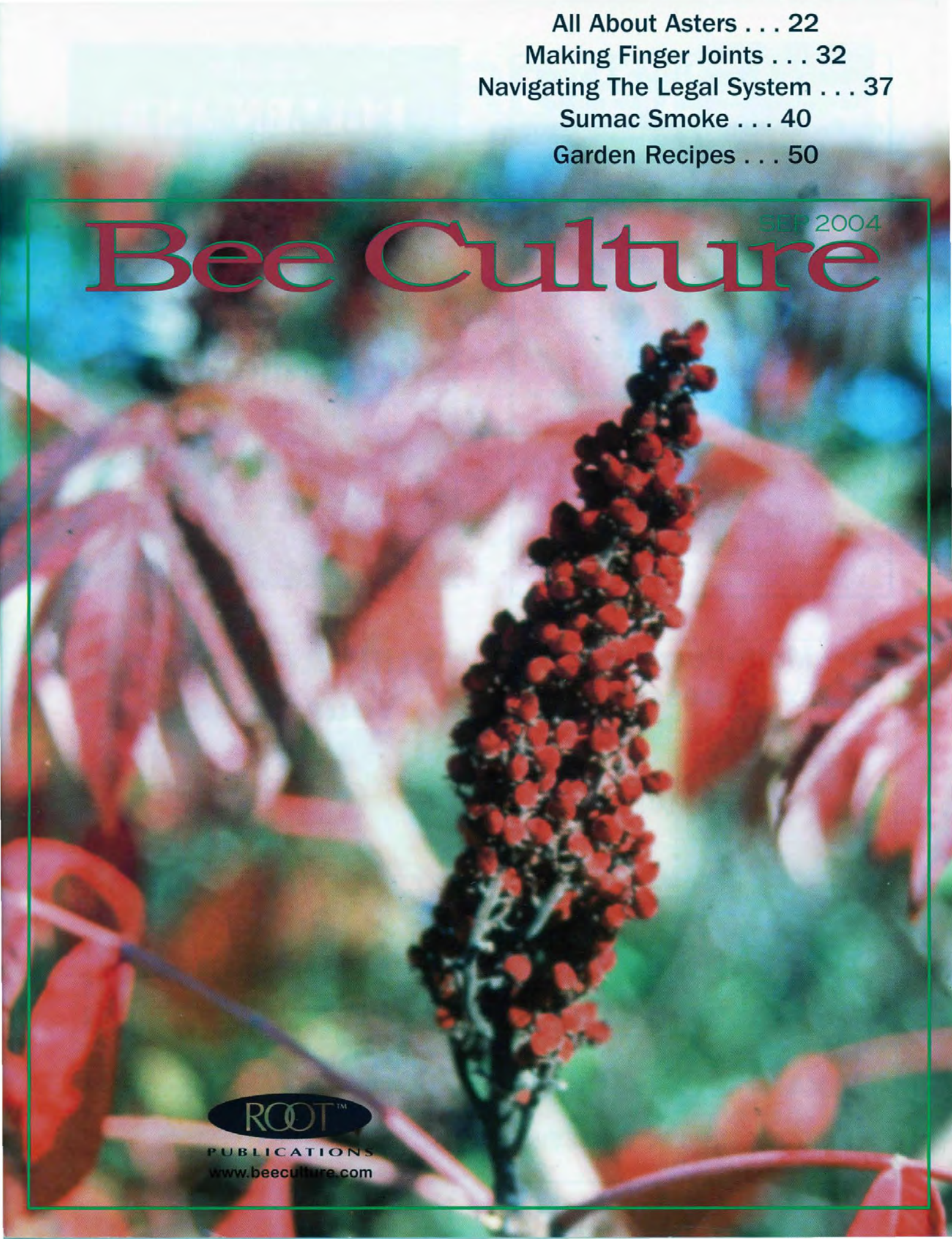
Bee Culture

SEP 2004



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Sumac is a useful plant. Its decorative species are often used in landscape plantings around the home. Honey bees love the flowers in early Summer and the ripe fruit, pictured here, when burned in your smoker, knocks Varroa *mites down. What could be better? Read the article on burning sumac bobs and droppingg mites on page 40.* (photo by Kim Flottum)

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

SEPTEMBER 2004 VOLUME 132 NUMBER 9

FEATURES

DEPARTMENTS & COLUMNS

KEEP IN TOUCH

Write: Editor, 623 W. Liberty St., Medina, OH 44256
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MAILBOX

Texas Court Decision

I read with interest the article on the Texas court decision about the dangers of bee stings and working with bees. My only question is: How will we ever get that warning label on each worker bee?

Sincerely (almost).

Gerald Herrin
Springfield, MO

Organic Facts

The recent letter to the editor by Ian Steppler states "... organically produced honey, or any other type of food, is no safer, no healthier, and of no better quality than the food I produce ..." Mr Steppler goes on to state that the promoters of organic agriculture are heavy on spin and low on facts. Thus, I thought that Mr Steppler and your readers may be interested in some facts.

In 2001, the Journal of Alternative and Complementary Medicine published a study by Virginia Worthington on the "Nutritional Quality of Organic Versus Conventional Fruits, Vegetables and Grains." In evaluating the nutrient content of 13 common crops grown in the U.S. between 1963 and 1992, the author discovered a trend: the conventional crops grown in 1992 contained 29% less calcium than they did in 1963; 6% less potassium; 21% less magnesium; 11% less phosphorus and 32% less iron. Also of interest was the fact that the organically grown crops had significantly less heavy metal content, significantly more nutritionally important minerals, better quality protein and significantly more vitamin C, iron, magnesium, and phosphorus followed by significantly less nitrogen.

In 2002, Swiss scientists published a definitive study that compared organic and conventional chemical farming over a 21-year period. They found that organic farms can be nearly as "productive" for many crops and they leave the soils much healthier. The study conclusively demonstrated that for most crops organic methods are more energy efficient per unit of crop.

Research published in the scientific journal Plant and Soil, by researchers from the Swiss Federal Institute of Technology in Zurich, revealed that plants can absorb vitamins directly from the soil and that fertilizing the soil with manure (the original organic fertilizer), rather than the chemical NPK (Nitrogen, potassium and Phosphorus) salt fertilizers used in conventional agriculture, actually boosted the vitamin B12 levels in crops dramatically.

The Organic Farming Research Foundation published research by Bill Liebhardt, the sustainable agricultural specialist at the University of California at Davis. Field studies showed little to no difference in yields between organic and conventionally grown corn, soybeans, wheat and tomatoes over a 14-year period. Liebhardt also noted the environmental benefits of organic agriculture. "What these yield figures do not reflect are the other benefits derived by organic producers and the land: increased profit per acre and improved soil quality as measured by soil structure, organic matter, biological activity, water infiltration and water-holding capacity. This translates into higher yields during drought under organic systems, leading to production stability year after year Nitrogen leaching is reduced considerably under organic agriculture, leading to less water pollution – a major ecological issue all over the world."

Today's conventional beekeeping techniques have been shown to cause chemical buildup in beeswax combs exposed to chemical miticides. These chemicals and their breakdown products once in the beeswax, have been able to migrate from the wax into honey that is stored in the same combs.

Varroa mites have proven themselves to be able to develop resistance to chemical controls in a relatively short period of time. Organic controls such as genetics, screened bottom boards, trapping and acid treatments, among others, do not provide the mites with the ability to develop resistance to such controls.

I am not in a position to evaluate the quality of the crops produced by Ian Steppler. However one could reasonably argue from just the few facts mentioned above, that indeed organic agricultural methods have significant benefits over the conventional methods in use today. These benefits extend to the producer, the land, water, air and the consumer Consumers themselves seem to be catching on to this fact, since the fastest growing segment of agriculture over the last 10 years has been the organic sector which has grown by 20% or more each year

Ross Conrad
Middlebury, VT

Honey Price Report Problem

I am a small beekeeper compared to the larger apiarist. I run approximately 1,000 hives and average a yield of three loads per year (200 drums annually). I enjoy your magazine articles. However, your quotes on what prices given and what price being offered by the packers is way off base. This month's quote was 1.12 average in the July issue. I am being quoted a price from packers below 70¢. I just wonder how your contacts can be this far off base.

Your magazine sales are that of the producer I feel your magazine has always supported the producer. In closing, if the produc-

Continued on Next Page

MAILBOX

ers gets run out by foreign competition, you're surely aware that this will affect your bottom line as well. Except perhaps your classified ads in the going out of business for sale section. The higher the price of honey the more people are interested in obtaining a new hobby.

Jeff Brack
Jasper, TX

Editor's Note: *You are correct in that the numbers listed on our report are generally not what you find. Like other reports, we do give the range of prices sent in by our reporters – the lowest coming from, probably, the packer that quoted you 70¢/lb., and the highest from a sideliner who sells out the back door. But we also take all the prices sent in and produce an average price. Plus there's the range, the average of each product last month, and for the same month last year. If you look at all of this data you can come to some pretty accurate conclusions. The trend in price change for any particular product becomes obvious – from last year to this month. The range this month and the average this month, when compared to last month and last year gives a fairly clear picture of what the market is doing – whether up or down. Knowing that, you can predict what you should be getting paid.*

The value of this report then, is the trends you see rather than just the actual, average price, or the range of prices. Follow those, and you'll be on more solid ground when dealing with packers, grocers, or even customers.

Forest Bees & *Varroa*

Tom Seeley's article, Forest Bees and *Varroa* Mites, was fantastic! It is very reassuring to know that feral colonies still exist and apparently thrive.

I was particularly interested in the possibility that the mites have mutated into a less virulent form. As we know *Varroa* does not pose a significant problem to it's natural host, the Asian honey bee *Apis cerana*. This appears to be partially due to the Asian bee's grooming behavior but also to the fact that *Varroa* reproduces exclusively upon the Asian bee's drone brood. The life cycle of *cerana's* worker brood is too short for the mites to successfully reproduce upon but the longer development period of the drone brood allows it. Unfortunately the longer life cycle of Western honey bees allows mite reproduction on both drone and worker brood. *Varroa destructor* is entirely too successful and would certainly die with it's host were it not for human intervention!

Among the mites which are parasitizing the feral colonies it would be most interesting to know the percentage that are reproducing upon worker and drone brood respectively. Perhaps the mites have developed a longer reproductive cycle which would spare the worker brood of the host colonies.

Maybe the answer is not a better honey bee, but a better mite. Perhaps it is possible to breed a mite with a longer reproductive cycle. One possible mechanism might be to select only mites which choose to reproduce on drone brood, provided in drone comb by the "mite breeder." These kinder, gentler mites could then be introduced into colonies to replace the more virulent types. Imagine beekeepers *paying* for mites!

