone larvae that are about to pupate. They crawl to the bottom of the cells and burrow into the small amount of larval food that is found there. Other than bee's blood, larval food is all that mites feed on. The mites, and the maturing honey bee larvae, engorge on the larval food until it is consumed.

The female *Varroa* mites deposit their eggs in the cells, and the hatching young and the old mother mite(s) feed at will on the pupa's blood. The mites do not attach permanently to the pupae. If the number of feeding mites in a cell is small the bee will mature but may have deformed wings and legs and a shorter life. If the number of mites in a cell is greater the pupae may die. Offspring from the original female in a cell mate in the same cell. The males remain there and die. Mature female mites crawl out of the cells when uncapped by the emerging larva and attach themselves to a passing worker. They burrow under the sclerites, the overlapping body segments, and insert their mouthparts into the adult bee's body and feed on its blood. When the female mites have had a large blood meal they detach and move into brood cells and the cycle is repeated. Mites are spread from hive to hive in an apiary primarily by drifting bees.

Identification

Adult *Varroa* mites are reddish-brown, hard, flattened, more or less oval shaped, and about the size of a pinhead. They may be seen crawling around on a bee's body or on the comb. Immature mites are white or light brown. You may sometimes see bees with deformed wings, legs, and/or antennae in a hive, but these are usually removed rapidly by house bees. When crippled bees are seen the most likely cause is *Varroa* mites; however, other diseases and malnutrition may rarely cause deformities.

If *Varroa* mites are present in the brood in a colony they are most likely found attached to drone pupae. They prefer drone pupae and in their native host feed almost exclusively on them.

Resistance

In 1990, a colony of honey bees that was apparently resistant to *Varroa* mites was discovered in Florida. Bees in this colony groomed the mites from their bodies, bit and punctured them, and carried them outside of the hive where they were dropped onto the ground and consumed by other insects. This is at least one of the protective mechanisms used by *Varroa's* native host, the Indian honey bee, to keep *Varroa* numbers low in its nest. It is also the method apparently used in part by Africanized honey bees in South America to protect themselves against *Varroa*. *Varroa* mites are found in every hive of Africanized honey bees in Brazil that is examined, but the number of mites is never very high and Brazilian beekeepers do not treat their colonies for *Varroa* nor are they concerned about them. Additionally, five groups of researchers have found European honey bees resistant to *Varroa* in Europe and North and South America.

The colony of apparently resistant bees found in Florida came from a 400-colony apiary where all of the rest of the untreated colonies had died. We have now found that many colonies of European honey bees may groom *Varroa* mites from their bodies, but most do so in such low numbers that it is not an effective method of control and the colonies die.

The important point about these naturally resistant bees is that they were found in areas where thousands of colonies had died. Honey bees are variable animals, and no two colonies are alike. Unfortunately, many had to die for these few colonies to be found. The fact that these variations among bees exist leads us to believe that we will find more colonies with the same behavior patterns or that have other mechanisms of control.

While we recommend that beekeepers treat colonies in infested areas with chemicals it is also important that they watch feral and unattended colonies in the event one proves to be successful in an area where others die. A thrifty feral colony may be naturally resistant to *Varroa* mites, tracheal mites, chalkbrood, and perhaps even other diseases. In past years we have paid little attention

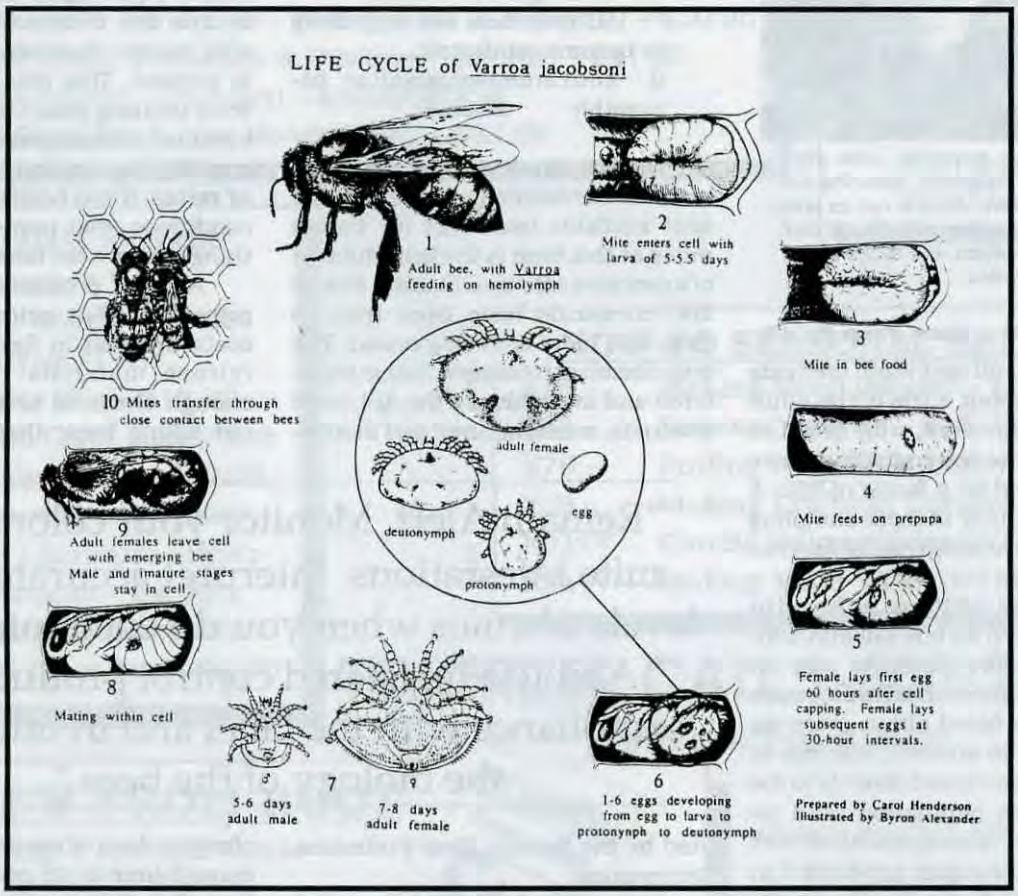
to feral bees in hollow trees and houses. However, they may become very important sources of breeding stock in the future simply because they have survived attacks by *Varroa* mites and other disease-causing organisms.

Who is breeding *Varroa* resistance?

At the present time there is no in-depth program to select and breed honey bees resistant to *Varroa* mites. Federal and state research budgets are being reduced, redirected, or limited by inflation. Stock that is partially resistant to *Varroa* mites has been released by the United States Department of Agriculture.

Obtaining clean stock

Varroa mites and the organisms that cause other honey bee diseases are so widespread in the U.S. today that all sources of stock, except those from Hawaii, are suspect However, the producers of package bees and queens are very much aware that their reputations are at stake when they sell bees. It is our experience that the package bee and queen industry is taking every precaution to produce clean bees.



Complications with other diseases

Any time a living organism suffers from a disease it is weakened. In such a condition it is more susceptible to attack by another disease-causing organism. Beekeepers in *Varroa*-infested areas should use effective chemicals to reduce attacks by organisms that cause American foulbrood, European foulbrood, and nosema so as to keep colonies as healthy as possible.

Recommendations

American beekeepers must increasingly assume responsibility for bee disease control in their apiaries. At one time, bee disease control was largely in the hands of state departments of agriculture. This is no longer true. Today, state after state is reducing their agricultural budgets, including money allotted to bee disease control. This is taking place because of pressure to use tax money for other programs. Bee disease problems must now largely be solved by beekeepers. Proper diagnosis is especially important. Good methods of control exist for most bee diseases, including *Varroa* mites. All beekeepers should include in their management scheme a check of colonies for *Varroa* at least twice each year.

An especially important consideration is the selection of the apiary site. A good site helps the bees control their brood nest temperature. It is exposed to full sunlight, slopes to the east or south, has good air and water drainage, and a source of clean water nearby. An apiary must be accessible so that the colonies may be examined with ease and treatments made as needed.

A beekeeper must determine the carrying capacity of an apiary, that is, how many nectar and pollen plants are present within a mile or two of an apiary and how many colonies an area will support. A natural abundance of food, both pollen and nectar, is necessary for successful beekeeping.

Presently, the only way to control *Varroa* disease is to use Apistan®, the trade name given a product that contains the chemical fluvalinate. There is currently no effort to register any other product for *Varroa* control in the United States. Beekeepers must increasingly become their own inspectors and must learn diagnostic techniques to survive.

Our present knowledge indicates that natural resistance is developing among European honey bees though it will be a slow process. The process may be encouraged by queen breeders through a natural selection process. State and federal laboratories are not currently directed to develop this stock. Some beekeepers may adopt Africanized honey bees because of their apparent natural resistance to *Varroa* mites. Individual beekeepers may speed up the resistance process by watching for and collecting bees from trees, buildings and abandoned bee hives that show resistance and selecting and breeding from them. Q

Using a cappings scratcher, slide the tines under the cappings, spearing the pupae underneath. This is not as easy as it looks, but works well. Check both brood and the bottom and sides of the cell for Varroa *mites.*

VARROA MITES ... Cont. From Pg. 17

The ether roll and wash methods only sample about 1.0% of the adult population. Therefore, with brood in the colony, those determinations have to be multiplied by a factor of 500. A few mites by either of these sampling techniques means big trouble for your bees.

When there is little or no brood in the colony, such as late fall and winter, the mites are forced to stay on adult wintering bees. Each mite needs to feed on bee blood about every six days in order to survive. Surveys at that time can be related directly to the total adult bee population, and no mathematical manipulations are needed since no mites are buried in brood.

No one has really equated numbers of *Varroa* mites in colonies to exact negative effects, but here are some guidelines that I think should help:

1. less than 100 mites per colony (after applied math, if necessary)
   a. not currently a problem
   b. plan to treat in September and October, unless a large increase in mites appears
   c. continue to monitor bi-monthly

2. between 100 and 999 mites per colony (after math)
   a. economically important number of mites
   b. treat as soon as possible after removing honey; start in August, even if you lose some of your crop
      (1) **you must protect your potential winter bees**
   c. continue to monitor bi-monthly

3. 1000 mites or more
   a. colony is rapidly approaching collapse
   b. remove honey supers (if already on) and treat **immediately**
   c. treat again in October
      (1) your bees are very likely to become reinfested
   d. continue to monitor bi-monthly

Despite our desire for something more environmentally compatible, the only available treatment for *Varroa* mites at this time is the introduction of acaricides into the colonies. Nearly 200 chemicals have been tried to date, and more are being tested. The only chemical treatment that is registered and available are the Apistan® products, manufactured and distributed by the Sandoz Crop Protection Corporation.

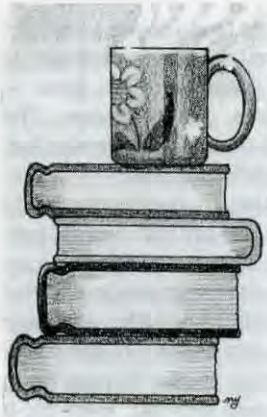
Apistan products are formulated with varying concentrations of the acaricide fluvalinate (a synthetic pyrethroid), impregnated in plastic strips. There is a 10% formulation in a large plastic strip that is meant to be used two strips per hive. (This will be changed soon to say, one strip per five frames of brood.) The 5% formulation, on a smaller strip, is designed to provide control of *Varroa* mites in packages. "Queen Tabs" contain fluvalinate formulated as a scored plastic strip that is torn into small pieces. Each piece is fastened to the floor of a queen cage to eliminate mites from an infested queen or attendant bees during shipment.

Timing of the use of package strips and queen tabs is subject to interpretation. Full colony strips may be used at any time of year, if certain precautions are followed (consult the label). However, full strips work best only under certain conditions. Obviously, you get the best results when the mites are out on adult bees and most likely to contact the acaricide. Late fall probably is the time of year with least or no brood rearing in most parts of the country. Mites should be more susceptible to treatment at that time. If you wait too long, and winter clusters get tight, many mites will escape the treatment. Many mites also escape treatments when brood is present. This should inhibit you from treating your bees in spring or summer, ***unless your surveys show rapidly increasing large numbers of mites.*** If you hesitate under those conditions, you may not have anything left to treat later in the year.

Apistan products carry a hefty price tag. That price results from costs involved in formulating time-release materials that dispense enough chemical to kill mites without killing bees; that dispense the effective dose of material over a long enough time to get good control; and that allow the treatment to be started and stopped simply by introducing or removing the product. ***Substituting other formulations of acaricides may cost less per treatment, but will cost more in the long run when honey is found to be contaminated or if acaricide resistance develops from long term exposure to acaricides in hives.***

Remain alert. Monitor your colonies for mite infestations. Interpret accurately the levels of mites when you do encounter them. And use registered control products in compliance with the label and in unity with the biology of the bees. This way you will be able to Keep *Varroa* Mites Under Control. ○

"Remain Alert. Monitor your colonies for mite infestations. Interpret accurately the levels of mites when you do encounter them. And use registered control products in compliance with the label and in unity with the biology of the bees."



LOCATION! LOCATION!

richard bonney

"Finding just the right spot will mean the difference between success and failure."

When we are just getting started, locating a hive or two is usually not a big deal. Most of us start out as backyard beekeepers and we put the hive, of all places, in the backyard. There are considerations, of course — accessibility, direction of the entrance, shade, neighbors, the kids' play space, and so on — but in a yard opportunities are somewhat limited and we do the best we can. And it all usually works out. For the most part, honey bees are good neighbors.

Expansion is a different matter, and at some point many of us start to expand our holdings. For some it is inadvertent — the result of picking up swarms. For others beekeeping is a disease, an affliction. Any opportunity to acquire another hive is seized upon eagerly. For others growth is more deliberate. After some modest success with a hive or two, a vision comes of the dollars rolling in from the sale of honey or from pollination.

No matter what the reason, more hives follow. As does the need for a place to put them.

Not many backyard operators have the luxury of expanding their holdings without facing some kind of limitations. Some towns have ordinances limiting the number of colonies that may be kept on a given size property. In other instances practical limitations prevail. More hives just won't fit, physically, or perhaps psychologically, so it becomes a matter of finding an outyard or two.

In one sense, the same restrictions prevail with an outyard as with a backyard — accessibility, shade, neighbors, and traffic of all kinds — but there are larger considerations. Accessibility, for instance, becomes more important. At home you thought in terms of walking up to your hive, perhaps sometimes pushing a wheelbarrow or dragging a garden cart. Now, in an outyard, you are probably thinking of vehicular access. If you are in this strictly for honey production, and not too many hives are involved, you may be willing to put up with a little inconvenience and carry things a short distance. If you are getting into pollination, though, close vehicular access becomes a must. Hives are heavy and awkward, and you simply won't want to carry them more than a few steps. So, think about conditions in the immediate vicinity of the hives, but also think of the approach to the hives, and in all seasons. Can you drive up to your bees at any time (except in the dead of winter, perhaps) without difficulty and without upsetting someone? Outyards usually are on someone else's property, and many property owners do not understand the need for access. They assume you will put your hives in place and maybe visit them a couple of times per year, on foot. Talk this out thoroughly when you first ask permission to be there.

One of my early experiences along these lines was with a yard I established one summer at the end of a paved private road, near a home. That pavement misled me. There was only the one house on that road, and the householder liked the idea of having bees there. However, she did not own a vehicle and did not maintain the road, or even have it plowed in winter. She walked or snowshoed to the nearest town-maintained road, about one hundred yards distant. I did not realize this until the first winter when I found I could not drive in. Then, the shaded, overgrown, unplowed road held snow well past the time I needed access for spring chores. I had a problem.

Of course this same limitation can hold even in an area without snow. Mud can be at least as much of a barrier as snow. So, too, can long grass. My truck is a small pickup, light in the rear end. In the summer a modest slope covered with long grass can be as hard to negotiate as an icy hill in winter. Without a load there is little traction.

The place where you are most often going to run into this type of problem, of course, is in the country. Farmers and other land owners often are willing to give permission for bees "over across the field there," or "anywhere down that road" (pointing off into the woods). Keep in mind that farmers don't see the land the same way you do. They see it from tractors or from four-wheel drive trucks, and cope with it daily.

Waterways are a further concern. If you must cross one to get to a yard, inquire about its yearly cycle. In the summer or fall you may think nothing of driving across a dry stream bed, or even fording a small amount of flowing water. Spring may bring something else entirely. That formerly minor trickle may become a rushing torrent.