George Desnoyer
Schofield, WI

MAILBOX

Frame Holder

From time to time I've regretted not having one of those handy frame holders that I see in bee supply catalogs. A gadget to hold a frame or two while working a hive, instead of leaning them against the side of the hive in the grass and leaves. They're very nice, but I think I've devised something considerably less pricey.

Materials: Four three-inch (x11/16") corner braces. Note that two of the braces (in the lower left) have been bent to the width of the standard hive body. A matter of a few minutes with a bench-top vice and hammer; two 1-inch (x½") corner braces; four #8-32 x ½" flat-head slotted machine bolts with nuts and washers.

Assembly: Position the machine bolts in such a manner that they will not interfere with clipping the holders over the side of the hive body.

In use: The individual frame-holders/hive clips are small enough to slip in your pocket on your way to the yard. The hard part is remembering to not leave them behind! Total cost about $5.50 at a local Home Depot. Thought you'd like to know.

Dave Alabran
Framingham, MA

DDT Redux

James Tew ignores the fact that there is no scientific evidence supporting the idea that DDT is "terrible for the environment." The main objection to DDT was a result of incorrect science in Silent Spring by Rachel Carson. She claimed that DDT harmed bird reproduction and caused cancer. Scientific studies revealed that there is no significant impact upon the hatching of eggs from birds exposed to DDT There is no creditable scientific evidence that DDT poses any cancer risk. The force that brought the ban on DDT into effect was purely political and flew in the face of scientific evidence available at the time. What is wrong with DDT?

Tom Elliott
Chugiak, AK

Editor's Note: *Dr Tew's comments on DDT referred to its long life, and its ability to show up nearly anywhere. We all have, today, DDT in our systems. And, if you look you'll find it in our food. Good or bad or indifferent, chemicals that persist for 50+ years have a bad side.*

INNER COVER

In early July I experienced one of those cardiac events that serves to scare you way more than hurt you, but hurts you just enough to make a way serious impression. Years of neglect, abuse and deadline stress caught up with me. Some told me it was God's way of saying slow down, while others thought is was his (or her) way of saying get out and run sometime, guy. I tend not to prescribe to either of these theories, however.

Until then, all those numbers that friends quoted so easily about blood pressure and cholesterol had no meaning. I still don't know what they mean, by the way. But now, at least, I know what to say when someone asks. And those diets people talk about – twigs and berries and bark and nuts – all seem extremely extreme to me. Numbers or not.

Look. Here's the deal. When I worked for my dad in his grocery store you woke up thinking groceries, and you went to sleep thinking grocery customers. When I was doing research you did what had to be done when it had to be done, day or night or weekends. When I was farming, well, you know what that's like. I was outside everyday, lifting bales and toting barges, and I'll bet my blood pressure numbers were in the teens. I don't know though, because I had neither the time to check, nor the money to spend. There was only the job, the tasks at hand, the 'one more thing' to do before it got too dark to see. That's what you did, where I come from.

That's what I still do. But I'm not outside anymore. No bales. No barges. No running. I like what I do, but it absolutely involves heavy duty desk time. Computer time. Reading time. More reading time. Not hardly *any* running or walking time. Doctors – specifically cardiac doctors – I've found frown on that lifestyle. If you're still alive when they get to see you.

Maybe you're the same. Lots of people are. Too much desk time, not enough exercise. I doubt you'll listen to me though, because you already don't listen to those people a lot more important in your life who want you around awhile. But if you don't listen, and learn, you'll find out what those numbers really mean. If you're still alive.

I had intended that my July event should be known to hardly anybody because it wasn't a big deal, really. The cat got out though and lots of people sent along their best wishes, and loads of good advice. Hundreds did, actually. That's a touching, and sobering thing to have happen. I wasn't prepared for that. I'll try, but I'm pretty sure I won't get to answer every letter, every card, and every email that came my way. There's this deadline thing, you know. But everyone, absolutely every one who took the time to share has already received a silent prayer of thanks. And I've kept all those cards and letters. That's to remind me that some numbers are much better than others.

•

Numbers, and Chinese Honey

It should come as no surprise that Chinese honey is back in the news. We knew it would be, eventually Honey from China was banned from most of the world's markets a couple of years ago when it was discovered to contain trace amounts of antibiotics. Additionally, a significant tariff was placed on Chinese honey entering the U.S. because of low prices.

Cut off from much of the regular market – the U.S. and the E.U. – sellers of Chinese honey sought new markets. The exact transactions are murky, but it appears that some of those new customers bought that Chinese honey containing antibiotics, repackaged it as their own and sold it directly to those forbidden markets. Tsk. Tsk. Some got caught, and most didn't. The sellers, of course, have no control over what happens after that honey leaves their country.

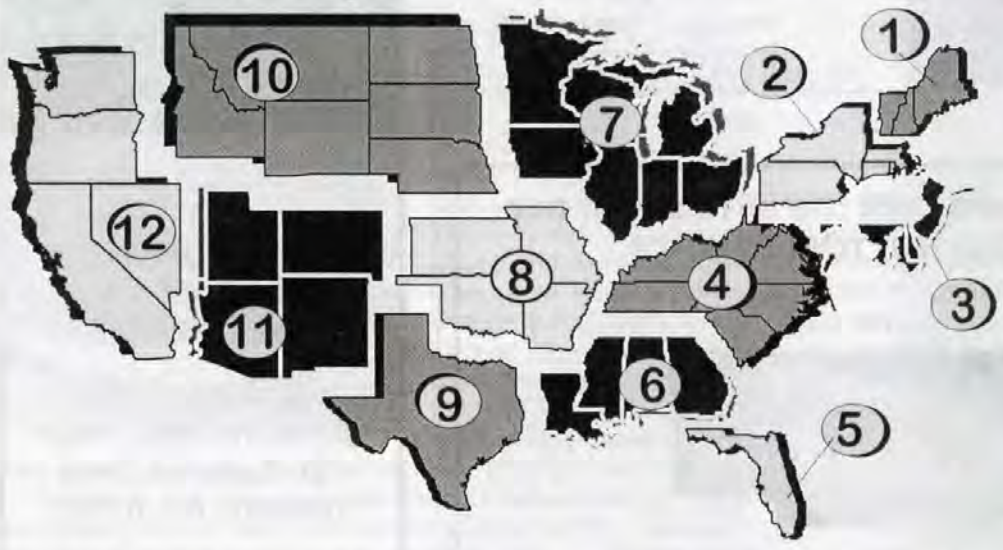
To clean up their contaminated product and make it acceptable to U.S. and E.U. customers, Chinese operations began processing their honey through ultrafine filters under pressure in an attempt to remove the of-

Continued on Page 56

CORRECTION

In the July issue we quoted Drs. Delaplane and Hood regarding the treatment level for *Varroa* when counting mites on a sticky board. The correct numbers recommended by their research are, if you have, on average, more than 125 mites/day when the colony population is large (as in the Fall), or 60 mites/day in the Spring, when the colony population is small, you need to treat for *Varroa*

SEPTEMBER – REGIONAL HONEY PRICE REPORT



Region 1 – Bulk prices down since last month, pails up, wholesale up a bit but retail down.

Region 2 – Barrel prices steady since last month, pails up a bit, wholesale steady, and retail definitely down.

Region 3 – Bulk prices steady since August, pails steady but wholesale only steady to down a bit, but retail up a tad.

Region 4 – Bulk prices up since last month, pails steady, wholesale steady to down a bit, but retail up a little.

Region 5 – Barrel prices down since last month, pails up, but wholesale and retail prices have dropped.

Region 6 – Bulk and pail prices up since August, wholesale too, but retail has dropped.

Region 7 – Bulk prices steady, but pail prices down since August. Wholesale steady but retail down sharply.

Region 8 – Barrel prices down but pails up since last month. Wholesale had dipped a bit, but retail is on the rise.

Region 9 – Bulk prices down, but pails up since last month. Wholesale steady to down a bit, same as retail.

Region 10 – Barrel prices down since last month, pails and wholesale up a little though. Retail has dropped some.

Region 11 – Bulk up, pails down. Wholesale steady to down a bit though, but retail rising a little.

Region 12 – Barrel prices down since August, but pails up a little. Both wholesale and retail on the rise.

	Reporting Regions												Summary		History	
	1	2	3	4	5	6	7	8	9	10	11	12			Last	Last
Extracted honey sold bulk to Packers or Processors													**Range**	**Avg.**	**Month**	**Yr.**
Wholesale Bulk																
55 gal. Light	1.15	1.30	1.15	1.13	0.85	1.15	1.33	1.15	1.15	1.18	1.35	1.25	0.85-1.35	1.18	1.21	1.40
55 gal. Amber	1.10	1.00	1.07	1.03	0.80	1.07	1.25	1.07	1.07	1.05	1.29	1.05	0.80-1.29	1.07	1.09	1.24
60# Light (retail)	100.00	114.27	112.02	96.00	105.00	112.02	102.58	101.67	135.00	112.02	105.00	130.00	96.00-135.00	110.46	103.94	101.97
60# Amber (retail)	102.50	108.93	110.57	95.00	100.00	110.57	102.80	105.00	147.00	110.57	105.00	120.00	95.00-147.00	109.83	97.60	94.74
Wholesale Case Lots																
1/2# 24's	51.50	38.98	35.27	33.49	35.27	35.27	39.31	35.27	35.27	35.76	30.00	35.27	30.00-51.50	36.72	39.37	37.26
1# 24's	55.94	52.94	64.07	51.28	47.00	64.07	61.42	59.60	50.20	77.76	72.40	77.00	47.00-77.76	61.14	58.97	57.13
2# 12's	52.12	51.69	54.58	49.73	45.93	54.58	53.57	61.80	48.00	57.84	50.00	64.50	45.93-64.50	53.70	52.46	50.57
12 oz. Plas. 24's	51.62	46.94	52.46	40.05	37.00	52.46	48.62	47.20	43.20	47.76	50.40	59.50	37.00-59.50	48.10	50.77	43.65
5# 6's	54.56	57.83	62.05	51.08	62.05	62.05	59.03	50.00	62.05	56.43	42.50	70.00	42.50-70.00	57.47	64.43	52.52
Quarts 12's	83.67	100.35	83.67	64.00	64.50	102.00	77.30	74.60	89.33	100.00	71.70	96.00	64.00-102.00	83.93	74.23	72.37
Pints 12's	47.52	49.95	47.52	37.50	46.00	51.00	44.60	44.00	54.00	50.00	40.00	52.00	37.50-54.00	47.01	44.86	43.36
Retail Honey Prices																
1/2#	2.16	2.28	2.59	2.48	2.29	2.59	2.38	2.74	1.89	2.07	2.65	2.75	1.89-2.75	2.40	2.61	2.51
12 oz. Plastic	3.00	2.79	3.37	2.90	3.55	2.60	2.78	3.56	3.14	2.79	3.56	3.75	2.60-3.75	3.15	3.10	2.92
1 lb. Glass	3.30	3.25	4.50	3.79	3.19	3.75	3.64	4.27	3.99	3.88	4.32	5.05	3.19-5.05	3.91	3.85	3.68
2 lb. Glass	5.88	5.79	7.00	5.50	6.24	6.98	6.05	7.37	5.47	5.50	7.32	6.98	5.47-7.37	6.34	6.30	5.95
Pint	4.88	6.00	5.00	4.38	5.80	5.15	5.34	5.56	5.25	5.58	4.50	5.05	4.38-6.00	5.21	5.50	5.08
Quart	7.38	8.55	9.00	7.17	8.95	9.50	7.58	8.76	9.00	9.18	8.20	9.75	7.17-9.75	8.58	8.92	8.64
5 lb. Glass	12.14	12.63	12.89	12.88	12.89	12.89	12.81	14.90	12.89	12.78	12.22	12.89	12.14-14.90	12.90	12.75	13.03
1# Cream	4.40	4.64	4.64	4.35	4.64	4.64	4.42	4.74	4.64	5.01	5.20	4.64	4.35-5.20	4.66	4.39	4.46
1# Comb	4.89	4.71	5.49	5.35	5.49	4.00	5.22	4.58	4.99	5.13	6.20	5.00	4.00-6.20	5.09	5.24	6.63
Ross Round	4.50	3.75	5.00	4.65	4.74	4.50	5.00	4.00	4.74	5.43	5.25	5.50	3.75-5.50	4.75	4.60	4.28
Wax (Light)	2.35	2.08	2.21	1.63	1.25	2.00	2.04	2.25	2.50	2.00	2.12	2.13	1.25-2.50	1.80	1.80	2.32
Wax (Dark)	1.85	1.60	1.74	1.75	1.10	1.50	1.46	1.85	1.48	1.74	1.50	1.85	1.10-1.85	1.20	1.19	1.96
Poll. Fee/Col.	47.00	41.33	43.67	35.00	40.00	43.67	45.71	60.00	38.00	43.67	45.00	40.00	35.00-60.00	43.59	41.08	37.77