Once you have established that you have year round access, it's time to look over the neighborhood and think about how many hives you can

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LOCATION ... Cont. From Pg. 23

about why you want this new outyard, and how it will be used. We have already alluded to this but you need to think about the possibilities in a little more depth. First, of course is that your home yard is overflowing and you just need a little more space. Second, you're going to start producing honey seriously.

If at all possible, have your apiaries hold the same number of colonies you can fit in your truck – or multiples – to make moving easier.

Always ask about bears. If they're around you absolutely will need an electric fence, or you'll end up picking up the pieces.

Third, you want to do some commercial pollination. A final possibility is that you are going to raise bees — queens or nucs, for instance. The needs for all of these uses are similar, but they are different, too.

If this is just an auxiliary yard to accommodate two or three hives, perhaps not even permanently, you can put up with some inconvenience. Not much, but a little. Look the site over with the same eye as for a home yard. If you are going to do things on a commercial basis though, even on a small scale, you need a different view, strongly influenced by the number of hives you will be keeping here.

There's a flip side to this, though. The number of hives here may be governed in part by your total number of yards, by the location of your other yards, by the locations of any pollination sites you may be servicing and by your vehicle capacity.

It can be very tempting to put a couple of hives at a friend's or relative's place. Permission comes easy and you feel comfortable going there. But that location may have problems - it could be too far from home, or it could be an out-of-the-way location, or it won't support many hives. You can easily eat up your profits by having to travel too far to service only a few of these hives, and it might work out that you just don't visit them often enough because of the distance. So, a grand plan is necessary.

Remember — a plan is only a plan, it does not bind you forever. Change it if necessary as your needs change, but if you don't have a plan at the start, your efficiency will suffer. In business, of course, and that's what we seem to be talking about here, efficiency is a must. Make that plan, then. How many hives will you have ultimately, and how will they be used. Then work towards outyards of an efficient size that are in a logical travel pattern so you can visit them efficiently, minimizing time and miles.

An overriding factor in all of this, of course, is forage. Whatever number of colonies you expect to put here must be able to survive and presumably make a crop. Start with thinking how much of a crop you want. Are you in this strictly for honey production? Then you want lots of honey, maximum production, you might say.

Are you becoming a pollinator? Then perhaps you still want surplus

Then you want lots of honey, maximum production, you might say.

Are you becoming a pollinator? Then perhaps you still want surplus honey but that is secondary to your need to maintain strong, healthy colonies (that are easy to get at when necessary) for their primary role — pollination. Or perhaps you are going to produce bees for sale. This process takes a toll on producing colonies. On top of the stress you are imposing by making splits taking nucs, shaking packages, or whatever, don't make them work overly hard to find enough forage to live on and produce a surplus.

All of this means a careful survey of the neighborhood. A topographic map from the U.S. Geological Survey is very helpful, and these maps are not hard to find. Stationery shops, news stores, and book stores often have them. With map in hand, what is the situation in a radius of one to two miles of your potential yard?

Woods? There's usually not too much forage in the woods. Is it steeply hilly or mountainous? If excessively so, this could limit the bees' travel in certain directions, restricting their foraging range in some directions, perhaps forcing them to go excessive distances in other directions to compensate.

Farmland? That's good, but what are they growing and what pesticides are being used? And so on.

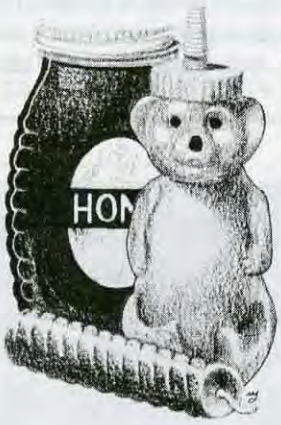
How about other beekeepers? Are there any? How many hives do they have? Will the area in question support more? If there aren't any, why not? Maybe there just aren't that many beekeepers around, but it's also possible this has proven to be a poor location. Assuming it is a good area, and you determine that even with other beekeepers present it will support more bees, will those other beekeepers agree? Be sure ahead of time. In these days of mites, Africanized bees, and public apprehensions, beekeepers must work together.

Don't forget as you look for new locations to think about other peoples' plans for an area you're considering. Today a farm, tomorrow a shopping center. Further, stay in touch with the property owner once you have established a bee yard. I have known of more than one instance where a property was sold and the beekeeper's subsequent access was restricted, and even ownership of the bees was in question. Be sure the property owner knows how to get in touch with you, and stop by and say hello now and then. Actually, this is always a good public relations move, so make it more often than not if possible.

Earlier I mentioned your vehicle as a limiting factor. Maybe the capacity of your truck will help you establish the maximum number of hives in a location. If you are a small-scale pollinator and you can readily carry twelve hives at a time, for instance, perhaps you should keep your yard sizes close to twelve, especially any yard that is at all isolated or distant. Then you can pick up the entire yard in one trip, and you won't have to make a second trip to pick up the two or three hives that didn't fit. Then again, if you do have multiple yards and they are well placed relative to each other, this size limitation will not be an important factor.

One final thought here bears. Be sure to ask if there are any in the neighborhood. Bears are by no means everywhere, but for many of us they are a fact of life, and bears do like bee hives. If you are in bear country, put up an electric fence when you set up your yard. Speaking from experience, I can say there is nothing more disheartening than to come upon a beeyard after a bear has stopped in for a snack.

Dick Bonney is the Extension Apiculturist for the state of Mass., and the author of two books on beekeeping.



THE WEEKENDER

jeff ott

"African honey bees, Texas, Mexico and what happens next."

I'm not sure what I expected to find when I visited Texas and Mexico to research the effects of the African honey bee (AHB) has had on beekeepers there. But there I was, in Mexico – riding in a Kansas State University van, sitting precariously on top of an ice cooler (there were no other seats). I was listening to Dr. Chip Taylor and Dr. Roger Hoopingarner discuss the African honey bee.

"The African honey bee is completely replacing the European honey bee. The African genetics are so dominant, the African genes are completely replacing the European's. We are finding this bee is becoming as African as the original bees that came from South African back in 1957

"The implications of this are important because it means there is no natural hybridization of the African and European honey bee. There is a period of time when the gene pool is all mixed up, but in the end, it is only the African honey bee that remains."

We bumped across northeastern Mexico towards Linares where Dr. Taylor has maintained a research lab for several years. I looked out over the arid Mexican landscape and considered the implications of what I had just heard. The mesquite and yucca trees made me feel a thousand miles from the United States and the AHB problem.

But I wasn't. The investigation had really began a few days earlier at the point of the U.S. AHB invasion. My first interview of the trip was at the office of Dr. Anita Collins, director of the United States Department of Agriculture's Bee Research Lab in Weslaco, Texas. The bee lab is only 15 miles from Hidalgo, Texas, the site where the first migrating swarm of AHB was captured and identified in the United States. Dr. Collins met with me in her office.

Dr. Collins felt the best way for me to learn about AHB was up close and personal. So she sent me out to meet up with a crew that was inspecting some USDA trap lines along the border with Mexico.

The USDA's trap lines are maintained by field technicians Art Cavazos and Ray Garza. They were busy inspecting one of the many swarm traps in the Santa Ana National Wildlife Refuge along the Rio Grande, a quarter mile from the Mexican border. Art and Ray had just killed a colony and were busy measuring the brood comb cell size and taking bee samples when I arrived. "You just missed the fun," Art said. "This colony has been established awhile. They were a little testy." *Testy?* I couldn't hide my nervous smile. Because some bees were still flying around all the horror stories of the AHB came quickly to mind. I pulled up my veil.

Art said that he was the one to find the "original African swarm" just outside Hidalgo, back in October of 1990, but the USDA had kept the find quiet for a few tension-filled days. The swarm was killed and subsequently identified as African at the Weslaco Lab. Then they sent bee samples to the USDA's Beltsville, Maryland lab

The giant 'Killer' bee that graces the town of Hidalgo.

Dr. Orley Taylor retrieves one of the swarm traps hanging in the tall brush.

After bringing the trap down Drs. Taylor and Hoopingarner begin the inspection process.

One aspect of the inspection is measuring the brood comb, looking for average cell size.

to have the Weslaco results verified before releasing the news to the press. "It was all very exciting," Art said. "The town of Hidalgo had a big ceremony and asked me to be there. They even sculpted a large honey bee that was used in a parade. It now stands outside the town's fire station." Inscribed just below the bee is "*Hidalgo, Texas – Home of the World's Largest Killer Bee.*"

Art and Ray finished with the sample and took me to the next couple of traps down the narrow wilderness-area road. The area appeared greener and more lush than other nearby areas. Art explained the landscape's appearance was due in part to the nearness of the Rio Grande and also because the area was not over-developed. I could understand why the bees had come this way into Texas. The many native trees and wild flowers seemed to make this a prime area for supporting feral colonies.

"What's the most dangerous aspect of inspecting these trap lines?" I asked, expecting an answer somewhere along the lines of "being stung to death."

But Art's reply was both quick and serious. "Drug dealers and border bandits," he said as we stopped at the next trap site.

Later, when I talked to the Border Patrol in McAllen, Texas, I found that border bandits *are* occasionally a problem for anyone working along the border. Even though Art and Ray haven't yet had any problems with the bandits, they do have a quiet respect for them. If they know bandits are in the area, they literally keep their heads down in their work. Sometimes as an added measure, they keep the bees flying just a little bit longer.

When I got back to the lab Dr. Collins reminded me about the importance of pollination to United States crops. The USDA estimates that about 66.5 million acres of agricultural products rely in whole or part on insects for pollination and honey bees are used to pollinate 80% of these crops. Simply put, every third bite of food we eat is the product of some form of insect pollination. In Texas, the major bee-pollinated crops are cucumbers and melons in the spring and cucumber pickles in the fall.

Next I met with Dr. William Rubink to get more up-to-date information regarding the AHB. Dr. Rubink is a research entomologist at the Weslaco lab and his work has been very interesting. The morphological changes that occur when a European honey bee and an AHB cross are quick to happen – usually within several queen-to-daughter generations. This is why AHB identifications that use precise anatomical measurements

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Can you tell which bee isn't European? (USDA photo)

The 'Real' African Queen.

WEEKENDER ... Cont. From Pg. 27

are effective. However, the genetic markers used to differentiate between the EHB and AHB are not as quick to change. Dr. Rubink has not yet seen the genetic changes take place in Texas. According to Rubink, even though the bees coming across the Rio were looking and acting like African Honey Bees, genetically, they were still basically *European*. The "true" African honey bee was not yet in the U.S. He said that no one really knows what the final hybridization of the AHB and EHB will be.

When I asked how the Mexican beekeeper's are dealing with the AHB Dr. Rubink said they are trying to work with the AHB and the first crosses between the AHB and EHB. This approach shows a different attitude than that of the U.S. beekeeping industry which wants to eliminate the AHB from beekeeping operations. Rubink cites several reasons for the difference. Mexican beekeepers don't have the threat of lawsuits hanging over their heads due to stinging incidents. Also, there are climatic differences – Mexico is basically a warmer environment than the U.S., and finally, the Mexican public is generally more educated regarding the AHB.

"More than 50% of the Mexican public knows about the AHB and to stay away from it. This is compared to about 1% of the U.S. population being aware of the AHB," Rubink said.

I also wondered how crop pollinators in the area were handling all of this news, so when I left the lab for my motel I called several pollinators suggested to me by Dr. Collins and made plans to meet with them the following day.

The next day was dreary, overcast and drizzly – not a particularly good day to work bees, I thought, especially those being moved for pollination (and could potentially be AHB crosses). But the mix made for the promise of an exciting day, on an otherwise dismal one.

The first stop was to visit with Bill Vanderput, the current president of the Rio Grande Valley Beekeeper's Association who runs about 4,500 colonies. I met up with him as he was preparing to pick up some queen cells from a local queen rearer.

The AHB are not causing him too many problems, but they are costing him money, he said. He maintains a system of requeening. Vanderput says that requeening is very expensive. Not only is the cost high per queen, but the labor involved is costly, too. He figures an increase of about 25% in costs compared to pre-AHB times. Although he is not passing the added cost on to the grower, yet, he will next spring, he said. He can no longer afford to keep absorbing the additional expenses.

Jerry Newton, former president of the RGVBA, related the same fears and concerns when I met with him later in the afternoon. Two of his beekeepers were moving colonies to a field of cucumbers.

But Newton feels his biggest problem is with other beekeepers. He, along with Vanderput, believes that requeening is the best approach to keep AHB out of a beekeeper's operation. But some pollinators who are not requeening. Not only does this raise liability concerns for all beekeepers, but it keeps the responsible beekeepers from passing along the costs of requeening. Newton says these beekeepers are offering pollination to the growers at up to $10 *less* per colony, and even though the growers are sympathetic to the pollinators' plight, the competition isn't.

Newton has not been able to pass along his 40% increase in labor costs to the grower. In the long run though, he feels that only beekeepers who properly manage for the AHB will survive.

Newton raised another problem that area beekeepers are experiencing. "Getting insurance is a problem. I can't get insurance anywhere in the Valley for a pollination contract," said Newton. He believes the best insurance for today's beekeeper is accurate record keeping, so he keeps accurate and detailed records of his operation, including all requeening information. He feels that if a beekeeper can show he has responsibly taken every precaution to keep AHB out of his operation, he can be spared in any legal action. (This has not been tested in court.) He also believes the growers in the area, represented by three or four large national corporations are in the greatest danger of an eventual suit. The large corporations have the deepest pockets for a lawyer and sympathetic jury to go after. "After all," Newton mused, "beekeepers don't have any money."

I asked about his requeening practices and he said that he is completely requeening with marked queens from Georgia, Texas and Hawaii each year and still believes he has a 25% AHB cross in his colonies. As soon as Newton finds an unmarked queen, or a colony exhibiting AHB behavior, it is requeened.

Newton summed it up by saying the changes facing area beekeepers will cause a shake up of things. Ultimately, he feels that the pollination business will continue, but only for those willing to take care of their business in a responsible and professional manner – and who have a little luck.

The next day I met up with Dr. Orley Taylor and Dr. Roger Hoopingarner at the McAllen airport. We picked up food and supplies then headed across the border to Mexico, bound for Linares and the rest of my investigation.

According to Dr. Taylor, a truly unique situation is occuring. "On one hand the AHB is presenting a problem for beekeepers in the Americas that has to be resolved," he said. "On the other hand, we're able to observe as one species of animal completely replaces another. It's exciting because we have learned so much in a short amount of time, especially about honey bee genetics."

As we neared the research lab we turned off the highway and twisted our way down a narrow dirt road. Taylor occasionally stopped and watched for bee activity at the entrances of the swarm traps that hung

in several trees along the road, looking like giant Christmas ornaments. Dr. Taylor was able to tell if the box was occupied by the way it hung in the tree. If occupied, it hung lower or hung lop-sided. They were all empty. "We're at the end of a swarming period. I didn't expect to find too many swarms," he said.

I spent three days with Drs. Taylor and Hoopingarner at the small ranch house that served as the lab. Being around the AHB was unnerving. I expect Taylor and Hoopingarner got a kick out me wearing my veil and gloves while we inspected swarm traps, since they did without. Neither were stung while inspecting a trap, at least while I was there. "The African doesn't become defensive until it becomes established and increases its population," Taylor said. "This isn't always true, though. I've been surprised a couple of times. This is one of the real dangers of this bee. It can be very docile, as this one is," he said as he searched for the queen in a mass of bees poured from a trap. "An unknowing beekeeper will hive this seemingly very docile swarm in his backyard and in a month or two, he'll check on his bees. Now the colony explodes in his face! The bees will exhibit full defensive behavior and sting everything in sight of that man's backyard."

"If you want to know what U.S. beekeepers are in for, come with me," Dr. Taylor said one afternoon. I always suited up, but when I saw Dr. Taylor suit up, I knew I was in for excitement. Around the small ranch house, Dr. Taylor keeps colonies of Europeans, Africans and artificially inseminated crosses. We opened several of these hives. In the short course of performing routine hive inspections, we had very angry, defensive bees all over us. Someone once told me that a colony of AHBs was no worse than the occasional "hot" colony a beekeeper will get. This might be true, if you consider the worst encounter you ever had with a hot colony. However, I doubt any beekeeper would choose to manage hundreds of these colonies, everyday, every time they open a hive. Even with a few AHB colonies, I found the constant bombardment exhausting.