RESEARCH REVIEWED

Explaining • Defining • Using

Steve Sheppard

"Treatment of colonies for Varroa destructor *in the late Fall may fail to prevent losses of colonies because the physiology of the bees has already been impaired."*

The damage done to honey bee colonies by the parasitic mite *Varroa destructor* is well-known to U.S. beekeepers. In a typical progression after mite infestation, untreated honey bee colonies die. Often these colonies go into Winter in an apparently normal state, but succumb in late Winter or Spring. Observation of the phenomenon may show that colony death followed what seemed to be a severe case of "Spring dwindling" (the death rate of adult bees is higher than the production of new adults). Ultimately, a handful of individuals remain in the colony, only to perish during a late Winter or early Spring cold period. An explanation for this observation was recently clarified in a very interesting research paper out of Norway by Amdam and colleagues (Amdam et al, 2004). The authors detailed a number of physiological changes that occurred in honey bees that served as hosts for mites. These changes prevented individual bees from developing into "long-lived Wintering bees" and, collectively, were considered very likely to reduce the overwintering ability of a honey bee colony.

As background, the authors cited previous research showing that honey bees fed on by *Varroa destructor* during the pupal stage exhibited reduced body weight, reduced hemolymph (the insect equivalent to blood) volume and protein content and reduced stored carbohydrate levels at adult emergence. Individuals that serve as mite hosts may also forage earlier in life and have reduced longevity.

The unique physiological characteristics of long-lived Winter bees actually develop over a period of three to four weeks following adult emergence. These characteristics include the accumulation of storage proteins in the hemolymph and other factors associated with longevity. To test the hypothesis that feeding by *V. destructor* on pupae altered the physiology of the host adult bee, the researchers used the presence or absence of mites on bee pupae in combination with a protocol that induces bees to develop the equivalent physiological characteristics of Winter bees. This protocol involves allowing newly emerged adult workers to age in queenright but broodless colonies (the queen is maintained in a cage) and has been shown to produce workers that develop the "characteristics of true Wintering bees within four weeks". The researchers first collected sealed brood from four mite-infested colonies and then individually marked emerging bees and recorded whether or not the cell from which the bee emerged had been infested with a mite (or mites). A total of 2200 marked workers were then placed into one of three non-infested colonies that had been set up to induce the workers to develop Winter bee physiology The researchers then collected the marked workers over a period of weeks (up to 30 days) for subsequent analysis.

Several tests were performed on the hemolymph of the various age groups of workers. These included tests to determine the amount of vitellogenin (a protein that is used both as a storage protein and by nurse bees to produce brood food), the amount of total hemolymph protein and a test to examine the amount and quality of specific cells involved in immune function. The results of the study demonstrated that bees that were fed upon by mites in the pupal stage developed significantly lower levels of vitellogenin than non-infested bees. Similarly, the levels of total storage protein found in the hemolymph of the two groups (infested vs non-infested) was significantly different. In the measure of the cells involved in immune function, the proportion of "normal" cells was significantly lower in the mite-infested bees upon adult emergence, but after five days there was no difference between the two groups.

The researchers concluded that worker honey bees that are fed on as pupae by *V. destructor* "do not accumulate hemolymph proteins, including vitellogenin, to the same extent as non-infested bees." They point out that honey bee colonies typically have only very limited pollen stores for the Winter and, thus, the protein stored within the hemolymph of the workers is needed for both survival and for brood production in the early Spring. Amdam and co-workers further suggest that the lower "storage capacity" of infested bees may actually

Continued on Next Page

represent a "physiological basis for the severe impact of *V destructor* on honey bees in temperate zones." The take home message from this study and one that is mentioned by the authors more than once, is that treatment of colonies for *Varroa destructor* in the late Fall may "fail to prevent losses of colonies because the physiology of the bees has already been impaired" They recommend that beekeepers implement practices (such as mid and late Summer mite treatment protocols) that maintain low mite populations during the period when Winter bees are being produced. This advice appears more than reasonable given the findings of their study and is perhaps most important in colder climates. Interestingly, in recent years a number of commercial beekeeping operations here in the Pacific Northwest have implemented a late season regime to feed their bees a protein supplement (such as pollen substitute or pollen). The beekeepers who follow this management practice report that their bees come through the Winter "stronger and have better early season build up." The current study of Amdam and colleagues provides a possible explanation for these reports, i.e. perhaps the feeding represents a protein boost for overwintering bees that also increases hemolymph protein levels and total colony "stores" for early season brood rearing. BC

Dr W. Steve Sheppard, Thurber Chair, Department of Entomology, Washington State University, Pullman, WA 99164-6382, shepp@mail.wsu.edu; http://apis.wsu.edu

Reference: Amdam, G.V , K. Hartfelder, K. Norberg, A. Hagen and S.W Omholt. 2004. Altered physiology in worker honey bees (Hymenoptera.Apidae) infested with the mite *Varroa destructor* (Acari:Varroidae) a factor in colony loss during overwintering? Journal of Economic Entomology 97· 741-747

Mark Winston

Heavenly Honey

"Is your honey available yet? When can I come by? Will you reserve some for me?"

The phone calls have started. Actually, they started in July, but in recent weeks have built to their annual crescendo. "Is your honey available yet? When can I come by? Will you reserve some for me?"

If you are not among the cognoscenti, our honey is Heavenly Honey, produced, bottled, and sold from my laboratory high atop Burnaby Mountain at Simon Fraser University. We often are up in the clouds, since the university is indeed perched loftily on a mountaintop. The name "Heavenly Honey" fits our location midway between earth and heaven, and its taste is sublime enough to live up to the highest celestial standards.

I love this time of year Like most beekeepers there is nothing I enjoy more than selling or giving away our honey. There is something intensely satisfying about producing a product that satisfies customers, and for Heavenly Honey we have some pretty happy consumers.

Our honey has become a cult classic in Vancouver, with some customers buying upwards of $700 worth. It's particularly popular with immigrants; our three most addicted customers originated in Russia, Malaysia, and Hong Kong. One buys vast quantities to distribute among the residents at the Russian seniors home, while the other two ship boxes of Heavenly Honey west over the Pacific to their Asian relatives.

And it is good honey. Our flows start in Spring with maple and dandelion, take a break in early June, then the tap opens again through mid-Summer with blackberry, raspberry, fireweed, and clover The maple provides an ever-so-slight greenish tinge, and the combination of floral sources perfectly balance each other to yield an exceptionally flavorful product.

We also treat our honey gingerly. Being a relatively small producer, we can get by without heating our honey to pump it through equipment. We extract with a 10-frame extractor, using student labor instead of machinery to uncap and bottle, and only filter our honey lightly through nylon. The lack of heat applied during processing is key, since it allows our Heavenly product to retain its full complement of aromatic smells and flavors that you just don't get in mass-produced supermarket honey.

I love our honey for its quality, but appreciate it even more because of the links it has provided to folks across the university community and off-campus. Heavenly Honey has built a network of persons connected only by our shared love for this sticky product, a network that has led to hundreds of conversations that begin with the exchange of jars. Customers have become friends, and friends have deepened through the annual ritual of giving away or selling this transcendent product.

I'm convinced that any professional success I've had at my university has been due mostly to generous donations (bribes?) of Heavenly Honey to any and all who have been friendly to our program. We start, of course, at the top, with a few boxes sent over to the University President, Vice-President, and the Board of Governors. We don't neglect the Deans and Chairs, of course, but also are fanatically careful to provide honey to every secretary, technician, laboratory assistant, janitor, and student who has helped us in any way during the year.

These gifts of honey are all the better for being sincere. I am fully aware of the Team University that works behind the scenes to keep things functioning, and what could be a better way of showing our appreciation than a bee-made product of which we are proud?

But don't take my word for it. A random survey of recipients yielded the following free-association comments:

"Yummy"
"Fruity"
"Healthy"
"It's organic, isn't it?"
"You don't have to wash it before you eat it"

I particularly enjoyed the honey lover who assumed our honey was organic. Heavenly Honey is actually pretty conventional, produced from hives managed very much in the mainstream of North American management paradigms, at least the legal methods. Yet, the personal touch we provide through Heavenly Honey elicits the assumption that it is more natural, organic, and healthful than "those other honeys" from the stores.

Our honey also represents the university, sold in the Simon Fraser University bookstore and often packed in specially labeled gift jars for university-related conferences. Whatever the outlet, it always has

Continued on Next Page

"There is nothing more fulfilling, and direct, than handing over a jar of honey to a customer or a friend."

the university's name on it, personalizing the institution and projecting what we hope is the reality of a university that's just a bit friendlier than most.

Gifts of honey off-campus also open the opportunity for discussions about bees, and nature. In my current position as Director of the Undergraduate Semester in Dialogue, our courses bring in upwards of 30 or 40 community guests to interact with a cohort of students each semester. After a morning of dialogue and insights, we traditionally thank each guest with a jar of you guessed it, Heavenly Honey.

What follows, besides their obvious joy in taking home a jar of honey, often involves an extended conversation about the honey, bees, their uncle so-and-so who kept bees down on the farm, the time they were stung, and on and on. We have an unusually high acceptance rate when inviting guests, and a virtual 100% return rate when re-invited, I'm sure mostly because the word is out that a jar of Heavenly Honey awaits.

Many of our course guests have ended up taking trips to the beeyard, and some have even paid for the opportunity. Our Dean of Science used to host a "charity auction," proceeds going towards scholarships, and one of the most popular items was a day in the beeyard plus a box of Heavenly Honey. Bidding was stiff, and that box of honey sold for way more than retail.

We also make sure that our honey gets around to other charitable uses. Many a poor student has picked up a jar or two of honey at the university food bank. Donating a few cases to the annual United Way sale certainly has brought in more new customers than any formal advertising.

Our honey has another benefit in attracting students into our bee program. We hire high school students to extract, two or three each August, and it's remarkable how many of them have stayed with us over the years. A number have expanded into research students as they mature, initially attracted by the job of extracting but soon drawn into the group by the intrigue of bee research.

Our experiences with selling Heavenly Honey are not at all unique. Every beekeeper who markets out the front door, or who hires occasional help, can speak eloquently about their customers and employees. There is something profoundly satisfying that grows from personal connections linked through honey, whether the honey is a gift or purchase.

A commercial business, of course, loses this connection with volume. To make money with bees, selling out your door can be at best a sideline. It's the bulk sales, the rows of honey on a supermarket shelf, and the high-volume industrial trade that make a living for a beekeeper. Yet, we under-exploit the opportunity to personalize our honey and connect with consumers in these mass-market situations.

Take a look at your local supermarket shelf, holding honey with generic labeling, limited diversity, and lack of compelling connections with customers. Why not provide more tasteful and attractive labels, boutique products, add-on brochures that personalize a beekeeper behind the honey, or some educational material for the kids?

Shouldn't we have a beekeeper dressed in a bee suit standing next to displays during the Winter months? And how about those free tasting samples every other product on earth gives out in supermarkets? Wouldn't a tasting of honeys with different floral origins be a great conversation starter with our customers?

We look to organizations to provide generic honey marketing for us, but beekeeping at its heart is a personal endeavor. There is nothing more fulfilling, and direct, than handing over a jar of honey to a customer or a friend. Imagine if each of us took a day or two this Winter to talk about bees and honey with customers in the local supermarket, and made sure the shelves were stocked with more interesting looking product than the bland mass-marketed stuff.

If nothing else, your phone will start ringing every August. "Is your honey available yet? When can I come by? Will you reserve some for me?" BC

Mark Winston is a Professor at Simon Fraser University, Burnaby, B.C. Canada.

Malcolm T **Sanford**

The Templeton Prize And Its Relation To Beekeeping

"In the haste to find a "silver bullet" the bee's welfare often seems the last thing on many people's minds."

I have always been fond of *World Watch* magazine.[1] It speaks to many who are searching for answers in a modern world that seems bent on breakneck change at any cost. In my career as extension apiculturist, I have often discussed the profound changes that have occurred in beekeeping over the last 20 years through my newsletters and articles.[2] Apiculture, in fact seems to be a microcosm of what is occurring all over this old globe.

A *World Watch* article in 1999 (Vol. 12, No. 2, pp. 12-23), for example, discussed a phenomenon called the "nemesis effect." This is a result of a biological system's response to an introduction. The article concludes, "... effects are determined, not just by the activities that initially produced them, but by each other and by the ways ecosystems respond to them. They are in other words part of an enormously complex system. And unless we can learn to see them within the system, we have no hope of anticipating the damage they do."

Within this context, I wrote: "Introduced organisms have dramatically affected both the honey bee itself and its management. In general, these have driven costs up and eroded the bees' productivity. The introductions, however, may be more problematic precisely because their final results are indirect and not easily detected within the context of the honey bee system (colony). One example is appearance of parasitic mite syndrome (BPMS), a new bee disease lacking a common symptomology and no specific, identified causal organism.

"The effects of sublethal dosages of fluvalinate (and later coumaphos) on queens and drones also have surprised us, while at the same time the mites themselves are becoming resistant to this chemical. Beekeepers also put grease patties, essential oils, smoke and other chemicals into colonies in an attempt to manage certain conditions. The number of surprises that might surface due to these materials used alone, or in concert with each other through synergism, is unknown. The nemesis effect should give all beekeepers pause when contemplating more extensive use of these and other substances in their colonies."[3]

Now comes a note in the July/August *World Watch* (Vol. 17, No. 4), pp. 3-6 under the rubric "Twin Towers and Ivory Towers." The author, Ed Ayers, relates that the 2004 Templeton Prize was awarded to Dr George F.R. Ellis, a South African physicist who specializes in "relativity and its applications to cosmology—the study of the origin and evolution of the universe."[4] Mr. Ayers admits to being vaguely irritated. "It's fascinating to hear scientists talk about things that happened billions of years ago and perhaps billions of light years away, but right now we have a billion people living in poverty and a million or so other species headed for extinction." So he asked what could Dr. Ellis have done to deserve a prize in a field like that, at a time like this.

That the Templeton Prize is awarded each Spring by the Canyon Institute of Advanced Studies in Phoenix, AZ "for progress toward research or discovery about spiritual realities" also raises a few eyebrows. What could a hard scientist possibly say about spiritualities Mr Ayers also asks.

Indeed Dr. Ellis' studies reveal that historically science and religion have had little to say to each other, the result of reductionism, breaking systems down so that the parts can be analyzed through the scientific method. Reductionism has become a pattern of thinking that is fairly basic to how most people in the Western world tend to analyze – and try to cope with – any crisis, Dr Ellis says, but it has its pitfalls.

Reductionism has led to the "unexamined" belief that even the most complex and mysterious of life's phenomena – mental illness, passion, addiction, hate – can be explained in terms of molecular or atomic phenomena, according to Mr Ayers. Taken to its extreme even the conscious choices we make are really determined by biochemical activity at a microscopic level. Dr. Ellis says this is mistaken, and thinks humans have free will, and that we are much more than the sum of our molecules. Mr Ayers concludes that many serious thinkers now believe it's essential to achieve clearer communications between the disparate patterns of thinking and belief on which conflicting human movements are based.

Mr Ayers says Dr Ellis' view could "explain a lot why the world seems to have become so destabilized in so many ways all at once – whether in the incidence of weather catastrophes, terrorist attacks, corporate collapses, cultural conflicts, or epidemiological crises." Examples of trying to reduce all behavior (and ultimately thought) to factor-by-factor explanations are legion. These include the recent finding of large amounts of lead in Washington D.C.'s drinking water caused by a switch from using straight chlorine that was found to be carcinogenic to chloramines which are not. In essence, Mr. Ayers concludes, "the city was reducing the risk of cancer but increasing the risk of brain damage to thousands of its children."[5]

Consider too the air pollution

Continued on Next Page

found in most U.S. cities. Although there are many bureaucracies in charge of aspects of clean air there is no one responsible for "just air" Mr. Ayers complains. He directs our attention to the recent disclosures of the U.S. 9/11 Commission concerning failures of various organizations to heed warnings that might have helped prevent or ameliorate terrorist attacks. Intelligence responsibility was and remains highly fragmented among fifteen national agencies (CIA, FBI, DIA, NSA, NRO, NGA, DHS, etc.) staffed by federal, state, military, civilian, civil service and political appointees, some of which had and have little idea of what the others were and are doing.[6] Little wonder terrorists were able to slip through intelligence cracks to deal a devastating blow.

All this reminds me of the often different goals between beekeepers and bee researchers.[7] Each group in its own way is seeking to find answers to the numerous crises that affect modern-day beekeeping, especially those surrounding parasitic mites and their control. Often, however, both groups are not working together to further the welfare of the insect they are involved with. Reductionist thinking lies behind many of the quick and easy recipes for solving many of these problems. This is especially true with reference to chemical use. If one chemical or substance doesn't work, there must be another out there that does. In the haste to find a "silver bullet" the bees welfare of ten seems the last thing on many people's minds. I am reminded of the time I went on a consulting mission to Egypt. During a seminar attended by several hundred beekeepers, I was peppered with questions about using this or that chemical or substance. Finally, somewhat exasperated when yet another fellow asked me whether using salt in colonies was recommended, I said, "poor bees." My retort hit a nerve; it got a responsive and knowing chuckle from the audience.

It is relevant to recall that many of the great discoveries in bee biology were in fact made not by scientists, but by men of the cloth. L.L. Langstroth comes to mind. The Ohio preacher discovered the principal of the bee space by observing how the whole colony organized itself, perhaps assisted by his theological training. It is questionable that he would have been able to find out this valuable piece of information by looking at single bees.

"While relevant to many scientists, the biological explanation for how either SMR or hygienic behavior work in honey bees is irrelevant to the practical beekeeper. Both can be taken advantage of by simply using conventional breeding techniques, the same as those employed by Brother Adam."

Another was the late, great monk at Buckfast Abbey, Brother Adam.[8] Most accounts of Brother Adam's work indicate that his breeding program was responsible for tracheal-mite resistance. Indeed Buckfast Abbey stock was and continues to be eagerly sought after due to tolerance to *Acarapis woodi*. Brother Adam's activities, however, seemed to have little to do with tracheal mites themselves. Rather, he simply bred bees that were able to survive the British winters common in his region, in spite of being infested by those mites.

Two contemporary beekeeping techniques do incorporate a more global (worldly) view in the search for solutions to many of the problems affecting honey bees and by extension their beekeepers. One is the effort to breed stock on which *Varroa* mites do not reproduce well. The suppression of mite reproduction, or SMR, is a societal behavior that is responsible for fewer (not eradication or elimination of) mites.[9]

Another is hygienic behavior.[10] The colony that uncaps and removes damaged or diseased brood is the one most likely to survive, whether challenged by parasites or bacteria. Reductionist thinking certainly had a role in describing this situation. Originally thought to be the result of only two genes, new information now suggests perhaps three genes are responsible. Reductionist thinking, however, also prevented this from being implemented in many beekeeping operations as beekeepers were able to use antibiotics to treat disease, in effect rendering hygienic behavior impotent.

While relevant to many scientists, the biological explanation for how either SMR or hygienic behavior work in honey bees is irrelevant to the practical beekeeper. Both can be taken advantage of by simply using conventional breeding techniques, the same as those employed by Brother Adam.