I asked Dr. Taylor about this and what he thought was in store for U.S. beekeepers. He said that American beekeepers need to accept the fact that they will have to deal with the African honey bee, or some form of it, especially in the Southern states. U.S. beekeepers should be preparing themselves for this eventuality. The African honey bee will not be stopped and it will not be bred away. This doesn't have to be all bad. The AHB has some redeeming qualities, such as they do appear to collect pollen and nectar long after the Europeans quit. This is the basis for Dr. Hoopingarner's research. It isn't all bleak for beekeepers. They are just going to have to learn a new way of managing their businesses. Dr. Taylor summed it up by saying. "The sooner they prepare for the AHB, the better off they'll be."

What is in store for U.S. beekeepers? Everyone I talked with believes that the AHB is going to force new management practices. Commercial beekeepers, although seeing an increase in operational costs, are surviving and planning to increase their businesses. They are optimistic about the future. Contrary to what I first thought, the hobbyist beekeeper is also doing well. Hobbyists traditionally are always interested in what's going on in their colonies. With only several hives, the hobbyist is keeping right on top of colony management. Surprisingly, there's been an increase in the number of hobbyists in the south Texas area.

The only casualty of the Texas AHB appears to be the sideliner. Beekeepers who manage several hundred colonies on weekends and days off are not able to keep on top of the changes taking place. Requeening is labor intensive. The sideliner simply does not have time the commercial operator or the hobbyist has. Faced with varroa and AHB, several sideliners in the South Texas area have quit and sold their operations. In fact, the beekeepers I talked with in Texas said the varroa mite was a bigger problem for them than the AHB. Bill Vanderput summed it up when he said, "The African bee is not as much a beekeeping problem as it is a public relations problem." This appears to be the case. At least, so far.

Jeff Ott is a freelance writer and beekeeper now living in Colorado. His column, 'The Weekender' appears of these pages on occasion.

RACES

kim flottum and diana sammataro

Have you ever bought a brand new car? Not an off-the-showroom floor model, but one you can customize from those glossy brochures the salesmen are only too happy to send home with you. The ones you sit down and look at all the options for exterior colors and trim, wheel covers, interior decor and all the gadgets that seldom come on floor models — like the 16 speaker AM-FM-tape deck-CD player, multi-memory cruise control, power windows and seats, computer map display, 25 level air conditioning

When it finally arrives and the dealer finishes the prep work (and the bank has a mortgage on your first born), you actually get to drive this dream-come-true home. And every day you marvel at the wisdom of your choices. And smile. "This", you say to yourself, "is exactly what driving was meant to be."

Believe it or not, you can have the same kinds of options when it comes to the way you keep your bees. You can choose the style, size and cost of every piece of equipment you buy. For instance, you can get top-end no-blemish supers or those budget-end types with knot hole cross ventilation; you can use high quality last-forever paint or off-color K-Mart mistakes; or you can

well, you get the point. By deciding your budget, personal preference, and perhaps manufacturer loyalty you can put together the exact operation you want.

You can also choose the bees you put in that equipment. You can customize your stock — choose the temperament, growth curve, population size, capabilities and to some extent the color of the bees you want to handle day after day after day.

But before you choose those bees, before you decide this breeder or that, southern or western supplier, light or dark color, this race or that, you need to know your management style. You need to know what you want those bees to do (produce honey, pollinate; fast, slow); you need to know the time and type of your local honey flow (early, mid-season, late); do you move south in the fall or overwinter? Are you located in the north or south? Do you intensively manage your bees, or is your timing more casual? Do you produce comb honey or only extracted? Is disease pressure a problem? All of these questions, and more besides need to be answered before you decide which kind of bee to buy, which is best for you and your operation.

To find out which bee would be best for you *Bee Culture* conducted a season-long study of the most commonly available races of bees, coupled with an indepth analysis of these same races gleaned from both the popular and research literature. Using this information you can customize your operation to (almost) exactly fit your management style, business requirements and personal preferences.

Our study began in the spring of '93 when we started colonies of Starline, Buckfast, Caucasian, Carniolans (from 2 different sources), Italian, Yellow and Purple Cordovans. All were started the first week in May on drawn comb, fed sugar syrup until they wouldn't take any more and appropriately medicated. For the duration of the season all colonies were treated the same at each inspection, and notes and photos were taken under as identical conditions as possible.

Remember, this study is by no means a scientific comparison of these races because we had only a single colony (or two) of each and made our observations during a single season. However, our observations were made to compare our bees with the 'ideal' from the literature. Our goal was to offer a 'real world' view of what to expect when you try one of the races we examined.

BUCKFAST. Buckfast bees are well-known around the world as the product of Brother Adam's breeding program at Buckfast Abby in England. The Buckfast bee is a result of crossing many races, looking for the traits of mite resistance, gentleness, production and wintering ability. Therefore, Buckfast bees are not a true race, but a hybrid of several races. Because of this unique situation, it is not generally considered a hybrid, but a 'breed' or 'line' However, this bee is so commonly available, and more or less uniform in its behavior that we are considering it here as a type of bee you can purchase with confidence.

Our Buckfast bees were obtained from Weaver Apiaries in Navasota, Texas, the only supplier of Buckfast bees in the U.S. to date. Weavers began their program with Brother Adam 26 years ago by bringing approved stock into the U.S. The stock is maintained by occasional infusion of semen brought to Texas from the Buckfast program in England.

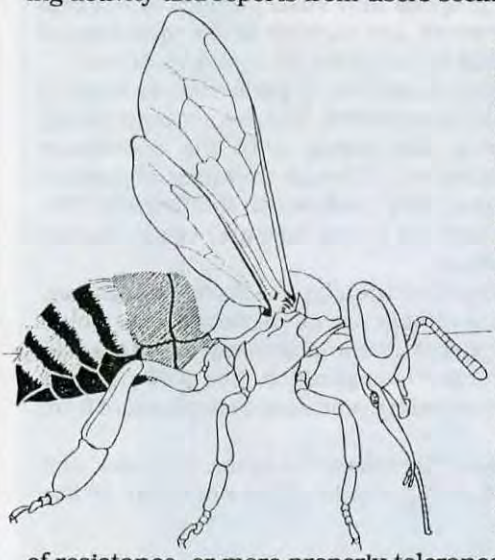
However, Weavers have practiced their own selection process on the original stock, producing a consistent hybrid that has the traits of the Buckfast they want, but adding traits they feel are beneficial to U.S. beekeeping practices.

The ideal Buckfast is produced to be a good honey producer with demonstrated disease resistance. This second trait includes good house keeping, meaning a clean nest, and low incidence of chalkbrood.

Buckfast bees are slow to build up in the spring,

therefore using less honey and pollen during what can be erratic spring weather. They also have very little brood in the fall, again using reduced stores during winter. Once started, however, they build fast.

Weavers have aggressively selected against swarming activity and reports from users seem to bear out the success of these efforts. The slow spring start contributes to that, certainly.



These traits have led to success in northern areas, but perhaps the most popular trait is their documented resistance to tracheal mites. Several studies have shown varying degrees of resistance, or more properly tolerance to low levels of infestation of this pest. Coupled with low food use and disease stress during the spring rush, overwintering success seems likely.

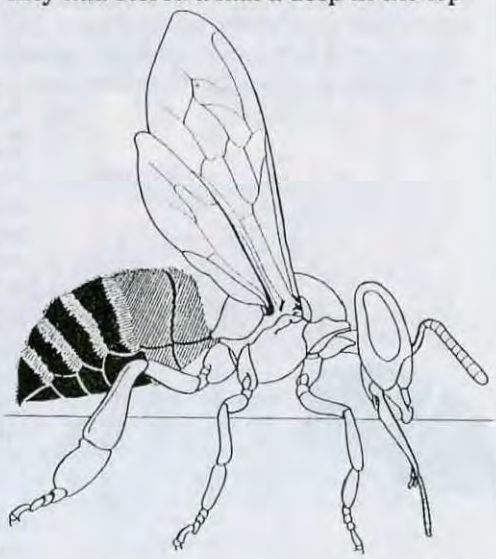
The front door of our Buckfast colony. Photos of each colony were taken at midday, all on the same day. They were very active at the door, and curious when the colony was opened.

Buckfast bees in general tend to produce little propolis or brace comb, but that trait tends to be variable. However, these appear not to be problems as reported by regular users. The bees in our project produced negligible amounts of either. Temperament, too, tends to be variable. Although extremes either way aren't common, they do occur. Our bees weren't noticeably aggressive, but were curious when the colony was opened, and showed what we considered average activity at the front door after working the colony.

True to their reputation they did not build up extremely fast after introduction, and didn't reach peak population until after the spring flow. If very early flows are important, packages of Buckfast wouldn't be the best choice, it appears. However they met the summer flow head on. The advantage is that they didn't need much food after introduction and would do well in a cold, wet spring.

Brood production shuts down by early October, with as much honey stored as the dry fall would allow. We harvested a medium depth super about two-thirds full, and, by October they had stored a half a deep in the top super.

STARLINE.



Starline hybrids are produced by Hybri-Bees Inc, in La Belle, Florida. Hybri-Bee produces breeder queens that are released to select producers, who use these breeders to produce production queens which you can purchase. Our Starlines were obtained from Howard Weaver and Sons in Navasota, Texas.

Starlines are four-way Italian hybrids, with their basic traits already established by Hybri-Bee. As such they are not a true race, but a combination of several Italian stocks. Selections are made for qualities that no single stock will have, but are resident in the population to some degree. Selections are aimed at producing bees with gentle temperament, fast, early build up, high brood productivity (which means an early, large population), that lasts late into the fall.

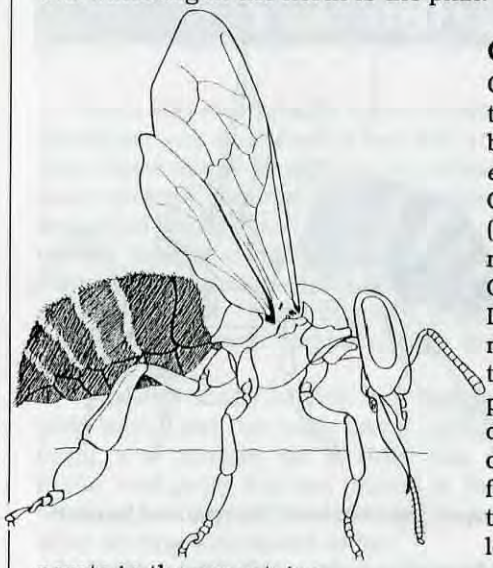
Starline front door. Though not many bees were present, guards were active just inside, and there was a steady stream of foragers into and out of the door. They don't seem to waste much time.

The hybrid was produced with the commercial beekeeper in mind and seems to fill the bill perfectly, especially for those who winter in the south and move

north for honey production.

Our Starline colony built up exceptionally fast and took advantage of the early flow. Brood production was rapid and the pattern was nearly perfect, filling the frames from 'wood to wood'

The advantages of this breed are obvious — lots of bees make lots of honey. The other side of that coin may not be so clear though. Cool, wet springs will slow nectar and pollen production and colonies will need to be fed. Lots of brood late into the fall can cause problems, too, if overwintering in the north is the plan.



CAUCASIAN.

Caucasians are a true race of honey bee — *Apis mellifera caucasica*, Gorbachev (1916). They originated in the Caucaus and Little Caucaus mountains near the Black Sea and parts of Azerbaydzhan, where the climate ranges from humid subtropical at sea level to cool temperate in the mountains.

They have predominantly dark pigmentation, sometimes with gray or brown spots and occasionally yellow bands. Color, though, can be highly variable, even in 'pure' Caucasians. Drones are large with dark hair on their thorax, different from all other races.

This is the top of the Caucasian colony's inner cover. Though they used more propolis than any of the other colonies, even this wasn't too much to work.

The race has been described as gentle, calm on the comb, but producing wet cappings (cappings directly in contact with honey in the cell, rather than having an air space between, making the cappings white). They have low tendency to swarm, primarily because they build slowly in the early spring, reducing space pressures.

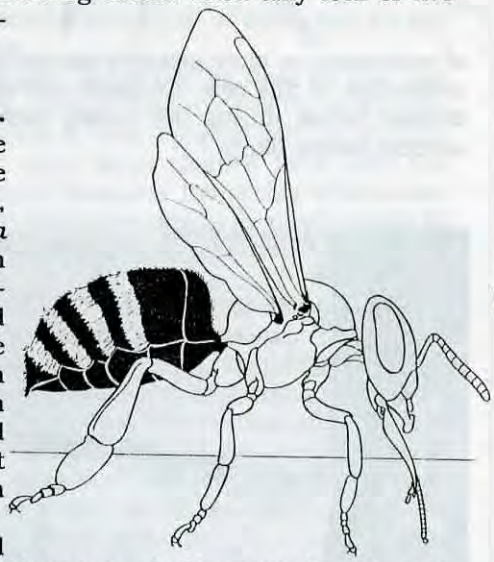
Caucasians also have the longest tongue of any of the races, giving them some advantage in resource utilization. This, coupled with their trait of being able to fly in unfavorable weather (cool temperatures, even rain) makes them ideal in situations of marginal forage, and areas that have long, drawn-out flows.

Two less desirable attributes that arise are their excessive use of propolis and susceptibility to Nosema disease. Both, however, are variable in the pure strains and can be reduced by selection by queen breeders.

The Caucasians in our study performed as close to the 'ideal' as could be expected. The colony built slowly but steadily during the spring, with the population peaking in early summer. Although they missed producing a spring surplus, they built-up on it efficiently. The dry summer reduced the major flow and brood rearing responded accordingly.

Sporting more yellow than typical (from outcrossing, probably) and somewhat active on the comb, they would certainly be considered gentle and were easy to work. Moderately productive compared to the Italians and Starlines, they nevertheless produced a surplus and from a package yet.

By mid-October there wasn't a speck of brood, and the small, overwintering cluster filled only four or five combs in the bottom box.



CARNIOLAN.

Carniolans are another true race of honey bees, *Apis mellifera carnica*, Pollman (1879), originating north and south of the Karawanken mountains in both Austria and Yugoslavia, but it is found in much of Europe.

Traditional beekeeping methods consisted of keeping these bees in small horizontal boxes, stacked in great piles for warmth

Continued on Page 37

New World Carniolan front door. A steady stream of traffic in and out, but few guards checking foragers, or strangers.

Buckfast hive. One of the traits we observed when working our colonies was the activity going on in the front when we finished. We manipulated every colony the same so our observations were similar. Although a fair number of bees came out, there weren't many in the air; they were just hanging around the front door.

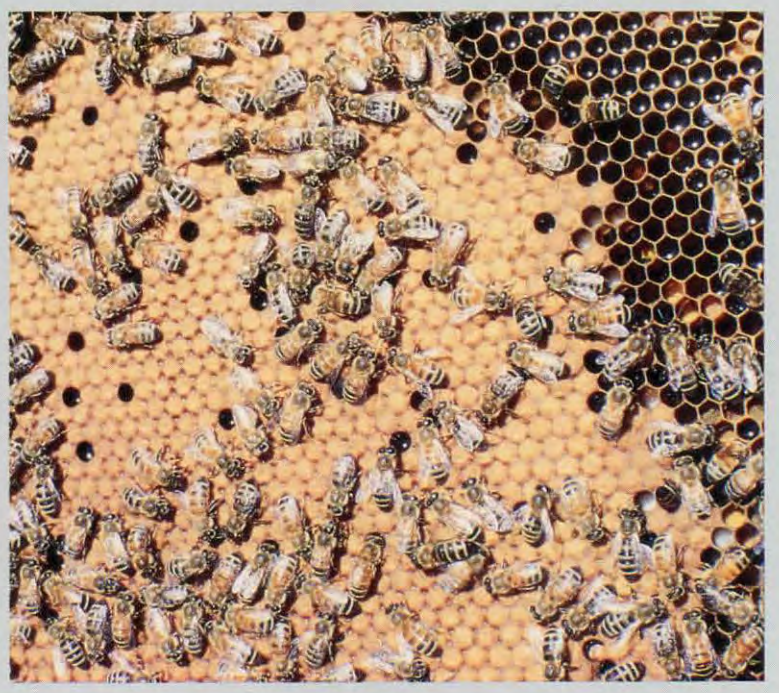
Buckfast top bars. Almost completely undisturbed when the inner cover was removed, normal activity continued unabated. Some burr and brace comb is evident, but the top bars are fairly clean of propolis. The color has been described as 'dark Italian' which these appear to be.

Starline top bars. Hardly noticing the removal of the inner cover, there weren't many guards, or watchers for that matter. Described by most as 'classic Italian' in appearance. A bit of burr and brace comb was apparent, but not until the major honey flow. Propolis wasn't used much and the frames remained easy to work all season.

Weaver Caucasian front door. As noted in the text these bees sported more yellow than the traditional Caucasian, but other traits were predictable. Guards were active during this high activity period. Note the propolis laid down on the bottom board just inside the door.

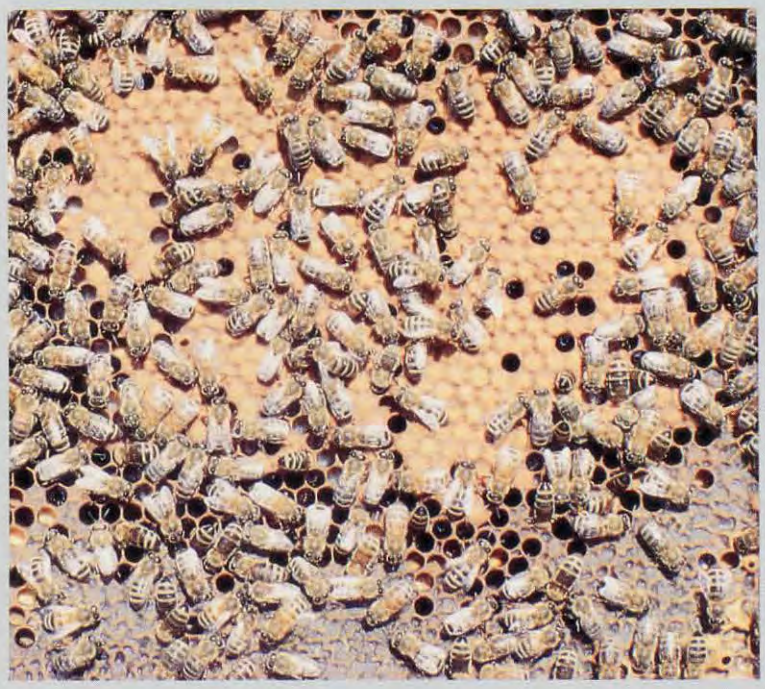
Caucasian frame. A good look at the pollen section of a brood frame. The bees were generally unaffected when the frame was removed and photographed. Very few bees were flying or running. This colony was a pleasure to work. Can you spot the Purple Cordovans?

New World Carniolan top bars. Although some guards are evident, normal activity continued. The most striking thing is the traditional color. Some brace comb was evident, but propolis was almost non-existent. Can you see the Purple Cordovan and the two Italian types in the photo?



New World brood frame. A solid pattern with no skips, pollen and honey in the corners. Brood was in four or five frames when this was taken. There are some strangers in the photo, too.

Carniolan brood frame. This photo was taken with the frame held upside down. A typically dark bee, but there is a little yellow mixed in. There was solid brood pattern, ringed with wet capped honey. Bees were calm on the comb, and activity seemed normal while the colony was worked and the frame examined.



Carniolan top bars. A few guards watched while we took this shot, but most went about their business as usual. Burr and brace comb weren't evident and the top bars stayed clean all season. Though some propolis was used it didn't interfere with working the colony.

Italian brood frame. A solid pattern on a nearly full frame. True to Rossman's goal there is honey (uncapped) and pollen in the corners. A bit flighty while working the colony, this one received a couple puffs from the smoker before they allowed us to take the shot.

Yellow Cordovan brood frame. The color is the most apparent aspect of these bees. 'Blondish' is the term, and the color. Gentle and easy to work, 'sluggish' would describe their behavior on most every inspection. But they are pretty.

Purple Cordovan top bars. For these, too, the color is outstanding. Working these brought no guards up in the air or running on the comb. Can you spot the stranger?

during the winter. This enhanced fast and early buildup in the spring, and, coupled with small colony space lead to early and frequent swarming.

Appearing similar to the Caucasian in size, color, and hair, wing venation is the key determinate. Carniolans have dark body color, the queen varies somewhat with light stripes with some yellow. Drones are dark with some light hairs and workers tend to gray or brown.

Carniolans winter well with small clusters, with a broodless period from October to February or March. Spring build up is extremely rapid through, taking advantage of very early nectar and pollen. Summer brood takes advantage of available resources. This very rapid buildup requires a management plan that is not so casual. Timing, and careful observations are important.

Considered very calm, they are one of the most gentle

Weaver's Carniolan front door. A fair number of guards checking foragers. These bees really checked out returning bees, and were vigorous in expelling strangers.

races. They produce little propolis or brace comb. As already mentioned they often are heavy swarmers, but this trait can be variable and has been diminished by careful selection.

Similar to Caucasians, Carniolans tend to forage earlier and later in the day than some other races, and will forage in cool, rainy weather with more ambition that most bees. They generally produce white cappings, rob little because they're more inclined to be long distance foragers, and drift little because they are object oriented rather than focusing on color.

We tried two sources for our Carniolans, one from Howard Weaver and Sons, the other from Susan Cobey's stock at The Ohio State University.

Weavers maintains their stock by artificially inseminating their breeder queens with their own stock plus stock brought in. Selection priorities are toward productive queens early, good housekeeping, honey production, solid brood patterns with honey stored near the brood, and gentleness. Color, though important, plays a lesser role in their program and the bees we had did show more yellow than the traditional.

The Carniolan bees obrtained from OSU are the New World Carniolan strain, maintained in a cooperative effort betweenOSU and the CA Bee Breeders

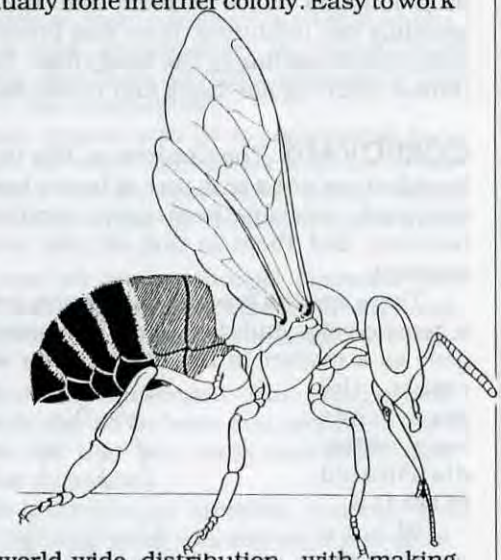
Association.The strain was developed by Susan Cobey and Tim Lawrence in a closed population breeding program selecting for production, gentleness, fast spring

Italian front door. You can see the activity, the bees colliding as they're moving in and out. Guard activity is hectic.

buildup, reduced swarming and disease/mite tolerance.

Both colonies behaved in tandem with their surroundings. Both built up rapidly after introduction and took advantage of the early honey flow in the area. We gave them ample room so they didn't become honey bound and had plenty of space for brood. The dry summer cut the honey flow and these two colonies had the smallest populations of any of our study colonies.

By early October there was little brood and by November there was virtually none in either colony. Easy to work with little propolis, the only difference between the two during the summer, was the color.



ITALIAN. Italians are without doubt the most commonly distributed race in the U.S. *Apis mellifera ligustica,* Spinola (1806), has been credited, because of its world-wide distribution, with making beekeeping a viable agricultural enterprise. It came routinely to the U.S. beginning in 1861.

Originating in the Apennine Peninsula, (Italy), the race was confined by the sea, and mountains to the north. The only bee from Europe with yellow pigmentation, it's appearance is somewhat similar to the Carniolan race, with the exception of color, of course. But there the similarities end. Do not confuse the yellow pigmentation with only Italian bees though. Several races from the African area also have yellow pigmentation.

Italians tend to be short-distance foragers, even having a medium length dance, called a sickle dance. This short distance attitude leads to robbing, however, a trait they're known for. Orientation is color-focused, thus drifting in an apiary is common.

Pure Italians start brood rearing slowly in the spring, peaking in summer and lasting late into the fall. This

trait, brood rearing even into winter, leads to high food consumption and during extended confined periods means feeding may be required. Swarming in the pure race is generally low, due primarily to the slow buildup in spring.

Our Italian colony came from Rossman Apiaries in Moultrie, Georgia. Rossman's Italians are a fairly true selection, chosen for several attributes. Due to it's normal slow buildup, Rossmans introduced a faster spring building Italian stock to their line to accommodate beekeepers who wanted pollinating stock.

Given this small timing difference, bee production is top on the list of priorities. Lots of bees produce lots of honey, the next selection, along with even and mild temperament. A solid brood pattern with a rim of honey around the edge with a little pollen in the corners is also the goal.

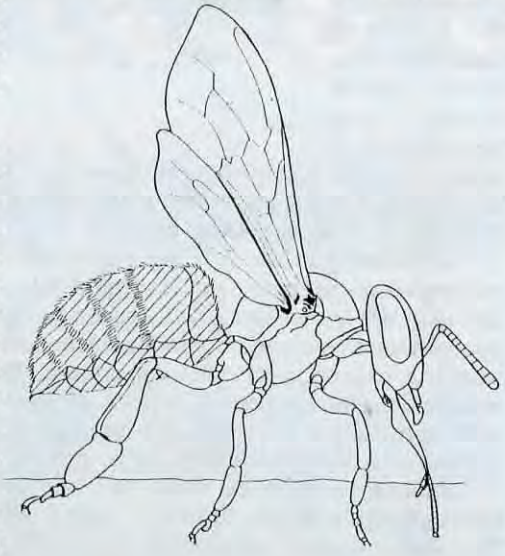
Breeder queens are selected for their ability to produce a uniform production queen with size and color certainly considerations. Large thorax and abdomens are important, with yellow to leather color acceptable.

The Italians in our study built fairly fast in the spring. Not nearly as fast as the Carniolans but almost as fast as the Starlines. The brood pattern had more honey and pollen in the brood frames than the Starlines, though. Once started, the rate of production was only up, and only began to slow in October.

Behavior wasn't very aggressive, but bees in your face weren't uncommon when working the colony. Propolis production was a bit more than the Carniolan, but certainly not inhibiting. Burr and brace comb was evident, corresponding to the honey flow. Color was typical Italian, with regular black and yellow banding.

CORDOVANS. The Cordovans, like the Starlines and Buckfast are not a true race of honey bees. Nor are they commonly available from queen producers. You may, however, find them in one of your colonies quite by accident.

There are two types of Cordovans, both the result of a genetic color mutation. Bud Cale used this recessive gene as a marker in the Starline four way cross. As a result the gene has been widely distributed in the U.S.



When present, the cordovan gene affects body color. It changes black body pigment to various shades of red and yellow - purplish bronze color. When present in Italians the bees are a blondish red.

The gene is recessive, meaning both male and female must have it to produce the light-colored offspring. Obviously, a queen with this gene that has been artificially inseminated with Cordovan-gene drones, will produce a colony of purple, or yellow bees. That's where our Purple and Yellow Cordovans came from.

Purple Cordovan front door. Not a lot of activity, and these bees weren't moving much. Guarding activity was minimal.

Yellow Cordovan front door. This is pretty self expanatory. Little acitvity, period.

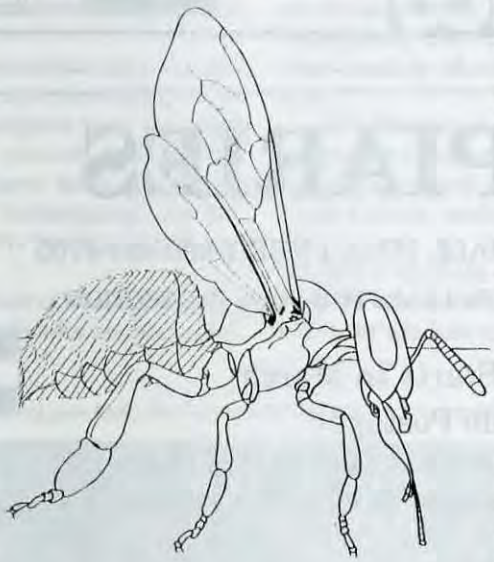
The OSU lab in Columbus maintains these stocks, and one of each was donated for the study by Sue Cobey, who keeps these lines available. Sue wrote an indepth article for us about these bees in the November, 1990 issue of *Bee Culture*. Cobey's experience with these is extensive, having raised them for some time while in California.

Our Purple Cordovans built up relatively slow, but produced a good brood pattern early and a healthy population by mid-summer. A modest amount of propolis

Yellow Cordovan brood frame. Not a bad pattern, but spottier than you might like. The other side was about the same.

Caucasian top bars. The Caucasian had considerable activity, and few guards. Also, not much in the way of propolis is apparent.

was apparent by season's end. There were two features that were most noticeable however. One, they drifted everywhere. I sometimes wondered how they kept bees at home. They shared this trait with their Yellow cousins. Look carefully at the photos and you'll some of each in many of them.



The second trait was their appearance. Inspectors, visitors - anybody who saw them wanted to know where they came from, and where could they get more.

One thing Sue commented on and we were able to confirm. Both colonies seemed susceptible to most of the problems bees encounter, only more so. The Yellows were the first (and only) colony to show *Varroa*, both had chalkbrood, seriously and both showed more or less spotty brood towards the end of the season (but this could have been due to the queens). However, the *only* trait selected for in these bees is color. Disease resistance, low or high swarming and the other traits are not taken into consideration.

The Purple colony shut down early, by mid-September, but the Yellow colony superceded in late September, so from our perspective it was no longer part of the study.

WHAT'S IT ALL MEAN?

Way back at the beginning of this article we talked about customizing your operation - both the equipment and the bees you use. The key to successfully accomplishing this, however, is knowing several basic items about yourself, your area and your goals. Like for instance.

What kind of honey flow do you have most years? When does it start? Is there more than one? Which is the one you make surplus on? Is it short, heavy and fast, or long, slow and steady? Once you have a feel for this critical aspect you can better select the type of bee that will best exploit those resources.

Of course your management style enters in here, too. Are you intent on making barrels and barrels of honey, or are you less interested in the 110% effort on your part that requires, and will settle for less honey, with a bit less work? And do you make comb or chunk honey, or only extracted?

Do you produce packages or nucs for sale, thereby needing lots of bees early? And these from either large overwintered colonies that build real fast, or from splits made in the south?

Do you overwinter your colonies? Is winter severe, long and tough, or mild, wet and short. Do you pollinate crops each spring, and if so are they really early like almonds, or later, like cranberries?

Although most queens sold go to commercial beekeepers, there are far more individuals who are in the sideline and hobbyist arena. Productive, gentle, easily managed, durable and fun are the requirements for most of this group.

Durable crosses all groups though. Diseases and pests have, and will continue to take their toll, and resistance or tolerance are certainly important, to everybody.

But I think that last requirement - fun - is important. And right alongside should be 'easy and profitable', too. You *can* pick the bee that best suits your style, your business and your operation.

Working with a breeder, or breeders, you can find that perfect bee. Certainly some trial and error is in store, that's part of the learning process. And good information from those breeders is important - ask, ask, and ask some more. Much of your fine tuning can be done by some basic research (like this article) and talking with those who make bees and others who buy bees.

And when you find that perfect bee, the one that does exactly what you want and exactly what the book and the breeder says it should, you can marvel at the wisdom of the choices you've made. And smile. "This", you'll say to yourself, "is exactly what keeping bees was meant to be."

Resources used include Friedrich Ruttner's "Biogeography and Taxonomy of Honeybees", and articles by Susan Cobey, Dr. Alfred Dietz and Dr. Basil Furgala, et al. The bees and information about each were provided by Fred Rossman, Rossman Apiaries, Morris Weaver, Howard Weaver and Sons, Susan Cobey, OSU, and Dan Weaver, Weaver Apiaries.

Drawings of each of the bees considered were made from photos taken of bees from each colony. They show pigmentation, banding patterns and hair length and color on the abdomen. Thorax, head and legs were not included in this nor was wing venation. Drawings by Mike Yatcko.