Perhaps those looking for solutions to many of the globe's current ills might take a page out of the beekeeping manual and employ a more worldly view As Mr. Ayers concludes: "Whether it's the lead in Washington's water, the automotive pollution of the world's air, the blindered view of what constitutes security, or the arrested-adolescent belief that only individuals matter, the one hopeful conclusion I can

draw is that reductionist solutions lead to far more frustration than satisfaction. When Ellis wrote the critiques for which he was awarded the Templeton Prize, he wasn't just another cloistered academic theorizing about the number of angels that could dance on a pinhead. He was contributing to the possibility of a sustainable human future – using a mode of thinking that is far more realistic than are the technocratic fantasies of so many of our industrial and political leaders." BC

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Honey Plants

Conn e **Krochmal**

Lots of Asters

Amidst the red, yellow, and gold Autumn foliage are blankets of asters abuzz with bees. These will be one of the last nectar and pollen sources for the year

Worldwide, there are 600 or so species of asters with over 120 of those being native to North America.

Range

Though it is true that asters are more common in the East, they're found in all states except Alaska and Hawaii.

Growing Requirements

Asters do best in full sun. Some tolerate both wet and dry conditions, while others prefer one or the other

Habitat

These plants flourish in many habitats, ranging from areas with rich, moist soils to rather dry, bleak situations. Those preferring dry sites grow along roadsides, in barrens, clearings, fields, meadows, open woodlands, pastures, prairies, thickets, waste places, slopes, and dry open areas – especially along the edges of woods. They're particularly common on banks, ledges, and dry sandy or gravelly rocky places.

The moisture-loving aster species thrive in damp or wet spots, such as bogs, damp thickets, low-lying woods and other low places, peaty savannas, riverbanks, shores, and along borders of swamps.

Value to Bees

Producing surpluses, asters are leading honey plants in nearly all areas of the U.S. The exception is the western mountainous region.

Pure aster honey is premium quality. It ranges from water white or light amber to very dark with flavor varying from delicate to extremely spicy, somewhat reminiscent of herbs.

Except for that from the heart-leaved aster, the honey usually crystallizes rather swiftly.

When the bees are processing the honey, beekeepers will notice a strong, distinctive odor around the hives. However, this is usually absent in the finished crop.

If cold weather arrives ahead of schedule before the bees have completed their work, aster honey can ferment. Should this happen, all isn't necessarily lost. A number of beekeepers have learned it still makes marvelous mead.

Though some extract and sell it as a Fall crop, aster honey is used primarily as Winter store for the bees. However, some sources report it may be difficult for them to digest.

While some aster species are reportedly better than others, most are good nectar/pollen plants under the right circumstances. Climate, soil, and growing conditions can affect the nectar flow.

General Plant Description

The many-flowered asters are often leggy and tall, reaching six to eight feet. They may look weedy Sometimes toothed, the alternate leaves vary in size, but for the most part are often narrow.

Beekeepers may find it challenging to identify a species by description alone, for these plants hybridize freely. Common names may not be helpful. Take the Fall-blooming golden aster, for example. In fact, this is no aster, though it is a relative.

Flowers

Generally, asters are enthusiastic bloomers with flowers opening from September through November. For some species, this may begin in July or August.

The daisy-like blooms can occur singly, but they're likely to be in clusters. Blossoms consist of a disk surrounded by ray flowers, often called petals. The small center may be yellow, red, brown, or white. Sometimes, these darken with age. Their petals are white, cream, blue, purple, pink, or red.

Continued on Next Page

Aster novi belgii

Specific Species

Of the many aster species, the ones described below are known to be excellent nectar and pollen plants.

Arrow-leaf aster (*Aster sagittifolius*)

Around six feet in height, these are stiffly erect plants. The stems often have soft hairs. Produced on winged leafstalks, the lower leaves are heart-shaped, and may be toothed. The upper foliage is narrow Beginning in August, these plants bloom nonstop until they're hit with a hard freeze. Blossoms in a range of colors are borne on long flower stalks. They may be pale blue, purple, or white.

Arrow-leaf aster prefers dry habitats. Native to the eastern U.S., its range extends westward to North Dakota and Texas.

Bushy aster (*Aster dumosus*)

A floriferous, bushy plant, this species is only one to three feet in height. The numerous, slender stems are hairy Normally the leaves are linear Those on the flower stalks are short, and bract-like. Occurring singly, blooms are ¾ inch wide. They're colored a pale blue with yellow or brown disks.

This species frequents dry and wet sites in the East, and Midwest southward to Texas.

Calico aster, starved aster (*Aster lateriflorus*)

Rising four to five feet, this branching plant features hairy, purplish stems that are wide spreading. It has thin, flexible foliage. The basal leaves are egg-shaped, while the upper ones are narrow. Unusually small, the blooms are only ¼-½ inch across. These have purplish-red centers and white or pink petals. They open from August through October

Calico aster is found in both moist and dry locations over most of the East.

Clasping aster, China-leaf aster, scaleleaf aster (*Aster adnatus*)

A much-branched, floriferous species, this grows from two to three feet in height. Its very small leaves clasp the stem. Flowers are bluish-purple. They're held in narrow terminal clusters. This is a late-flowering species – from October through November

Clasping aster prefers dry sites. Its range is restricted to the lower South.

Flat-topped aster (*Aster umbellatus*)

Among the taller species, flat-topped aster reaches eight feet in height. This wide-spreading plant has rather stiff branches. They're leafy to the top. Lance to egg-shaped, the foliage is rough-textured. An abundance of white blooms make their appearance in flat-topped clusters from July through October They're usually white.

This species grows in dry and wet habitats throughout the Northeast, and Midwest southward to Georgia.

Frost flower, small white aster, white field aster (*Aster vimineus*)

Up to 4½ feet tall, this species has arching, forked, slender stems. These are hairy and purple-tinged. Often toothed, its linear to lance-shaped foliage is rough. From August through October, clusters of white flowers, changing to pink, appear The disks may be red or yellow. Bees prefer the latter, for these offer more pollen.

Frost flower is adapted to dry and moist locations. This plant is found throughout the Northeast to Michigan, and the Southeast westward to Arkansas and Texas.

Heart-leaved aster (*Aster cordifolius*)

Growing to six feet, this large plant may have multiple stems. Its lower leaves are heart-shaped, while the upper ones are broadly egg-shaped. They're often hairy. Sometimes toothed, the foliage is thin and firm. The abundant flowers, which may be blue, purple, rarely pink or white, open in clusters from July through October This species inhabits dry places throughout the East, and Midwest westward to Missouri.

The heart-leaved aster yields lots of nectar, and can be counted on for surpluses.

Lance-leaved aster, marsh aster, panicled aster (*Aster simplex*)

A particularly good nectar species, this stout plant has large, toothed foliage. The leaves are broader than long. Its numerous flower clusters are usually large with forking branches. Opening from August through October, the blooms are white, sometimes blue-tinged or lavender.

Growing in damp spots, this is native to the East and Midwest.

Large-leaved aster (*Aster macrophyllus*)

About two to four-and-a-half-feet tall, this plant is named for its oversized, unevenly toothed, heart-shaped basal leaves, up to eight inches long. The winged, upper ones are smaller In August and September, purple or light blue flowers develop in flat-topped bunches. Blooms are ½ inch in diameter.

This species grows throughout the East and Midwest. It is adapted to wet and dry sites.

New England aster (*Aster novae-angliae*)

Reaching eight feet in height, New England aster is one of the tallest species. This much-branched, stout, hairy plant has lance-shaped leaves that clasp the stem. Blooms are borne terminally in loose clusters. One inch or so in diameter, the striking flowers are purple or red. Centers are yellow or orange. These open from August through October.

Despite the common name, New England aster grows throughout the East. A choice plant for damp and moist sites, this is often cultivated. There are many interesting cultivars.

New York aster (*Aster novi-belgii*)

One of the most beautiful asters, this widely cultivated species is three to six feet in height. Its leaves are linear to oblong. Clasping the stem, the upper ones are sparingly toothed. Flowers are two inches across. Produced in flat heads, they're blue, violet, red, or occasionally white. The cultivated types add other colors, such as salmon and pink, to the palette.

New York aster blooms from July through October. Also known as Michaelmas daisy, its flowers are open on St. Michaels Day (September 29) in England.

Easily grown, New York aster is an eastern species. It prefers damp places. This is native mostly within a hundred miles of the coast.

Aster novae angliae

Purple-stemmed aster (*Aster puniceus*)

One of the largest asters, this handsome species reaches eight feet. The reddish or purplish stout stem is hairy. Its toothed, lance-shaped foliage has a dry, harsh texture, that clasps the stem. From August through October, dense clusters of blossoms are produced from the leaf axils. Pale yellow or red disks are surrounded by blue, purple, pink, or rarely white petals.

Tolerant of salty and brackish water, this species is most common in coastal areas. It prefers damp and swampy places. This is native to the East, Midwest, and Rocky Mountains.

Tradescant aster (*Aster tradescanti*)

Tradescant aster is a particularly good nectar species. Rather short, this slender plant is only two feet in height. Its leaves are oblong to linear. Flowering takes place from July through September in scattered, long-stalked heads.

Tradescant aster prefers moist places. Its range extends from the Northeast to Michigan.

White aster (*Aster ericoides*)

With bushy, towering eight-and-a-half-foot tall stems, this is a stiff, erect, densely hairy plant. Its rigid, linear leaves with rough margins are crowded together. The upper ones are smaller. For the most part, its blooms are white, occasionally blue or purple. Flowering is from July through October

This plant's range extends throughout the East westward to Oklahoma, Texas, and Arizona in dry, open spots.

Whorled wood aster (*Aster acuminatus*)

Whorled wood aster is three feet tall. Appearing like whorls beneath the blossoms, the large, densely crowded leaves are clustered on the upper part of the stem. They're coarsely toothed, long and pointed. The lower leaves are smaller

Its flowers open in flat-topped clusters. Around the yellow or red centers are white petals. It blooms July through September

Whorled wood aster grows in the Northeast southward to Georgia in dry and wet habitats.

Willow-leaved aster (*Aster praealtus*)

This is one of the best asters for bees. Over six-and-a-half-feet in height, it has spreading, very leafy stems. The lance-shaped foliage has a firm, leathery texture. Along their edges, the leaves curl backwards. Flowers are present from August through October in large bunches on leafy, short stalks. They're usually blue or purple, but can be white.

Its range extends from the East

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westward to Missouri, Oklahoma, and Texas in dry habitats.

In addition to these species, other cultivated ones that are known to be good nectar/pollen plants include:

Alpine aster (*Aster alpinus*) zones 4-7 Summer blooming.

East Indies aster (*Aster tongolensis*) zones 5-8. Summer blooming.

Frikart's aster (*Aster x frikartii*) zones 5-8. Summer blooming.

Italian aster (*Aster amellus*) zones 5-8. Blooms in early Fall.