LIKE FATHER . . .
. . . LIKE SONS

vikki auten

The bee business isn't exactly the field of choice at least not for most people. Ask 100 kids what they want to be when they grow up and you'll be lucky to find one that eludes to the idea.

For the boys in the Auten family, the thought was as equally far fetched. Living in the desert of Phoenix, Arizona, the idea really never entered into their minds. Their father, Bill Auten, made his living as a school teacher. To say that it is a surprise to find three of his four sons working with bees is an understatement to the extreme.

When he was about 13 years old, Bill Auten took up a new hobby. Bees had always intrigued him. So, after finishing his chores around the family's Tennessee farm, he experimented with beekeeping. He assembled his own hives and rescued swarms.

Initially, most of what he learned was self taught. Books and the experience of others helped a little. But, by age 20, he had gone to work for a beekeeper to learn what books couldn't teach and realized how much he didn't know.

Even enlisting in the army didn't deter Bill from beekeeping. Although his hobby was put on hold for the time being, it wasn't long after his discharge that he was at it again. He settled with his wife in Phoenix, Arizona and took a job teaching Social Studies. The school janitor approached him one day about a swarm on campus. With that, Bill returned to his hobby. Over the years, he would keep roughly 18 colonies at any one time.

Bill learned that he and Arizona beekeeper Charles Bledsoe attended the same church. The two men became friends, exchanging stories after church on Sundays. Having worked in the field for most of his life, Charlie always had new ideas and words of wisdom for Bill to consider.

Bill mentioned that his second oldest son, Brad, was graduating from college and looking for a job. Charlie told him to bring his son over and he would put him to work. In 1978, Brad Auten graduated from Pacific Christian College with hopes of becoming a minister. However, soon after working with one of the masters in beekeeping, he decided to put that idea on hold for the time being.

At the end of Brad's first year, Mr. Bledsoe loaned him 48 colonies from which to build. Brad increased the number of hives, proving his ability as a beekeeper. In a short while, he began Western Honey Company.

The next Auten to enter the beekeeping industry was the youngest son, John. Like his father, John had taken up beekeeping as a hobby. His father had given him his starter colonies and had shown him how to work them. In 1982, John joined his brother as a partner in Western Honey Company. Over the next four years, the

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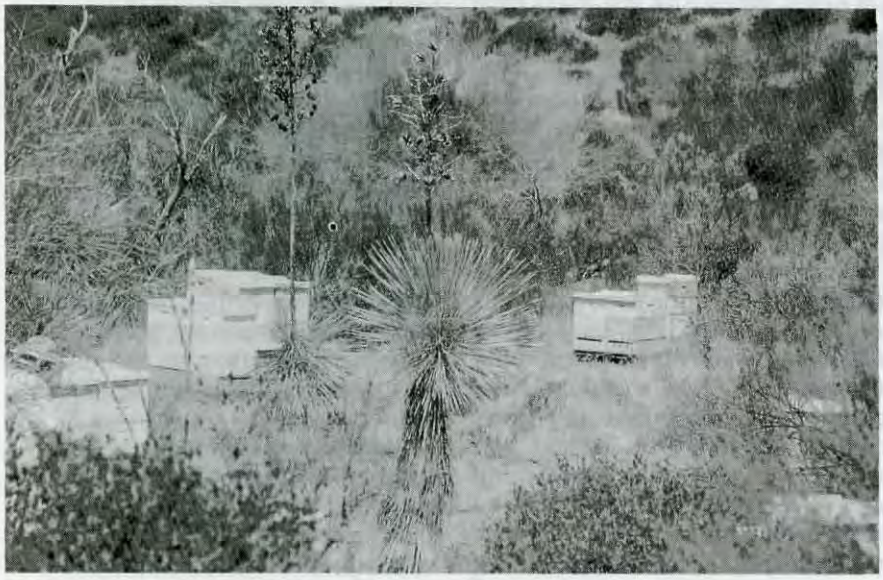
No matter which way you look, the landscape appears a bit surreal.



Father and sons, George, Bill, John, Brad (in front).

Bill proudly holds up a frame, standing in a typical Auten beeyard.

ARIZONA ...Cont. From Pg. 41

number of hives would grow to more than 300.

Charlie Bledsoe retired from beekeeping in 1984. At that time, he sold his remaining 1,200 colonies to Brad. Brad worked the hives until 1989 when he joined up with Alaskan Wilse Morgan, to form Apiary Specialists where today, there are more than 1,800 colonies.

Even with the birth of a new company, Brad and John continued their work on "Western." With their father's help, the two brothers experimented and expanded the company to more than 475 colonies.

Brad and John like to refer to Western as the "pilot" company. Because it is small it is more easily managed and enables experimentation with new techniques. If an idea proves successful, it is incorporated into Apiary Specialists.

Both companies make their permanent home in the desert surrounding Phoenix, Arizona. The landscape may seem like an unlikely place for bees to flourish, but it is more abundant than it appears. The monsoon season leads the way for lush growth during the spring. Mesquite trees, flowering underbrush and other desert flora allow the bees to thrive throughout most of the year. With the exception of saguaro blossoms, cactus blooms are not that significant in the production of honey and pollen.

The production from each of the colonies is something Brad and John are proud of. Each year, the colonies will yield between 80 and 90 pounds of honey each. Brad and John have found ways to boost their pollen production. Stacking the colonies two and three stories high and furnishing each with a pollen trap (designed by Charles Robson), produced a considerable amount of pollen. The colonies yield between 20 and 25 pounds of pollen per year per colony.

Like many other beekeeping companies, Western Honey and Apiary Specialists ship their colonies to the orchards of California for pollination. In mid-February, the bees are loaded onto semi-rigs and moved west. There they will stay until mid-March.

When they return to Arizona the bees are taken to locations north of Phoenix, such as Cordes Junction, Bloody Basin, and Flagstaff. Many of these locations are State-owned and managed by the forestry service. They remain in these high-desert locations until the fall, foraging primarily on catclaw. Then they are moved back to the lower desert for the winter. Here, they produce wild western and buckwheat honey.

Both Western Honey and Apiary Specialists place heavy emphasis on honey and pollen production. They have not yet taken up the task of packaging and retailing their own product, however, Brad seems to suggest that it is only a matter of time. Until then, supers are taken to independent companies for extraction. The honey is then put into 55 gallon drums and sold to packing companies.

The most recent of the Auten boys to take up beekeeping was George. As Western Honey and Apiary Specialists grew, their industrial needs became greater. Forklifts, boom trucks, and other vehicles were purchased to help serve their demands. Brad's younger brother (and John's older brother), George was an automotive mechanic. Often times, he was called on to maintain the equipment.

After years of listening to his brothers, George figured there must be something to this beekeeping biz. In 1992, he acquired his first 35 colonies. By the beginning of 1993, he had expanded his inventory to more than 55 hives and began the Cave Creek Honey Company.

Located in a small town just north of Phoenix, George's bees make their home in the hills and washes of Cave Creek, Arizona. Although pollen production and honey are both significant concerns, George has placed emphasis on wholesale and retail sales.

In today's health-conscious society, there is a strong demand for raw, unfiltered honey. Individuals with pollen allergies and other ailments, want a product that is native to their

environment. And, it is equally important to them that the product maintains as much of the natural nutrients as possible.

George's company provides such a product. The honey is as pure as if it were still in the hive. The only difference is that the comb and spare bee parts have been removed. The honey is extracted and taken to an FDA approved packing house and placed into tamper-proof containers. It is packaged in sizes useful to the consumer - pints, quarts, and gallons being the most popular.

When the demand for the product surpasses the amount of honey that Cave Creek Honey Company can produce, George purchases additional quantities from Western Honey Company. Because all three brothers maintain a similar schedule for their bees, the honey is essentially the same.

Cave Creek Honey Company retails its product through special events or "shows." If done properly, this type of marketing can be rewarding. By following a few guidelines, even a company as small as George's can realize a decent profit.

There are three basic rules the Cave Creek Honey Company follows when marketing at a Trade Show – gimmick, inventory and samples. As with any other type of retailing, the first order of business is to get the public to notice you. An observation hive works best at attracting attention. There is nothing more enticing than to be up close and personal with something that can inflict pain on the human body. Not only that, bees are a fascinating society to observe.

Now that you've got everyone's attention, be sure you have a "more than adequate" display. Devote careful forethought and time to your presentation. Put as much product as possible in front of the customer and stock different flavors. The public loves a selection. However, if you don't have different flavors, all is not lost. A selection of sizes will do quite well, too. Fill in the open spaces with bee-related props such as stuffed bears.

Finally, have samples of your products available. If you have different varieties of honey, provide a sample for each. By letting people taste each your chances of selling your product are dramatically increased.

As to the retail cost of honey, well, that varies with each region and marketing outlet. Check your competition, taking into consideration the presentation of the product and numbers of competitors. One item of utmost importance is to not undersell your product. Honey and pollen are two very precious commodities. Bees work extremely hard and their efforts should not be taken lightly.

Now that Bill Auten has started all of this, you are probably wondering if he still plays a part. Well, his passion for bees is as strong as ever and he pretty much welcomes any opportunity he has to work with his sons free of charge. Needless to say, they are more than happy to take him up on his offer.

Desert beekeeping is a way of life in the Auten family. Even Bill, Jr., the oldest of the Auten boys, who doesn't actively work bees, contributes his fair share. He has a sharp mind for business and can offer some pretty good advice.

So, while all those other companies are hashing out their strategies around formica tables beneath fluorescent lights in colorless meeting rooms, the Auten family does it in a more comfortable setting at the dinner table. It is a gathering where each member has a fair understanding of the business, and an equal voice.

Vickki Auten is a writer from Cave Creek, AZ, and definitely related to the subjects of this story.

The 'Honey Bucket' Problem

franjo goluza

During the Great War, latrines in the Canadian trenches were merely metal pails. Ironically, Canadian troops called them "Honey-buckets," and in a twisted, morale boosting initiation rite an ignorant recruit was usually cajoled to empty it. To his dismal surprise, a bucketful of golden liquid wasn't waiting for him.

Well, fortunately for beekeepers Canadians don't use the term "Honey-buckets" in that context anymore. Yet, a "Honey-bucket" is what many beekeepers in urban areas are beginning to call 'muddled' honey. In Victoria, British Columbia, the nectar of flowering plants varies dramatically and after a harvest, a 'muddling' effect on the honey crop is the result of the extraction process. Unfortunately, small-time operators are limited to only a few really good nectar sources and have the "Honey-bucket" problem to contend with. Essentially this means that urban beekeepers in areas like mine won't see large quantities of 100% single-variety honey that comes from the hills of Fireweed or Clover out of the commercial beekeepers' extractors.

Linden flowers make excellent honey, and a perfect pot of tea.

Last year, after my third beekeeping season, the honey I extracted was mixed simply because their wasn't enough of a single variety available to my bees. I felt it wasn't worth my time to clean the extractor out for a mere 500 milliliter (1 pint) jar of 100% pure Clover or linden honey. So in the end I really didn't have a choice, I had to mix. I wasn't sure what type of honey I was extracting, but there was a hint of American linden, blackberry and clover in there somewhere. I could guess all kinds, but I could never have the privilege of saying this is American Linden or Clover or Blackberry honey. What disappointed me most were friends who asked, "What kind of honey do you have for sale?" I didn't have an answer for them.

My beekeeping instructor, John McDonald, keeps bees a long way out from Victoria. I think his bees collect the best nectar in the entire Pacific southwest. Fireweed honey is the most popular in Victoria and John collects a lot of it. Whenever I go to my local Safeway, I see John's honey up there sparkling on the shelf under the incandescent light. On the jar in bold letters is "Fireweed Honey – The Finest Honey Anywhere." Although a cliche, I wouldn't doubt that slogan for a moment.

For me, keeping bees away from home is uneconomical. I just cannot afford the expense with my small operation. Under a municipal by-law I am allowed only four hives in my area, which I can barely maintain due to the lack of food sources. Last year, in an attempt to give my bees nectar that would produce more of a certain kind of honey, I helped plant three American linden (*Tilia americana*) trees in my neighborhood. I started out with five, but I could only convince three of my neighbors that it was worth their while. One neighbor didn't want the tree in his yard and the other just didn't like tea (American linden makes a flavorful cup of tea). That was two years ago. Now the trees are about four feet tall, but they still don't provide much nectar. Things can't change overnight however.

In my second beekeeping year John let me in on an old trick. It was an obvious tactic I should have tried before. The idea was to keep a super with ten empty honeycomb frames in reserve for when my linden was in bloom – which was usually a one-week period in late July. At the outset I thought that the idea was a Godsend. Finally there was a way I could have the honey I so desired. It turned out however that my linden just wasn't mature enough to act as a good nectar source. It was the second season of the proverbial honey-bucket, but it gave me the idea to plant more lindens in my neighborhood.

I tried plants like the golden honey, purple loosestrife, marjoram, mountain mint and the golden cleome, but the American linden tree was, in my opinion, the best choice because of its potential. Most plants needed more care than I could give them anyway and not many of my neighbors wanted plants that they would have to tend to almost every day. Also there just wasn't enough of these plants to get a quality crop – it wasn't worth my time to extract. I needed a tree that was going to give me a high return on my investment. Still, in the greenhouse, the golden cleome and the golden honey plants are healthy and will continue to provide my bees with nectar when the time is right.

Continued on Next Page

HONEY BUCKET ... Cont. From Pg. 45

In my greenhouse this year, I have propagated over 20 American lindens in an effort to populate my neighborhood during the coming summer. I obtained discarded pots from a local garden center and with a little work I transplanted the shoots. In mid-May I am going to walk door to door in an effort to convince people to plant a linden. Twenty trees will be an easy sell, especially when the price is free. The advantage here is that my bees will not have to travel very far for a good supply of food. It might be slow, but in the long term I'm hoping it will be effective enough to stop my 'honey-buckets' from overflowing.

Making Linden Tea

American linden tea is made from the tree's dried blossoms. Pick flowers immediately after they've bloomed, but before they turn brown or are ready to fall off. When flowers are ready to be picked, the honey-like scent surrounding the linden is strongest. On larger specimens, this scent can be noticed from ten feet away. This will last for nearly two weeks.

To dry flowers evenly, prepare an area of your home that is cool and dry. Then spread the flowers you've picked onto a clean bed sheet or large piece of cardboard, leaving the blossoms in the room for five days (or until the flowers are brittle). Do not place flowers in direct sunlight. Once brittle or crumbly, the flowers can be placed in Zip-lock storage bags or recycled coffee cans with plastic lids.

For tea, a good ratio is two cups linden flowers to one quart of water. Using three cups flowers to one quart of water is not uncommon, however. Some people like it weaker, others stronger, so you'll have to experiment to suit your preference. American linden is a common home remedy for coughs, colds and sore throats. It is also a natural diaphoretic and stomachic.

American Linden Tea

2 cups dried, American linden flowers
1 quart water
Method: Bring water to boil. Add flowers and cover for ten minutes. Let cool or drink when hot. Makes approximately four cups.

Lemon Linden Ice Tea

1 quart American linden tea
4 teaspoons sugar
4 teaspoons lemon juice
Icecubes
Method: Boil linden flowers and water for 10 minutes. Let cool. Pour tea into glass and add one teaspoon each sugar and lemon. Add icecubes. Makes about four cups.

Linden Fruit Punch

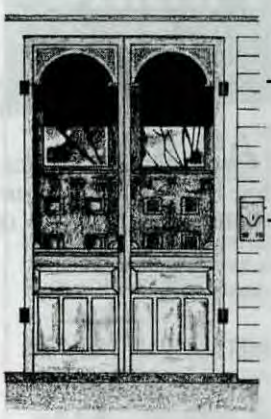
2 cups tea, chilled
1 cup apple juice
1 cup orange juice
4 teaspoons honey
1 orange
Method: Pour tea, apple juice, orange juice into punch bowl. Add honey & stir. Cut orange into sections. Serve chilled with floating orange slices. Makes about four cups.

Propagating American Linden Trees

The best way to propagate American linden is by taking suckers. New suckers are sent forth almost every summer by the parent tree and can be transplanted easily. Here's how to do it – take a one-gallon container and fill it 3/4 of the way with moist potting soil. When you take a sucker, gently dig around its base until you see the root-ball. Then with a garden trowel, scoop roots at their lowest point and transplant the sucker into your prepared container. Pack firmly around the container's edges, but not around the sucker. Then water thoroughly every second day until the shoot takes root.

Though people take suckers during summer months, best times are in February and March while the tree is still dormant. This way the tree has time to firmly root itself for over-wintering. Another precaution to take for over-wintering is insulating the roots. There are a couple of ways this can be done. Bury your container in the garden or wrap the pot with newspaper. make sure newspaper cover is at least 1/2 inch thick and then tie it with string. American linden is hardy to -10°F, but usually first and second year trees' roots are more susceptible to cold, especially windchill. A more simple way to deal with the cold weather is to bring your tree indoors and place it on a window sill. Then it's sure to see the next growing season.

Franjo Galuza is a freelance writer, tea drinker and beekeeper from Victoria, British Columbia, Canada.



HOME HARMONY

ann harman

It's Lunch Time!

Lunch — it can be found in a brown paper bag or on fine china. It can be eaten "on the run" or under a tree. Unfortunately lunch can be boring or even repetitious at times. Honey can certainly make lunch more interesting.

Your first thought might be to make a peanut butter and honey sandwich. Delicious, to be sure, but not adventuresome. Now before you decide that interesting lunches take too much time to make, consider that you do not have to have a gourmet lunch every day of the week. Furthermore, you can make lunch dishes in advance, several at a time and, in these days of microwave ovens, you can have a hot lunch whenever you wish. Individual portions can be frozen so that a variety of lunches can be available any time. Take a rainy weekend afternoon and prepare some interesting lunch dishes — using honey, of course. If you can, invite someone to share your lunch occasionally. That would make an excellent introduction to honey cookery.

NOODLE KUGEL

Here is an interesting recipe for a lunch dish. Serve it hot with a salad or fruit. You can bake it in individual serving size dishes or in one dish, divided up after baking.

3/4 lb flat noodles
3 eggs
1/4 cup honey
2/3 lb farmer cheese (or "hoop" cheese)
1/2 teaspoon salt
1/2 teaspoon cinnamon
1/4 teaspoon nutmeg
1/4 cup butter

Cook noodles according to package instructions until tender but still firm. Drain immediately. Beat together lightly the eggs, honey, crumbled cheese, salt, cinnamon and nutmeg. Cut half the butter into small bits. Stir together the noodles, the egg mixture and the cut-up butter. Put 1 tablespoon butter into a medium-sized casserole and heat it in the oven until butter is melted. Tilt the casserole so that the sides are coated with butter. Spoon in the noodle mixture. Sprinkle a little cinnamon on top and dot with the remaining butter. Bake for 25 to 30 minutes at 350°, or until the top is golden brown.

The Vegetarian Epicure Book Two
Anna Thomas

QUICK WINTER HERB BREAD

Soup and a sandwich — that's a classical lunch. Now for a bit of change how about soup and a piece of this.

1-1/2 cups unbleached white flour
1/2 teaspoon salt
1-1/2 teaspoons baking powder
1/2 teaspoon baking soda
1/4 teaspoon marjoram
1/2 teaspoon basil
pinch thyme
1/2 cup raisins
1/2 cup chopped nuts
1 egg
2 tablespoons honey
4 tablespoons melted butter
3/4 cup buttermilk or sour milk

Sift together the flour, salt, baking powder and soda. Sprinkle in the herbs and toss with two forks until well blended. Mix in the raisins and nuts and toss again, making sure they don't stick together. In a large mixing bowl beat the egg until it is light and slightly thickened. Add honey and beat to blend. Beat in the melted butter and buttermilk. Blend the dry and wet ingredients together with just a few strokes. Turn out on well-floured board. Using a scraper or turning spatula, reach under the dough and lift it on top of itself. Do this several times and pat the mixture together gently with your floured hands. If it is very gooey, sprinkle on a bit more flour but be stingy. When the dough just holds together but is still lumpy, put it in a buttered cake tin. With lightly floured palms, pat lightly to fill the pan. Bake at 400° about 20 minutes or until lightly browned and the middle feels springy when pressed. Don't overcook. Cut into wedges and serve warm with butter.

The Garden Way Bread Book
Ellen Foscue Johnson

QUICK DIP

If you are still convinced that lunch requires a sandwich, why not make a dip and take along a baggie of fresh vegetables to dunk. In this way you have a sandwich and a "salad" both quickly made.

3 tablespoons honey
1/2 cup mayonnaise
3 tablespoons onion, minced
3 tablespoons ketchup
1 tablespoon curry powder
1 tablespoon lemon juice

Combine all ingredients and refrigerate several hours or overnight before using. Delicious with crisp fresh vegetables.

Ontario Honey Recipe Book
Ontario Beekeepers Association

ORANGE WALDORF SALAD

A fruit salad is a refreshing lunch treat. This next recipe calls for mixing the salad several hours ahead of time. This means that you can fix your lunch salad at breakfast time, saving yourself time at midday.

5 medium-size tart red-skinned apples (or a combination of green- and red-skinned)
2 tablespoons orange juice
1-1/2 cups halved seedless red grapes
1 stalk celery, thinly sliced
1/2 cup coarsely chopped toasted walnuts

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HOME HARMONY ... Cont. From Pg. 49

Core, but do not peel, and dice apples. You should have 5 6 cups. Mix with orange juice. To toast walnuts: spread in a shallow pan. Bake at 350° for 8 to 10 minutes, until lightly browned. Add grapes, celery and walnuts to apples. Mix lightly with dressing. Cover and refrigerate for 1 to 3 hours. This can be served in a lettuce-lined bowl.

DRESSING:

1/3 cup plain yogurt
1/3 cup mayonnaise
1 tablespoon honey
1/8 teaspoon grated nutmeg
grated orange rind

Mix together until smooth.

The Complete Book Of Salads
ed. by Ortho Books

CARROT AND ORANGE SOUP

On another day you might like to have soup. This one can be served chilled (nice on a hot summer day) or heated (for a frosty winter day). This soup would be delicious with a ham sandwich.

2 tablespoons butter
1 pound carrots, thinly sliced
1 large onion, sliced
3 cups chicken broth
1 teaspoon honey
1/2 teaspoon dill weed
1-1/2 cups fresh orange juice

Melt butter in 5 - 6 quart pan. Add carrots and onion. Cook, stirring, until onion is limp. Add chicken broth, honey and dill. Cover and simmer 35 minutes or until carrots are very tender. Whirl half the mixture at a time in a blender until smooth. Stir in orange juice. Cover and chill. Season to taste with salt, if desired. Serve chilled or reheat. Serves 6

Entertaining For All Seasons
Sunset Books

BBQ BEEF

You can have a hot BBQ sandwich for lunch one day. Mix up this ground beef BBQ and freeze individual-size servings. Thaw and warm in the microwave for a quick tasty lunch sandwich.

2 lbs hamburger (lean)
1-1/2 tablespoons oil (try canola)
1 green pepper, finely chopped
1 cup celery chopped
1 cup tomato sauce
1 onion, chopped
Chili powder — dash (to taste)
1/2 tablespoon salt
1/4 cup honey (dark and flavorful is best)
2 tablespoons cider vinegar

Sauté the onion, celery and green pepper in oil. Add hamburger and brown, making sure meat is broken into small pieces. Stir in remaining ingredients and cook over low heat about 45 min. Makes 10 - 12 servings.

A Honey Cookbook
A. I. Root Company

With this assortment of recipes, you will see that lunch can be interesting and delicious, all because of honey.

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

Time spent with your bees should be fun, right? Sometimes it's hard work, sometimes even frustrating—but it should *always, always* be fun.

But if it's not, if it seems no matter what you do it isn't right, if you're not sure what to do next, if...well whatever the obstacle, no matter what it is, *Bee Culture* Magazine has the answers you need.

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Kim Flottum
Editor

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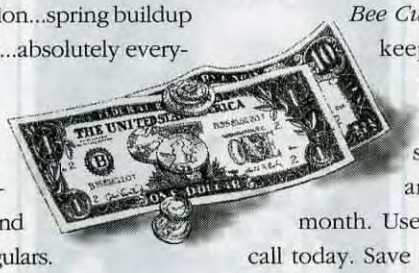

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IT ALL STARTED LIKE THIS . . .

bruce t filbeck

Let me set the stage. It was Thursday, April 15, 1993 and the location was eastern Michigan. The bees had arrived!

Well at least some of them had. Since I had ordered three of those "three-pound packages with clipped and marked queens" (one Midnight, one Starline and one Buckfast – I'm really an experimenter at heart and wanted to compare them) and had ordered them from two different suppliers it had been a real guessing game as to which bees would arrive when. When the post office called (right in the middle of my second cup of coffee) and told me two packages of bees were there, I immediately rushed to pick them up.

The moment of truth when dealing with a package.

During the 10-minute trip, I speculated about what I would find waiting for me and decided it must be either the Midnights and Starlines (in two crates from one supplier) or all three packages with the Midnights and Starlines in a single crate. What I found was a single package of Buckfasts and a single package of Midnights. I knew that I had Buckfasts since it said so on the label, but I wasn't too sure what the other ones were yet. As it turned out this was only the first of several things about my bees that were not turning out as I had expected (and certainly not as described in the book)!

The lady at the post office was careful to inform me that there was a bee on the outside of each of the packages. It was chilly outside (in the 40's) so the bees were not very active and I carefully knocked off one of the extra riders when I got into the post office parking lot. The other one I left alone to continue her ride on the outside of the crate – after all, I was a "beekeeper" now and one little bee didn't scare me. My faith was justified and we all rode home in my car quite peacefully.

When we got back I put the bees in the garage and painted some sugar syrup onto their cages. They went right after the syrup and I was amazed and delighted to see their little tongues extending through the cage wire as I painted the syrup on with a new paintbrush. I'd never seen bee tongues before and I was fascinated. After giving them a good feeding, I sadly

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IT ALL STARTED LIKE THIS ... Cont. From Pg. 53

headed off to work and looked forward to getting home in the evening to "hive my bees."

As luck would have it, this mid-April day turned out to be warm and beautiful with a temperature near 70° by the time I arrived home about 4:30. My wife had fed the bees some syrup a couple of times during the day and they were humming merrily in their cages. An aside here about my wife and her attitude toward my "bee project." She was quite apprehensive about the bees to start with but they are "growing on her" and she is finding them very interesting. Lately I've found that she has gone down to the beeyard alone a couple of times on nice days to watch them.

We took the bees down to their hives and, dressed in my bee coveralls with zip-on veil and rubber gloves, I carefully removed the Midnight queen cage from the package. The queen was a beautiful little creature with a fluorescent blue dot on her back. She was lively and looking anxious to get out of her cage. I made a nail hole in the candy and then hung her cage in the center of the six frames of Duragilt foundation that I had left in the hive.

I then dumped some of the bees onto the top of the frames above the queen cage. Since there were quite a few dead bees in the bottom of the box I set the box in front of the hive rather than trying to dump its entire contents into the hive. As the temperature dropped in the evening, I found that they had started to cluster in the shipping crate so I did a second dump and ended up with most of the dead bees in the hive after all.

Over the course of the summer, I would find out just how much I didn't know

I repeated the process with the Buckfasts, only I dumped nearly the whole package into the hive (there were not as many dead bees in this package). The remaining bees left the box and made their way into the hive quite readily.

On April 17th, my wife and I attended the Southeast Michigan Beekeepers Association Bee school. The entire day was interesting, informative, fun, and enjoyable. The most traumatizing piece of information we heard was that if you paint syrup on the screen of a package bee shipping crate, you may injure the tongues of the bees as they lick it off. All those pretty little tongues damaged. I'm sorry, bees, I just didn't know!

On April 18th (three days later just like it said in the instructions), I checked both hives and found that both queens had been released from their cages. I took the cage from the Buckfast hive and laid it and its accompanying bees on the entrance to the hive while I examined the other bees in the hive. After a bit I noticed that there were quite a few more bees on the queen cage than there had been. After some careful examination I found that the queen was on the outside of the cage. I quickly brushed her and her retinue back into the center of the hive. Next time I'll look more carefully before I take things out.

I had entrance reducers and entrance feeders on both hives and I kept the feeders filled with syrup steadily for the next couple of weeks. The weather was chilly, with nighttime temperatures in the low to mid 30's and daytime temperatures in the upper 40's. The syrup bottles dwindled steadily and the bees seemed to be flying quite a bit when it was warm during the day. I waited with impatience for the time when I could open the hives and check to see how much comb had been drawn and whether or not there were eggs.

Since the third package had not arrived within a week after they were supposed to have been shipped, I called the supplier. It seems that they had failed to ship the Starlines. I found out it was the Midnights that had arrived by describing the blue marking on the queen to the lady on the phone. After looking at the Starline queen it was obvious which was which, but when I only had one I was at a loss. The missing Starlines were shipped on April 21st and arrived on the 26th. I hived them that evening, leaving the shipping crate inside the hive after dumping the bees. That night the temperature got down into the mid 20's.

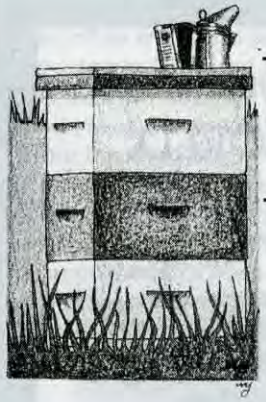
On the 27th, the weather finally warmed up enough that I thought I could take a quick peek at the first two hives of bees. After I opened the Midnight hive, I found that they had NOT drawn their foundation out into a nice comb, but instead had built some comb between the frames in what I presume was the center of their cluster. They had stored plenty of sugar syrup and some pollen (maybe from pussy willows?). I couldn't find the queen and didn't see any eggs or larva although I didn't move the bees off the comb. It was not real warm so I closed the hive up quickly, deciding to leave further inspection for later.

The Buckfasts had also built some comb (burr comb?) in what appeared to be the center of their cluster, but they had also drawn comb on a couple of frames of foundation. I found a similar mix of syrup and pollen stored. Although I didn't see the queen, I did find eggs in some of the cells. All in all, things seemed to be going much better with the Buckfasts than with the Midnights. Perhaps it was due to the larger number of shipping losses that the Midnights suffered.

Since I had not read anything about why they would build burr comb this way, I assumed for the moment that it was caused by their need to stay clustered in the cold weather. Since they had lots of stored syrup in both hives, I decided to cut back somewhat on the amount that I was feeding them and I removed the entrance reducers. The question was, what should I do about the burr comb? For the time being, I decided to just leave it alone.

Actually, the bees seemed to know a whole lot more about what they are doing than I did so I figured I'd just let those with the knowledge make the decisions for a while. Over the course of the summer I would find out how much I really didn't know.

Bruce Filbeck is a freelance writer, and still a beginning beekeeper, from Lexington, Michigan. His first season adventures will continue on these pages.



BEE TALK

richard taylor

"Not many of us can tend herds or flocks or farms, but beekeeping satisfies many of the same needs."

I recently heard a very interesting talk by what we would call a "big" beekeeper, meaning by that, someone who numbers his hives in the thousands. He described, with slides, his vast and complex operations and procedures – making up nucs by the thousands, rearing huge numbers of queens, trucking bees back and forth over thousands of miles, harvesting the crop in his enormous plant, and so on and on. Listening to this fascinating account boggled my mind, almost gave me a headache, and I could, vicariously, feel my back begin to ache under the toil he so vividly described. And he concluded by lamenting the poor price he gets for all this honey.

I admire anyone who, applying his wit and resourcefulness and aiming at big things, can create something like this, and if someone manages to get rich doing it, then so much the better. No one is made poor by someone becoming rich this way.

At the same time I could not help thinking that this gentleman is missing what most beekeepers find to be the real rewards of their craft. As in so many things, the getting of money, and even wealth, sometimes displaces things far more precious. Beekeeping is like gardening in this respect. Many find deep fulfillment in gardening. We all understand this. But I once met a man who made his entire livelihood, and a good one, just raising radishes. He had a huge, mechanized agribusiness in radishes. But could he still be called a gardener?

I sometimes think we are in danger of becoming alienated from the very earth from which we have sprung. No other species is. All other creatures, however harsh may be the conditions of their lives, are at least still close to the earth that nourishes them. But we, in trying to escape that harshness, have to some extent isolated ourselves from the rest of creation, and from our mother earth herself.