Rhone aster (*Aster sedifolius*) zones 4-7 Blooms in the Fall

Thompson's aster (*Aster thomsonii*) zones 4-9. Blooms in late Summer

Despite fickle weather, most asters reward beekeepers with a good nectar flow. BC

Connie Krochmal is an award winning garden writer and a beekeeper.

In The 60s

James E **Tew**

Some old Paths and some new.

My old path

I've written the introduction to this piece about 10 different ways, but I have not liked any of them. In a degree of exasperation I have chosen the direct approach. In a nutshell – after 20+ years of having a full-time technician, I lost funding for the position. The loss was due to state financial reductions that affected the entire state extension program, not just the beekeeping program. Clearly, nothing lasts forever. I was very comfortable on my old path, but it's come to an end. What's next?

Some new pathways

Having lost my technician I abruptly became a "one-man-show" bee program. Hives need working? I do it. Grass still growing? I cut it. Honey supers to come off. My problem. Phone calls and email? Mostly my responsibility. Storage barn cluttered. I'm the one to do something about it. For the immediate future, I have no help. Maybe next year.

Ironically, these are all pathways that I traveled as a younger university faculty member In a sense, these recent new responsibilities are old ones that have become new again.

How you factor in.

In recent years, time and time again, I've written about the virtues of the beekeeper who intensively manages a small number of hives rather than minimally managing a larger number of beehives. To the amusement of many I said that two hives would be plenty for me, and, in fact, two were probably one too many.

For many years we routinely ran about 200 hives during the Summer. When I learned that I was to lose my technical support I let that number dwindle to about 60 hives, which is where I am now. The guy who said that two hives was plenty now has 60. I know, don't even say it. There are those among you who keep many more than that. I know it's done all the time, but this is a new direction for me and not a direction that I freely chose – plus I still have a full-time academic job.

So how do you factor in? As always I will write about the various experiences I encounter as I on the management of these hives for the next few months. I don't know how this series will end.

My fundamental plan at this point

I have no choice. Being 56 years old, I simply have to work as smart as I can and pace myself. I have developed the following working list (subject to serious change.)

Only pick up what must be picked up.

Otherwise, use anything else to pick it up for me (no matter what it is.)

Beekeepers are notorious for having bad backs. Even my former technician commonly had back problems once or twice per year I want hand trucks everywhere and wheels on everything. But I know that sooner or later something must be moved manually.

Keep more colonies in fewer yards.

Through the years I have recommended that beekeepers spread their hives about the community in small groups in order to maximize honey production. I'm not going to do that. In fact, I currently have three yards, down from sixteen – one just outside my lab door I don't want to cut grass in multiple yards or spend inordinate amounts of time driving from one yard to another. Since July, when all this started I have been trying to maximize my time and energy more than maximize my honey crop.

Standardize everything on the hives.

I want all my hive equipment to be as simple as possible and essentially identical. I want to be able to make splits, combine, and swap frames – whatever it takes – to expeditiously manage these colonies. This includes frames. I don't care if it is a metal bound frame from the early 1900's, if it's weak and wax moth riddled, it's going away All discarded wood frames will be replaced with plastic frames.

If it's wood and needs repair, throw it away.

I cannot believe that I said that. I'm the guy who always said, *"Anything can be fixed."* Unless it's just the smallest repair, I don't have time to fix it. On the other extreme, by not repairing damaged equipment, but continuing to use it, I would be running junky equipment with ancillary problems. I must retrain myself to throw away stuff that could be repaired. I admit that I will have to work on this point.

But if it's not wood and needs repair...

Aside from wood repair, I have no problem with old stuff so long as it is dependable, heavy-duty and usable. So I drive a terrible looking 1976 flatbed Ford truck with a lift gate. I use a 1975 Wheel Horse riding lawn mower to keep the grass knocked down in the two primary yards. As I write, I realize that nearly all of my equipment is old – extractors, uncappers, honey pumps, hive equipment, trucks, and me – all showing some age. Nothing wrong with that.

Continued on Next Page

"I need to look at everything I do. I don't need busy work."

My primary obstacle is a labor shortage.

The main thing I don't have is labor Through the years, I have acquired a lot of diversified beekeeping equipment of all types and all ages. I actually have an abundance of stuff, but I am the only person available to employ it. I'm like a kid with too many toys.

An above average honey crop. Is this good news?

For the first time in several years I had a pretty good honey crop this season. The colonies were supered in time, swarming was minimal and, since I have no help, yep, I got a pretty good crop. I feel like someone who has caught a lot fish and now has to clean them. On one hand I am glad to have the crop, but on the other hand, I'm the one who must deal with it in a labor-efficient way.

Working smart by working slower.

How can *"working smarter by working slower"* make sense? To comprehend this comment, first, you should be over 50 years old. Second, be doing all the work yourself. Third, have additional job demands other than keeping bees and processing honey in fits and starts. My way of coping with this was to only bring in the number of supers that I could process in about a half day, rather than working for several days and bring in the entire crop. About 20 or so supers, depending on their weight was a pretty good half day's work. I didn't want to have unprocessed supers sitting around, leaking honey and encouraging small hive beetles. Then, after extracting, I didn't want lots of uncapped supers to be hauled back to be put away.

In the yard

Protective gear I wear good protective equipment in the yard. Remember, I presently have no one else in the yard to turn to for help should the bees get real testy. For about five years, I have been using cedar wood shaving (animal bedding) that I buy at a local farm supply store. I know you can use pine needles, sumac pods, and corrugated board, that you can get for free, but I want something that burns for a long time and burns dependably. I also use a good smoker.

Honey super removal equipment. To remove bees from the supers, I used a Dadant Tri-pod gasoline-powered bee blower This thing is heavy and noisy, but attaching it to a hand truck made my life just a bit easier (Plus, you can use air from the blower to cool yourself on particularly hot days.) I took my time blowing the bees out in order to get as many of them out as possible. Though we have fume boards and have used them extensively in the past, I didn't want the smell on the equipment, in the truck, in the extracting room, or on me.

In the extracting room. To continue my "working slower" concept, I also used smaller processing equipment. Since I was only bringing in a small number of supers at the time, I didn't want to fire off my larger processing equipment. It takes about 20 gallons of honey to prime my larger cappings tank and to fill the pump and the honey lines. I didn't want this machinery filled with honey sitting around unused for days at a time. In total, I extracted about 200 supers. If I had all of these supers to process at one time, it would have been logical to use the larger equipment, but since I was processing about 20 supers at a time, I was actually processing honey at the small hobby beekeeper level. By using smaller processing equipment, I made my extracting line simpler and easier to clean after each extracting session.

Presently in a quandary.

I put the extracted supers back on the colonies to entice the bees to clean up the loose honey, which is where they are now. I don't usually get a Fall crop and if I don't get one during the remainder of this month and next, I might just leave the supers on over Winter But I don't know. I guess I am in a quandary here. Those empty supers on top of a colony are reasonably easy to blow off during Winter storms. I know they should be put away, but it's more work and if they don't blow off, they're in place for Spring, saving me additional work then. I need to look at everything I'm doing to be sure that it really needs to be done. I don't need busy-work. I'm clearly making this up as I go along. BC

One of my beeyards with supers still in place.

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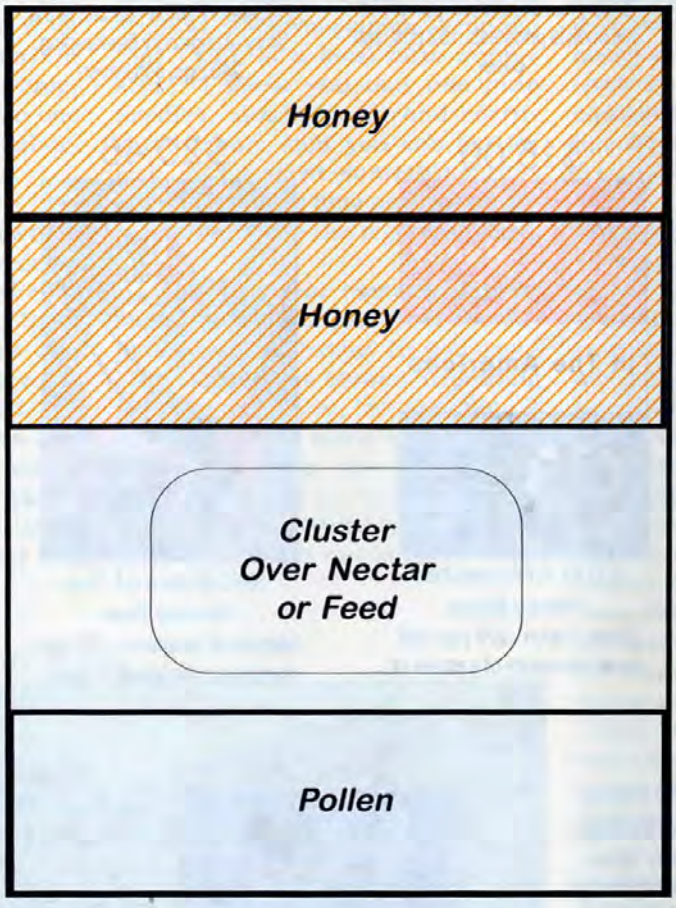
POLLEN BOX OVERWINTERING

Walt **Wright**

The literature is big on providing sufficient honey stores for Wintering in your area. The results of failing to do so are stark. The sight of a starved colony is at once a pitiful thing, and the beekeeper responsible feels not only remorse, but also has twangs of guilt. These emotions tend to push adequate honey stores into a priority position.

The effects of a shortage of Wintering pollen are not nearly so dramatic, but are *very* significant in colony development for the following season. The colony must have pollen stores within the warmed cluster volume to rear midwinter brood. Midwinter brood rearing offsets the cluster decline in volume due to loss of Fall bees. If deprived of pollen in midwinter, the cluster volume continues to decline into the late Winter/early Spring period of the build up. Spring dwindling sets in before field pollen is available. The effects of this condition are not as stark as starvation because the cluster, although alive, just continues to shrink. Winter losses are important when factored into your bottom line, whatever the cause. And weak colonies in the Spring are not honey producers without substantial effort.

Shown here is my recommended Wintering configuration, replacing the double deep. If you have recovered your composure from your initial reaction to this bizarre stack, perhaps you will be interested in *why* it is better, in my opinion. Of course, if you are addicted to the double deep, it is your prerogative to continue to abuse your bees. As owner, you pay the bills and suffer the consequences.



The data I've collected points out that some colonies will "fill" the lower deep on the white wax flow with pollen, and led to the following investigation. I concluded that brood nest reduction included raising the bottom with Wintering pollen in the natural environment of a hollow tree. If so, that meant that our hive design was somehow interfering with the colony's normal processes, so I tried to alleviate the hive design problem. Initially a box of foundation or drawn comb *below* the double deep during the build up. The results were iffy. Some colonies used the added box for pollen storage and some didn't. The results were not as positive as I had hoped. But when a box of brood was moved to the bottom board, the results were more uniform. All colonies had pollen in that box by harvest time. This confirmed my suspicion that our hive design was indeed interfering in their normal storing processes.