Thus, people have gathered into cooperative societies, developed currencies and then the specialized lives that this has made possible. We do not each of us have to hunt, husband or farm. Others can do this for us, and together we escape much of the hardship and constant threat that is the lot of other living things. We have, however, carried this way past the point of positive benefit, so that the escape from toil and want have become replaced with the search for ease and possessions far beyond what can make us happy, or even well. In our desperate effort to escape the one pair of evils, hardship and want, we have invited two others, boredom and an alienation from nature.

Some people, having lived their lives in the artificial environment of cities, have not merely forgotten nature; they never knew her. They have little choice, then, but to continue, day after day, adding to their sometimes already excessive pile of possessions, things that were originally sought as protection from want, but which now sometimes overwhelm their very lives. In their escape from one master they become slaves to another. Richer and richer they may get, and oddly, from a similar perversion in the desires of others, they actually become objects of envy. Something which has become grotesque from the standpoint of nature becomes instead, in the eyes of plain and simple people, an image of "happiness," which it assuredly is not.

It is the still felt pull of nature that leads some persons back to the wilderness. Most of us cannot retrace our steps that far, of course, but will settle instead for a basic simplicity in our lives, along with a real and more or less constant communion with nature. That is the chief joy of gardening, as well as the exquisite joy of beekeeping. A wise person does not do either of these things to become rich. If he did, his means would be as foolish as his end. What that person is likely to be seeking instead is a basic affirmation of his nature or, if that seems pretentious, then let us say he is seeking the simple happiness of an uncluttered life lived closer to its source, which is the earth, bathed in sunshine and rain, the great givers of life.

What happiness exceeds planting in the sweet spring earth, tending and tilling through the warm months of growth, then harvesting, with your own hands, the good food that will help carry you through the winter cold? What does a person who can do this need of power or riches, so long as his basic needs are fulfilled? Think of the last time you saw a summer thunderstorm approach, then drench your thirsty garden and, perhaps, yourself; or anticipated a threatening

frost, and survived it with plants intact. Or think of nourishing tiny seedlings, then watching them burgeon over the weeks, culminating in basket after basket of the freshest and most natural of foods, then finally tasting what nature and your own hand have so perfectly wrought. Something in the human spirit is revived in this way, and no other way. A person who depends entirely on others for this result can live, certainly, but not live as well; and similarly, one who converts this basic vocation of gardening into a vast business, with machines and trucks and devices for the massive application of pesticides, can also live, and sometimes live bountifully, but toil will have replaced work, and anxiety supplants normal care and concern.

The tending of honey bees fulfills exactly the same need, for just as our ancestors lived in daily familiarity with plants, so did they husband animals. Not many of us can tend herds and flocks, but all the basic satisfactions of doing so can be derived from the husbandry of honey bees. A hive of bees can flourish almost anyplace, even, for a city dweller, on a roof. A small corner of a back yard is enough, and the bees themselves will range over countless surrounding acres. It does not matter to them, nor to you, who owns those acres. The bees can be tended at your leisure, and even wholly ignored for weeks at a time, while they go right on gathering nectar and making the honey you will eventually harvest. They do not require feeding, no pens need be cleaned out, and there is nothing akin to butchering. There are not even any unpleasant odors. All the odors of a beehive are pleasant ones, whether from incoming nectar, or from the waxen combs, or the resinous and sweet-scented propolis that the bees gather from trees to varnish the inside of their hive. And what is the reward of this already joyous and engrossing culture of bees? The most delectable food to be found on the face of the earth, and the only sweet that need not be in any way processed or altered by human intervention.

It is not just to nourish our bodies that we garden and tend bees. It is to find fulfillment, and a sometimes elusive happiness, in the most direct and elemental way that we can.

Part of this is excerpted from the author's *Beekeeping For Gardeners* (1981) and is used with permission.

?Do You Know? Answers

1. **True** American foulbrood spores germinate approximately one day after ingestion by the larva. After germination the bacteria multiply in the midgut and penetrate into the body cavity through the gut wall.
2. **False** Even though there are distinctive odors associated with American foulbrood and European foulbrood, odor is not considered to be a reliable diagnostic method of distinguishing between the two diseases. Odors associated with European foulbrood varies with different secondary invading bacteria.
3. **True** European foulbrood generally kills larvae two to four days old while they are still coiled in the bottom of the cells. With American foulbrood, death typically occurs after the cell is capped, during the last two days of the larval stage or first two days of the pupal stage.
4. **False** Powdery scale disease is caused by the bacterium *Bacillus pulvifaciens.*
5. **False** Spore cysts are produced with chalkbrood disease when sexual reproduction occurs. If only one strain (+ or -) of mycelium is present, the larva dries into a hard, shrunken, white chalklike mummy. When the + and - mycelia are present in a diseased larva, spore cysts can form and the resulting mummies appear either mottled (black and white) or entirely black.
6. **False** It is difficult to isolate *Melissococcus pluton* from diseased European foulbrood larvae since there are numerous secondary bacterial invaders associated with this disease.
7. **False** Healthy worker larvae are pearly white in appearance, while diseased individuals show a color change ranging from dull white to brown and finally black with the progression of the disease.
8. **True** European foulbrood, chalkbrood and sacbrood are considered to be stress diseases and are most prevalent in the spring of the year.
9. D) *Ascosphaera apis*
10. D) Requeen the colony.
11. A) Fungus
12. B) 2.5 billion
13. C) Virus
14. E) American Foulbrood
15. D) European Foulbrood
16. A) Sacbrood
17. B) Chalkbrood
18. A) Sacbrood
19. E) American Foulbrood
20. E) American Foulbrood
21. E) American Foulbrood
22. Robbing bees
    Drifting bees
    Exchanging combs between a diseased and a healthy colony
    Feeding honey or pollen contaminated with AFB spores
    Using a hive tool or gloves contaminated with AFB spores
23. Terramycin is normally mixed in confectioners (powdered) sugar rather than sugar syrup since terramycin breaks down rapidly in syrup and the likelihood of contaminating honey is greatest when fed in syrup.

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

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

QUESTIONS?

What About Wax Moth?

Q. I have always used paradichlorobenzene crystals against wax worms, but this stuff is getting harder to find. Why would not the old-fashioned naphthalene moth balls work just as well?

Russell Willsey
Sebring, FL

A. The problem with naphthalene moth balls, and to some extent with paradi crystals as well, is they leave a residual odor which lasts quite awhile and is very offensive to bees. The best way to deal with wax moths up here, and probably down in Florida as well, is to expose the combs to fresh air and daylight. Usually it is sufficient to stand the hive bodies, with empty combs, on end out of doors. Wax worms hate light and fresh air.

Editor's Note: Naphthalene is not labeled for wax moth control, and is illegal to use for that purpose. As noted in the Gleanings section para has been relabeled and is available.

Yellow Jackets

Q. I have a problem with yellow jackets trying to invade my hives.What is the remedy?

Leo E. O'Brien
Eureka, MT

A. This is usually an indication that the colony has been weakened and demoralized by parasitic mites or other problems. A strong and vigorous colony can usually repel any kind of wasps that inhabit temperate zones.

Grease Patties

Q. Are grease patties effective against mites? If so, how do you make them?

Alvin E. Leslie
Fort Hill, PA

A. Apistan strips should be used to combat *Varroa* mites. Extender patties, as they are called, were originally developed for preventing American foulbrood in apiaries where there was a history of foulbrood, but it has been discovered that they are quite effective in inhibiting tracheal mites, too. The traces of oil on the bodies of the adult bees apparently discourage the mites from hitching a ride on them. One formula for making such patties is: Mix 5 lbs. of granulated sugar with one-quarter pound of TM-50, then combine that thoroughly with two pounds of Crisco. Place about a half cup of this mixture on a scrap of newspaper and lay it on the top bars of the bottom brood chamber.

Colony Strength

Q. What should be the goal for the population of bees in a hive going into winter? Can there be too many? After early July it is too late for an egg laid to produce a field bee before the honey flow is nearly over, so it seems sensible to restrain the conversion of honey to bees after that date by restricting the brood nest.

John H. Tanton
Petoskey, MI

A. This raises an interesting point, upon which opinions differ, but my policy is to try to have my hives as populous as I can the entire year. Given adequate or, preferably, more than adequate stores, then the stronger a colony is in the fall, the stronger it will be in the spring, when you need strong non-swarming colonies.

Patties Where?

Q. Does it matter whether Terra patties are placed over the top bars of the brood nest or the top bars of the honey super?

Henry L. Yoder
Flemingsburg, KY

A. Yes, it matters a lot. *Any* medication of a hive should be applied in or near the brood nest, whether treating for foul brood, mites or whatever, in order to be effective. Besides this, any medication should be kept away from any super from which honey will be harvested, in order to avoid contamination. If we extend your question to the treatment against *Varroa* with Apistan strips, it has been found experimentally that these are far more effective when inserted between frames of brood than when simply laid over the top bars of brood combs.

Resistance?

Q. I lost most of my bees to mites in 1992. I replaced them with purchased nucs and after harvesting the honey treated all the hives with Miticur strips. By fall I found mites in front of one of the hives, so I again treated each hive with Miticur and observed them closely. I found expelled mites in front of every hive except one. I suspect that one may be mite resistant. I have seen the bees of that hive grab live ants and fly away. Should I contact the breeder from whom I bought that queen, or is this a common occurrence?

Fred R. Brown
Chickamauga, GA

A. What you describe does suggest mite resistance in that colony, but it is not very strong evidence for it. The manner in which some colonies resist Varroa is as you suggest – they attack the mites and throw them out of the hive, in the same way they attack ants. Almost any colony gets rid of ants this way, however, so that doesn't prove much. Some breeders are claiming progress in developing mite resistance, but I do not believe any think they have really gotten there yet.

Editor's Note: I may be more inclined to think that colonies expelling mites may be showing more resistance than one that doesn't, but both are promising. Yes, contact the breeder, and by all means observe those colonies for more signs.

Questions are invited. THOSE NOT ACCOMPANIED BY A STAMPED ENVELOPE WILL NOT RECEIVE A DIRECT RESPONSE. Address: Dr. Richard Taylor, Box 352, Interlaken, NY 14847

ANSWERS!

Richard Taylor

INNER... Cont. From Pg. 4

mites are present in colonies, the colonies aren't dying. The question is why? One answer is that the bees have developed some sort of resistance. A perfectly reasonable answer, probably containing some degree of truth.

But another answer is that perhaps the mites are changing, becoming less lethal in their attack. This, too, makes some sense, since any parasite that kills its host tends not to thrive. Period. So, if the mites become less toxic, as it were, their chances of continuing would be greatly increased. This, too, makes some sense. Perhaps it is some of both, resistance to the mites and less toxic mites. We should be so lucky.

There was a half day symposium on the Reality of Africanized Bees, some of which was encouraging, some not. The best part was from the energetic folks in Texas who have moved heaven and earth getting good information out to the public on the whatfors, whys and hows on dealing with this new pest. Not quite so encouraging was the information from the National Association of State Departments of Agriculture. They surveyed each state regarding existing or planned-for regulations on Africanized bees.

What they found was that 31 states have regulations in place, 13 have none and four are in the planning stage. They found that 13 states have all or part of the National Honey Bee Certification Plan in place (developed in St. Louis in Oct. '91), 29 have not adopted the plan and seven are planning on a program based on the plan. Beekeepers in 22 states were positive toward the plans in their states, in seven states they didn't like the plan and 19 were mixed or unknown.

Not exactly overwhelming support, but not bad, either. Though I gotta tell you, regulating the movement of bees, Africanized or European, isn't easy, especially when there's little or no manpower to carry a stick, and those who are supposed to be regulated don't want to be. History, very recent history confirms that. Stay tuned.

The rest of the meeting was about all kinds of other insects - both pests and good guys - and the chemistry, biology, ecology, economics, gene structure and more on these tiny and important creatures. Some of which are as interesting as honey bees, believe it or not. It was enlightening and if you ever get the chance, I recommend you attend, you'll learn something and meet some good people.

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If you haven't filled out and returned your Reader's Survey yet (remember that blue thing in the middle of your magazine last month?) there's still time. The response has been outstanding, but the more the better. Go ahead, give it a try. We need the information and you *will* get a better magazine for your efforts. And thanks to all who have sent in the form. We have already learned much.

•

The results of the International Trade Commission hearing are still out, but all reports are positive. The group testifying to impose a tariff or quota were well organized, articulate and professional. The group opposing were not, or so I hear. I had a chance to read the preliminary report submitted by the counsel for the group seeking protection and they seem to have done a pretty good job. You get what you pay for, it seems.

The request is for a quota on the amount of honey that can be imported from China into the U.S., set on an amount imported a few years back. If approved several things will happen. First, other countries will try to fill the gap; second, the lower priced Chinese honey will be sought by packers needing to fill already-signed contracts (with some vigor, I imagine); and finally, the price of honey should go up, no matter where it comes from.

Unless, and there is always an unless, Chinese honey is brought into Canada or Mexico, (or almost any country for that matter), and labeled as originating from that country. That could cause some problems, if anyone would be unscrupulous enough to do that.

But nevertheless the price of honey should go up, and that is good news. Which isn't a bad way to start a new year, right?

I'm optimistic, at least for now, and let's all hope '94 has fewer mites, and more profit, O.K.?

Kim Flottum

BOTTOM ... Cont. From Pg. 68

Putting in his two scents worth - A beekeeper combining a couple of colonies in a single hive.

Queen bee - The "social" director for a colony of social insects.

Queen Excluder - Party list for commoners.

Queen marking (1992) - An itsy-bitsy, teensy-weensy, yellow polka-dot *bee*kini.

Rebuttal - A bee stinging a wasp for the second time.

Reign beau - A drone that spends some quality time in the sky with a queen.

Sealing fans - Bees that produce propolis.

Shed a tier - Removing a honey super.

Shoo size - For just a few bees, it's okay to give 'em the brush off, but large numbers are a definite smoke signal.

Skep - Comb dome.

Smoker - Hive balmer.

Sonic bloom - A flower with a bee in it.

Stem - Flower tower.

Supercedure - Queen riot.

Swarmy weather - When workers start building vertical queen cells, you know something isn't on the level.

Syrup-tiliously - The best way to feed bees when they can't provide for themselves.

Tail-wagging - Bee-iennese waltz.

Tail wagon - A pollen basket.

Typical colony - One queen with ladies-in-waiting by the thousand.

Uniform-sized frames - Pine clones.

Unsifted flower - A blossom that bees have left alone.

Urban swarm - Crosstown buzz.

Wait for the waggin' - What bees do when they want to learn the location of a promising new nectar source from scouts.

War of the roses - What happens when too many bees are beating around the bush at the same time.

Wild bees - Beech combers.

Winter cluster - Chiller bees.

Wood bee - Member of a tree-based colony.

Worker's compensation - Free honey.

X-rated hive - One that won't admit any frame that's under 17

Young flowers - Baby bloomers.

Zombees - Bees in winter.

Gleanings

JANUARY, 1994 ALL THE NE[illegible]HAT FITS

CANADA BORDER CLOSED TO '95

The Canadian government has accepted recommendations that include opening the Canadian border to honey bee imports from the continental United States in two years.

The decision extended the Honey bee Prohibition Regulations of 1991 until Dec. 31, 1995.

The recommendation was made in a report by Dr. Clayton Switzer, former dean of agriculture at the University of Guelph in Ontario and also a former Ontario deputy minister of agriculture.

He was hired by the federal Ministry of Agriculture and AgriFood Canada to report on honey bee imports after consulting all interested parties.

Importation of honey bees from the U.S. has been barred since November, 1987, because of the risk of introducing the *Varroa* mite into Canada.

Since then most Canadian beekeepers have overwintered their bees or imported stocks from Australia, New Zealand and Hawaii.

Switzer, however, recommended consideration be given to allowing the importation of queen bees from the continental U.S. in 1995 under tightly controlled conditions. He also recommended that beekeepers, under the leadership of the Canadian Honey Council, develop a strategy to ensure the long-term health of the sector.

Switzer's proposal on the border closure was in line with the stand taken by all provincial beekeeping associations, all 10 provincial ministers of agriculture, the Canadian Association of Professional Apiculturalists and the Canadian Honey Council.

Both CAPA and the CHC had earlier voted unanimously to keep the border closed for another two years.

CAPA president Gard Otis said that in September he had polled provinces with mite infestations and obtained the latest information on the distribution of both the *Varroa* and tracheal mite.

"Tracheal mites infested only about a sixth of Canadian colonies, despite their fairly widespread distribution in the West and parts of the East," he said.

"More importantly, *Varroa* was believed to infest only about 3% of all colonies and that was a robust estimate," he said.

He said although no complete study had been completed across Canada for both mite species in recent years, he was confident in stating about 80% of all colonies are still uninfested.

"When the uncertainty of the Africanized bee situation is thrown in on top of that, the majority decision is supported," he said. "It is still too soon to consider importing queens and package bees from the U.S."

Otis said while it was true the number of beehives in Canada has been declining since the time of the border closure, it was not known how much of that was due to the loss of package and queen bees from the U.S., as opposed to low honey prices.

ROBINSON HONORED

Gene E. Robinson, assistant professor of entomology at the University of Illinois at Urbana-Champaign, has been selected as the Thomas A. Murphy University Scholar for 1993. The University Scholars program recognizes "the most talented faculty from many different disciplines." Recently Robinson was also selected to receive the 1993 Hambleton Award for Outstanding Research by the Eastern Apicultural Society. Robinson studies hormonal, neural, and genetic mechanisms that regulate honey bee social behavior.

ASIAN AGREEMENT FOR AG PRODUCTS LIKELY

The Asia Pacific Economic Cooperation forum is a wake-up call for Europe. And it's a call that should sound good to American farmers, according to an Ohio State University agricultural economist.

The APEC forum met in Seattle beginning Nov. 17 to discuss options for trade and relationships between the countries. But don't hold your breath waiting for a major agreement, Luther Tweeten says. The discussion is more scare tactics by those concerned that the international General Agreement on Tariffs and Trade will be derailed by European isolationism.

"This APEC discussion is basically an attempt to scare the Europeans back to the full bargaining table with regard to free trade", Luther Tweeten says. "But if it were to go through, there would be some true advantages for American agriculture."

East Asia contains the world's most explosive markets at this point. The economies of Japan, China, Indonesia, Taiwan and Singapore are all growing leaps and bounds. And they need food commodities and processed food products, Tweeten says.

Realistically, East Asia could never form its own free-trade agreement because the countries have too many old political and cultural differences among themselves. But throwing in the United States, Canada, Australia and New Zealand balances things out, Tweeten says. Western partners

Continued on Next Page

ASIAN AGREEMENT ... Cont. From Pg. 61

would level the political problems between the Asians. And the partnership would open new markets for all the countries involved – particularly those with agricultural products.

Most of the Asian countries have too many people per acre of land to be major food producers. They currently protect what agriculture they have because they want to maintain some form of food security, Tweeten says. But a trade affiliation with major agricultural producers such as the U.S., Canada, Australia and New Zealand would reduce some of those security concerns, he says.

The question remains how anch as APEC agreement would benefit Americans. Tweeten and others have studied the effect of a free trade agreement between the United States and some Asian countries such as Japan. They've found some very strong economic incentives for both sides in such an agreement. National income of Japan, for example, would be raised $7.2 billion while U.S. income would go up $4.3 billion by Pacific Rim free trade in agriculture alone.

"It would be a lot better for the United States if Australia and New Zealand weren't in the mix on any kind of APEC alliance," Tweeten says. "But any kind of free trade bloc is better than no free trade if GATT fails."

ON-LINE AG NEWS

The Associated Press has selected ARI Network Services, Inc. to host and market a dial-up version of its AP ALERT agricultural information service.

AP ALERT/Agribusiness is a comprehensive news package of agricultural developments from around the world. The AP news is supplemented by Pacific Rim news from Kyodo News International, press releases from PR Newswire and transcripts from Federal News Service.

AP markets a number of AP ALERT industry news services delivered direct to customers' PCs or printers for a fixed monthly charge. Under the arrangement with ARI, agribusiness and food-processing companies now may access an online database of ag-related information for a connect-time fee.

"ARI's experience with the agricultural market makes them a natural choice to carry AP ALERT/Agribusiness in this new dialup service," said Chris Pederson, director of AP Information Services.

Greg Krauska, ARI's manager of agricultural information services, believes "many companies will be receptive to usage-based pricing for access to agricultural news drawn from the complete AP news report, including state and local coverage."

The database of news, corporate and government press releases and verbatim transcripts is updated continuously and maintained online for 30 days.

The Associated Press is one of the oldest and largest news-gathering organizations in the world. With bureaus in 147 U.S. cities and 67 countries, AP generates thousands of stories each day. It provides news to more than one billion readers and listeners through its newspaper and broadcast members and subscribers.

Kyodo is the largest news agency from Japan and the Pacific Rim, with 2,000 people in 46 bureaus. PR Newswire is the most widely used distributor of U.S. corporate and government press releases to the media and financial community and Federal News Service is the leading U.S. transcript service.

ARI is a leading provider of computerized network and information services to targeted sectors of the U.S. agribusiness industry. The Milwaukee-based company provides electronic data interchange, electronic mail and other network services, along with a variety of online business information services.

For more information call 1-800-AP-CALL-1.

EMPLOYEE UPDATE

If you hire employees on your farm, be sure you fill out I-9 forms on each of them. The Immigration Reform and Control Act of 1986 (IRCA) requires you to complete the I-9 within three business days of hiring, or by the end of the first working day for jobs of less than three days.

On the I-9 form, your employee states he or she has legal status. You list the documents you've examined to prove this and state that they appear genuine. If you don't do this, you can be fined, even if workers are U.S.-born citizens.

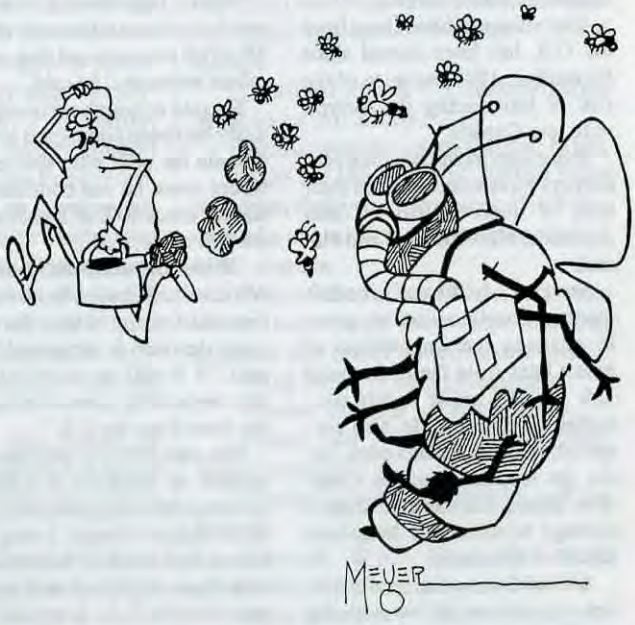
This law makes it illegal for you to knowingly hire or recruit an alien not authorized to work in the United States. If you do, you could face strong civil and criminal penalties, including large fines and even jail sentences.

The law applies to all employers, no matter how many workers they employ or what industries they are in. You must inspect documents showing the employee's identity and legal right to work in the U.S. The only employees exempt are those hired before Nov. 6, 1986.

An employee compensation package that may be possible and yet help a farm or ranch compete for good help might include the following:

1. A wage allowing a standard of living somewhat above the poverty level.
2. Family health insurance.
3. If housing is provided, it must be decent. This does not mean a glorified bunkhouse. Utilities should be paid.
4. An arrangement that does not require the employe to use his personal vehicles for work.
5. If livestock are part of the operation, meat should be provided. If not, the cash wage should be enough to compensate.
6. Annual bonuses based on productive performance. This provides incentive for accomplishment.
7. Provide a work place that is neat, tidy and handy. There is nothing more aggravating than a shop that is so cluttered that it is hard to find space to work on the lawnmower, or where tools and equipment are scattered among a dozen little buildings so nothing can be found or gates that don't swing.
8. Treat your help like valuable people, not second-class citizens.

This list is not all inclusive by a long shot, but it should give some indication of what is needed to compete in the labor market.



OBITUARIES

Dr. Robert William Meloy, 76, died Sunday, Nov. 7, 1993, after a brief illness.

Dr. Meloy was born June 11, 1917, in Ireton, Iowa, the son of John W. and Marilla (Smith) Meloy. He graduated from Sioux City Central High School in 1936, joined the Navy in 1937 and earned the rating of chief pharmacist mate (P.A.) USN (MC). He served with the 3rd Marine Division as a medial corpsman during World War II in the South Pacific Theatre.

On Dec. 21, 1944, he married Pauline A. Haller of Sioux City. After World War II, he worked as a pharmacist, and later graduated from Morningside College in June 1949. He later earned degrees at the University of SD and University of MN. He taught at Morningside College until 1969, during which time he had over 2,500 nursing and pre-medical students. He was chosen Outstanding Faculty Member for 1959-1960. In 1969, he became director of research and development for the Sioux Honey Association, retiring in 1985.

Dr. Meloy was a member of the Institute of Food Technologists, American Society for Microbiology, IA Academy of Science, AOAC Associate Referee (Honey), Kiwanis International, Sioux City Chamber of Commerce, Sioux City Garden Club, Senior Center, and Monohan Post 64, American Legion.

A musician, he performed with many bands and orchestras, including the original Lawrence Welk Group, the Sioux City Municipal Band and the Siouxland All American Band. Until last spring, he was a professional beekeeper and a member of the Sioux Honey Association Cooperative.

Survivors include his wife; three daughters, Josephine S. Keitges of Onawa, Iowa, Molly O. Meloy of Irving, Texas and Paul A. Meloy of Sioux City; three grandchildren, Sarah, Robert and Michael Keitges, all of Onawa; and a brother, Keith L. Meloy of Carlsbad, CA.

Alfred N. Delicata, 69 died unexpectedly at his home, Oct. 10, 1993.

He was born in Atina, Italy, March 25, 1924, the son of Ralph and Laura (Fellena) Delicata. At age seven, he moved from Italy to the U.S. where he was raised in Newtonville, MA. He was a 1942 graduate of Our Lady Help of Christians High School. He was a certified machine instructor for vocational education. He was married in Newton to Genevieve A. Snow on June 2, 1951. He was an honorary 3rd Degree and 4th Degree member, Knights of Columbus; member of the Our Lady of Help of Christians Catholic Church, Newton, MA; and member of St. Vincent de Paul Catholic Church, Bucksport, where he was a cantor.

For over 30 years, he was a self-employed machinist in Newtonville. In 1986, he and his wife retired to Stockton Springs, where he had continued working as a machinist. He was a member of the Atina-San Marco Society; past vice president and lifetime member of the Eastern Apicultural Society; past president of the Massachusetts Federation of Beekeepers; past president of the Middlesex County Beekeepers Association; past president of the Maine State Beekeepers Association; member of the Eastern Maine Rock Hounds.

Surviving are his wife of Stockton Springs; his mother, Laura F. Delicata of Newton, MA; four daughters, Janelle A. Delicata; Barbara M. Siddell and her husband, Carl; Laura G. Harvey and her husband, Christopher; and Mildred "Millie" Delicata; two sisters, Mary M. Direand Geraldine B. Mazzola; one brother, Alexander J. Delicata of Durham, ME; two grandchildren, Leighann M. and Evan M. Harvey of Appleton, WI; aunts and uncles, many nieces, nephews and cousins, and friends.

NEW REVIEW OF WORLD BEE HEALTH

The spread of pests and diseases is one of the greatest threats to beekeeping today, and the most serious problems are caused by the movement of pest species to new areas.

A new publication contains valuable information on the status bee pests and diseases around the world. Where have pests and diseases been reported from? How reliable are the surveys on which these records are based? What are the most pressing threats to bee health today?

World bee health report reviews the status of honey bee pests and diseases in almost every country in the world. It discusses recent changes in the apparent distribution of pest species, and analyses the reliability of disease reporting.

It will be useful to people wishing to obtain supplies of healthy honey bees, to study beekeeping in different areas, or even to find out more about bee health in their own countries.

This up-to-date report of 37 pages contains seven tables, 10 maps and 289 references.

World bee health report, by Andrew Matheson. £4.25 (plus £1.00 postage UK, £2.00 rest of world) IBRA Publication Sales, 18 North Road, Cardiff CF1 3DY, UK. FAX (+44) 222-665522.

PARA RE-REGISTERED

Mann Lake Supply has obtained a new registration for paradichlorobenzene, a fumigant control for wax moth in stored supers.

The previous label expired several months ago and the manufacturers were reluctant to re-register the product for so small a use.

The product, yet to be given a trade name, will be available in one pound plastic cans, 10-pound plastic pails and 55-pound bags.

It will be registered in all states, with, perhaps, the exception of California. This has yet to be resolved.

For information on price and availability contact Mann Lake Supply directly.

Display Index

Air male - A drone that's gone a courting.

Ambitious bee - One that decides to buzz the airport.

Anti-nuc protest - Claiming that bigger is better, even when selecting the hive size for rearing queens.

Approved smoker fuel - Legal tinder.

Artificial comb - Cellular phony.

Baseball bee - One that flies out to scenter field.

Bee bread - Honey bun.

Beehive - Aunt hill

Beekeeper's coveralls - "Foundation" garment.

Beekeeping -The sport of stings.

Beeline -The shortest distance between two poinsettias.

Bee-littled - The winter honey supply, by spring.

Bee movie - "Indiana Drones and the Temple of Bloom."

Bee prepared - A scout bee's motto.

Beeswax candlelight - Honey glow.

Behind the seams - The place to look for propolis.

Board feat - Putting a hive together.

Both - The business end of a bee.

Broken legume - A field of poor-leaf clover from lack of pollination.

Ceiling fans - Bees that work their way to the top of the hive.

Colonial rule - A queenright hive produces the most honey.

Colony - Buzz 'em buddies.

Cover girl - A bee that's sitting on top of the hive.

Daily dozen - When referring to eggs, it's time to requeen.

Dormant perennial - Possum blossom.

Draggin' fly - Winging hiveward with full pollen baskets.

Drone - The bee most likely to "fall" for the queen.

Error-traffic controller - An identifying scent that's distinctive from the odor of every other colony.

Excited swarm - Hummy bees.

Expert swarm retriever - A trap-bees artist.

Fear o'-moans - Why the beekeeper wore earplugs while waiting for a new assistant to become desensitized to the occasional sting.

Fermented honey - The penalty for early withdrawal.

Fertilization of eggs - Son blocker.

Flower fidelity - Botanical guardin'

Food chamber - The 'sweet spot' in the hive.

Forest florist - A bee that goes after the wildwood flower.

Friendly skies - Air that's free of pesticides.

Good year - When commercial beekeepers make a beeline to the bank.

Granulated honey - Sugar that can't be beet.

Guard bees - Whenever the hive is threatened, these bees get their pals in an uproar.

Hindsight - Watching a bee dance.

Hive - Sorority house.

Hive bomber - A cleansing flight that really hits home.

Honey - Food for thought, since sugar is essential for proper brain function.

Honey bare - An uncapped comb.

Honey knife - A bee-sickle built for goo.

Honey making - Bees doing their hum work.

Identity crisis - A package bee who doesn't know whether to describe herself as "mail" or "female"

Inverting sugar - A complex process with simple results.

Jawbreakers - Steel magnolias.

King-sized - A drone cell.

Ladies' choice - What bee dances are.

Last chance to sting - Beware of bees that bring up the rear.

Loser - A bee that takes directions from the wagging tail of a friendly puppy.

May bees - Doubtful thrivers in far Northern climes.

Migratory foul - Moving diseased bees.

Miss America - What beekeepers hoped the Africanized honey bee would have done.

Nectar gathering - Wild goos chase.

Nothing to sneeze at - An empty pollen trap.

Nurse bee - Dinner belle.

Observation hive - Gape-iary.

Optimist - Someone who estimates the number of bees in a package and orders a honey-jar label for each one.

Package bees - Hive stock.

Paided pollinators - Fee bee.

Pessimist - Someone who's reluctant to market chunk honey for fear the public won't buy a comb with teeth missing.

Pheromones - Beeodorant.

Pile-it error - Putting the supers below the brood chamber.

Pollen - Fruit of the bloom.

Pollenaise - A bee dance in Poland.

Pollinator - *Anther*ing machine.

Pre-zoomed innocent - A queen that has yet to take off for a mating flight.

Problem child - A young queen that wants to take over the hive before her mother's ready to abdicate with a swarm.

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Webster's Hives (Revisited)

john h dromey

BOTTOM·BOARD