When I was Wintering in double deeps, about 25% were feeble in the early season. At one stage on my learning curve, I used to make post-harvest divides out of 25% or so of my colonies. These divides were a source of expendable bees in the Spring to maintain a

constant hive count. But, since I started adding the pollen box below the basic brood nest, I've quit making those post-harvest divides. Colony Wintering is much more consistent when pollen management is deliberate.

Now, I haven't lost a colony over the Winter in years. My mite management is effective, and most of my Winter losses of yesteryear were the result of queen loss.

The tidbit on Winter queen loss is included here to make the point that Winter dead-outs are not inevitable. Cold itself does not kill bees. Their little trick of generating enough heat in the center of the Winter cluster to warm the bees of the insulating shell is unique in the insect world. If you take care to provide colony Wintering requirements, you'll have less Winter loss. In this article, we are discussing pollen for midwinter brood rearing.

It is true that my local milder, and shorter Winters improve survival rates – even with poor preparation by the colony. But poor preparation takes a greater toll as we move northward. The principles advanced here become more significant at more northerly latitudes. Strangely enough, if you look at what happens in very cold climates, the bees are more likely to get it right. A colony Wintered in a triple deep will typically Winter in the second, or middle deep box. The lower deep is used for pollen and the top deep is filled with honey. For lack of a better description, I call this the "sandwich concept." The Winter brood nest is sandwiched between the stores required for Winter brood rearing. In the triple deep, the colony contempt for the break in functional comb between deeps actually assists them in getting stores properly placed.

The recommended configuration applies the sandwich concept for colonies located where less stores are needed for Wintering. Here in Tennessee, a single shallow of honey would be ample if the brood nest is filled with nectar in the Fall. The second shallow of honey is shown for colonies maintained at intermediate latitudes such as Ohio. In either case, the colony preference for rearing brood on deep frames will cause them to gravitate to the deep chamber for a Winter brood nest. Additionally, the use of shallows for Spring brood nest expansion does not seem to slow them down much. The urge to reproduce (swarm) is a strong motivator. An intermediate Winter cluster can add three shallows of brood to the basic deep in our short build up season, if forage is supporting.

This arrangement offers two main advantages to the colony for Wintering. In addition to pollen for Winter brood rearing, a second advantage is rather subjective. Brood nest expansion in the Fall is not competing with Winter stores for space. With honey above and pollen below, the colony is comfortable with use of the deep just for brood. This permits them to rear *more* young bees for Wintering. However, you're not relieved of the obligation to confirm that the brood nest is filled with liquid feed after brood rearing terminates. If the colony relocates upward on solid capped honey, abandoning the empty brood nest, the pollen box will be out of reach. The recommendation from here is to check the status of the brood nest at about the first killing freeze. If the brood nest has empty cells or capped brood, feed, feed, feed. Field nectar may terminate with the freeze, but periodic mild days between cold spells will permit the colony to move feed to the brood nest. The "heft" test, reflecting colony honey weight, does not tell you that the brood nest is properly prepared for Winter. *Eyeball it*, feed if necessary, and watch your bees come through Winter in better condition.

Although the configuration shown is oriented toward improved Wintering of the colony, there are some fringe benefits for the beekeeper. Never having to lift a deep of honey is significant. A deep of brood weighs less and would seldom require lifting off to go below. In that same vein, you know where the brood will be when medicating for pests. You can rest assured that the colony preference for rearing brood in the deep will prevail, and Fall brood rearing will be centered there. In the Spring, the colony that had the brood nest properly prepared in early Winter, and starts brood rearing there, will still be using the deep brood chamber *for its intended purpose.*

But after initially getting the colony into the recommended configuration, you're still not home free. Some additional effort may be required in subsequent seasons. All colonies do not react to configuration differences in the same way. Some will maintain pollen in the pollen box throughout the active season. The only extra work there is to check that pollen has been maintained through the early build up. Some colonies will have both brood and pollen in the pollen box – they are O.K. also. Now there's a controversial concept. The indications are that in the wild brood nest, the colony expands the brood nest in both directions: up into honey and down into pollen. (Everybody "knows" that the colony never expands downward.)

The colony that lets the pollen box empty out in the early build up is the one that needs some help in getting it right. If their sensitivity to the break in functional comb is severe enough to let the pollen box go empty during the build up, they are not likely to use it for pollen for the rest of the season.

About mid-build up, and before the stack gets high enough to be extra work, check the pollen box on the bottom board. If the center frames are basically filled with pollen or brood, you can forget them for the season. But if the box is basically empty, reverse it with the first shallow of brood from above. They will get it right for the remainder of that season.

Although it would do no harm to leave the shallow empty at the bottom for the whole season (adding six inches to the stack), the objective is to provide pollen at the lower edge of the Winter brood nest. Another advantage to the colony, not mentioned above, is physical separation of the brood nest from the cold and drafts of the bottom board. There would be more room for the insulating shell at the bottom whether filled with pollen or even if it was empty.

The extra inspection and/or manipulation is well worth the time required. Although accomplished in the early season, it is an investment in reliable Wintering. BC

Walt Wright is a life long student of the honey bee.

Peter **Sieling**

MAKING BOX JOINTS

There are at least a dozen ways to join hive bodies, supers, and telescoping covers at the corners, including splines, tongue and groove joints, and butt joints. These are simple to mill on an ordinary table saw. Some are stronger than others. All share one common disadvantage: they do not form a strong glued joint. Wood can be glued side grain to side grain, edge to edge grain or side to edge grain. End grain doesn't stick to anything. In most joints end grain is butted up against side grain.

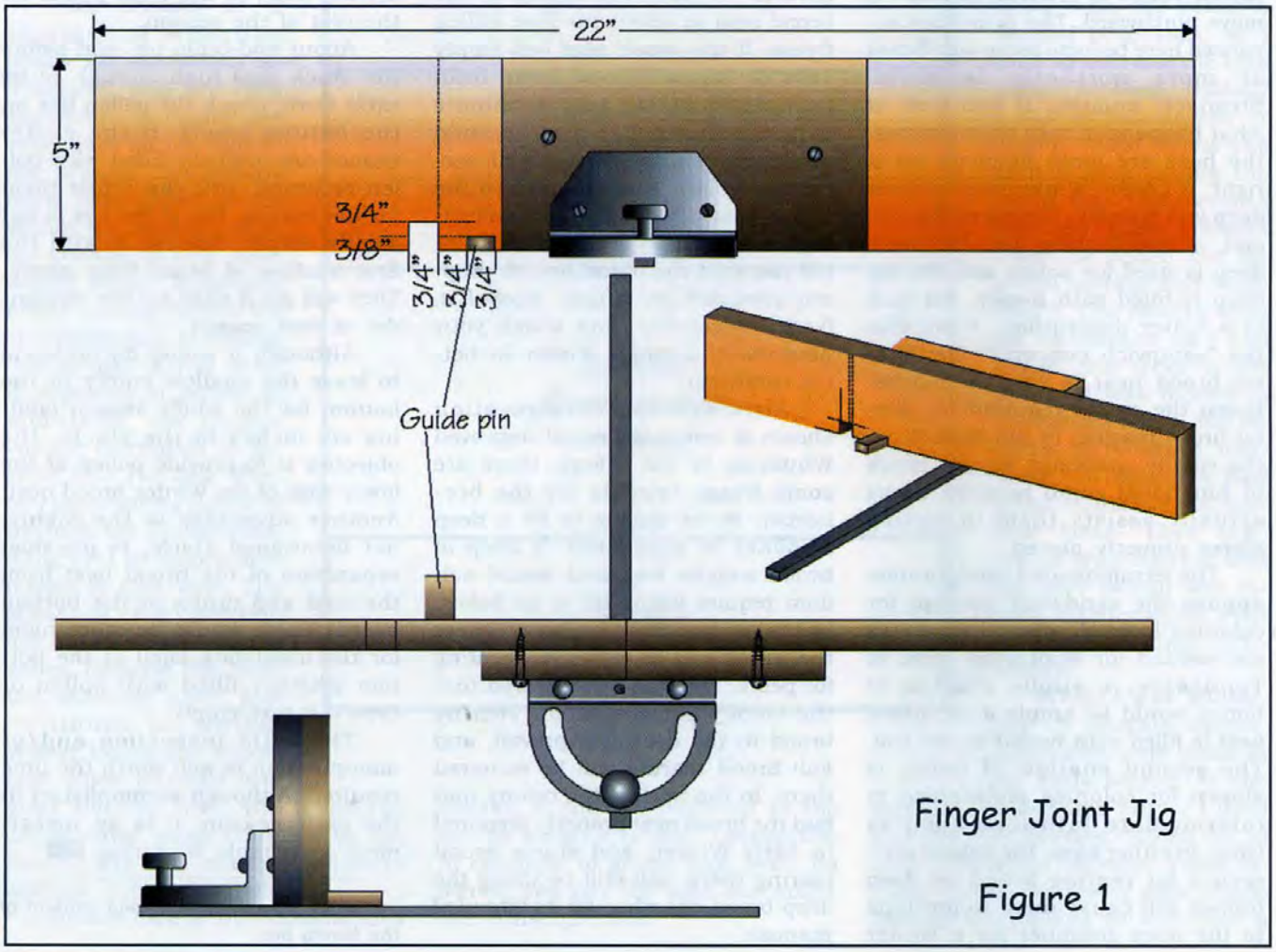
The classic beehive joint is the finger or box joint. Finger joints are superior to other joints in strength. They provide a lot of side grain against side grain surface area. Even without glue, a well made finger joint automatically squares up the box and resists wracking. It is the industry standard.

Finger joints are fairly easy to make without expensive equipment. A finger joint jig can be purchased for a router or home-made for a table saw with a dado blade. The home made jig is the simplest, least expensive and probably faster to use than commercial jigs. Its use extends beyond cutting corners for bee boxes. It also works for joining drawer sides and furniture construction. It's a good addition to a woodworker's jig collection. The first jig you make will probably take less than an hour. Once the process is mastered, a jig can be made for any size fingers in a few minutes.

Making a Finger Joint Jig

The finger joint jig is easy to make. While it requires accuracy within a few thousandths to make a snug joint, that accuracy can be achieved without a dial indicator.

Assemble the necessary tools before starting. You will need:



Finger Joint Jig

Figure 1

1. Table saw with a miter gauge and fence
2. Dado cutting and regular cross cutting saw blade
3. Carpenter or combination square
4. A couple C-clamps
5. Screwdriver
6. Drill, bits and countersink

Before starting, clean and sharpen old blades or buy new ones. It is impossible to cut accurately with dull blades. Remove any gummy deposits with oven cleaner or ammonia, and then lubricate the blades and the saw table with paste wax.

Adjust the saw arbor and miter gauge until both are absolutely square. Don't trust the numbers stamped on the housing or gauge. Make a practice cut on scrap wood and hold it up to the light. Readjust until no light sneaks between the cut and the square. Most woodworkers fasten a board to the miter gauge for extra support. The finger joint jig will attach to this board.

The jig has two parts, a backing board and guide pin. Cut a board to approximately 22" long and 5" high (these dimensions are not critical). Stack the dado blades and chippers for a ¾" dado width* Set the blade height to 3/8" Clamp the board to the miter gauge, and cut a notch in the approximate center of the board.

To make the guide pin, replace the dado blade with a regular blade. Use a piece of wood 12" to 18" long. Rip it to exactly 3/8" by the thickness of the dado blade (in this case 3/4"). This stick must slide into the groove on the backing board without extra play and without binding. One part of this piece becomes the guide pin on the jig. The rest is used to set the blade height on the saw. Cut a 2" long end from the guide stick and insert in the groove. Drill and countersink, fastening the guide pin to the board with a screw.

Slide the jig along the miter fence until the 3/4" guide stick just fits between the blade and the guide pin. This makes the distance between the blade and the guide pin the same width as the dado. Clamp the jig to the miter gauge and make a practice finger joint on two scraps. They should slip together easily. If too loose, nudge the guide pin farther from the blade, if too tight, move it closer. Take the time to make the fit perfect. Drill, countersink and screw the jig to the miter gauge. It's time to mill up a stack of supers.

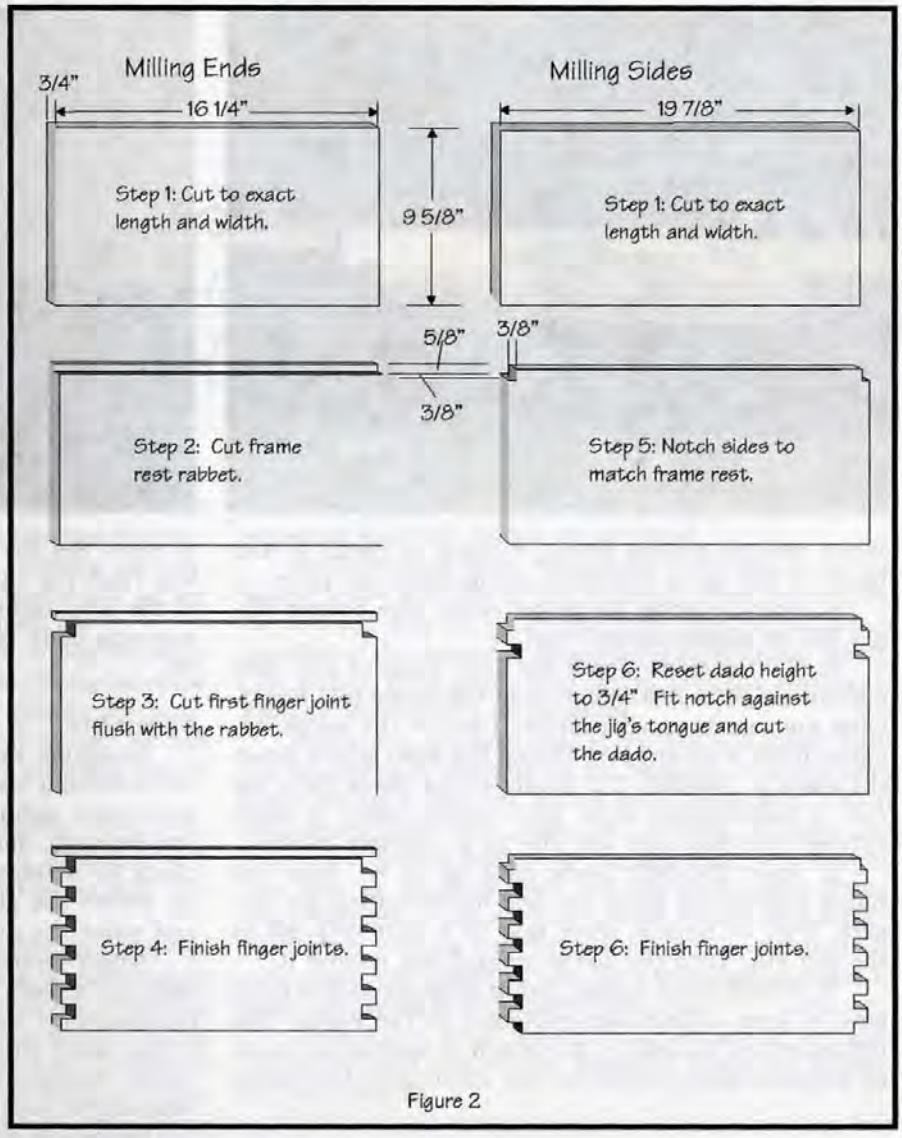


Figure 2

Milling Hive Sides and Ends

1. Prepare the stock for the hive ends and sides. Plane it to ¾". Rip it all to the desired width – 9-5/8" for deep supers, 6-5/8" for medium supers, or 5-11/16" for shallow supers. If your equipment varies slightly from these dimensions, rip to match your own equipment. Crosscut to length, 19-7/8" for the sides, and 16-¼" for fronts and backs.

2. Mill the 5/8" x 3/8" frame rest rabbet on the front and back. Use the guide pin to set the fence 3/8" from the blade. Raise the blade until it is exactly 5/8" high. Cut the rabbets.

Milling the Finger Joints

The frame rest rabbets complicate the normally simple job of cutting finger joints. The easiest way is to start at the top on the hive ends, making the first cut just below the rabbet.

3. Attach the finger joint jig to the miter gauge. Raise the dado blade to ¾" Line up the first finger joint with the frame rest rabbet. Cut the first groove exactly flush with the bottom of the rabbet (see figure 2).

*There is nothing magic about this ¾" dimension. You can make finger joints any width you wish up to the capacity of your table saw and dado cutter by readjusting the sizes given.

When making several boxes, it helps to clamp a stop block to the jig to automatically position the piece.

4. Finish cutting the finger joints. The bottom finger will be slightly larger than ¾"

5. Mill the sides. Lower the dado blade to 3/8" and cut out a 5/8" x 3/8" notch to fit the frame rest finger. Chip out can be severe on the back of the notch because there is no support behind the dado groove when the blade is lowered. Cut slowly as the blade exits the cut. If that doesn't work, put another piece of wood between the hive side and the jig to support the cut.

6. Raise the dado blade back up to ¾" Slide the notch against the guide pin and finish cutting the fingers. With ¾" fingers, there may be a thin strip left at the last cut. Turn the board around and remove it.

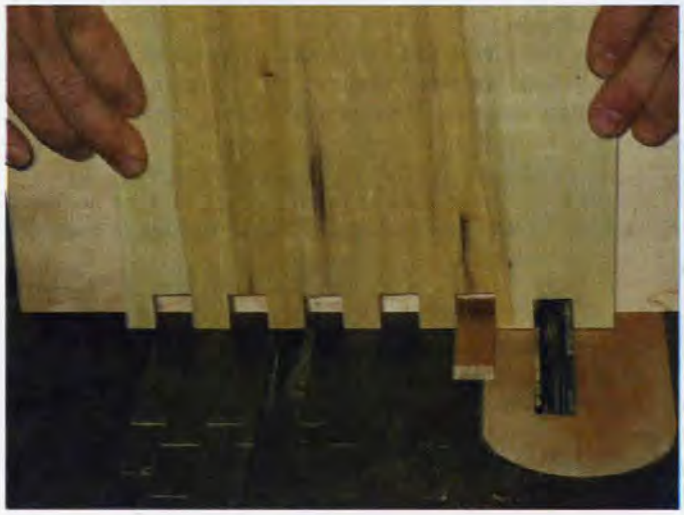
7 To cut hand holds, clamp a board to the table saw in front of and perpendicular to the blade. The distance from the edge of the board to the highest point on the dado blade should be half the length of the sides or ends. Set the dado height as high as you can, but less than the thickness of the sides. Holding the end of the side against the board, slowly lower it onto the spinning dado blade. Shut off the saw before lifting it off.

Assembly

Assemble the supers using waterproof glue such as Titebond II and nail together with 6d 2" spiral thread galvanized siding nails or something similar Put in just enough nails to hold everything together then check for square. This is your last chance to square it up before the glue sets. Add more nails later Prime and paint the outsides.

Finger joints give home made hives a professional look. It's a good way to save money on equipment and increase your woodworking skills if you enjoy working in the wood shop on rainy or cold days. If you are a sloppy woodworker, your experience making and attempting to assemble finger jointed supers will make you appreciate the cost and quality of commercial equipment even more. BC

Hardware	Number	Dimension
Flat head wood screw (for guide pin)	1	8 x 1"
Flat head wood screws (fasten jig to miter gauge)	2	8 x 1 ¼"
Waterproof wood glue	1 bottle	
Galvanized spiral thread siding nails	24 per super	6d 2



Materials:

For finger joint jig	Material	Number	Dimension
Support board	Kiln dried hardwood	1	3/4" x 22" x 5"
Guide pin		1	3/8" x ¾" x 12"

For Hives	Material	Number	Dimension
Sides	Lumber any softwood or soft hardwood, kiln or thoroughly air dried	2	19 7/8" long by the desired width
Ends		2	16 ¼" long by the desired width

Peter Sieling operates Garreson Lumber Co., keeps bees in home made hives, and is the author of his book, Bee Hive Construction.

Centurion Beekeeper

"Still keeps around a hundred hives and produces over 7,000 pounds of honey per year."

Bob **Harrison**

Around age 65 Waldo McBurney of Quinter, Kansas began to take a serious interest in keeping healthy. McBurney took up running. Not only running but distance running. In the eighty-year old age group he set the Kansas State record for the ten mile run.

McBurney also competes in the World Masters Athletics championships. Last year the championships were held in Puerto Rico. McBurney ran in the hundred-meter dash and set a New World record for his class in the shot put by beating the standing world record by three feet!

McBurney is part of a study on longevity being conducted at Boston University School of Medicine and headed by Thomas Perls an expert on aging and the study director.

Certainly a certain amount of McBurney longevity can be traced back to genes but quite a bit also points to lifestyle. McBurney has never had a drink of alcohol or used tobacco. He seldom drinks soda pop or coffee.

According to Mrs. McBurney he is even tempered and never gets upset. A ritual with McBurney is the one-mile walk each day to his honey house and honey sales area in Quinter. He has a valid Kansas driver's license still drives but prefers the walk for excercise.

McBurney and his wife run around a hundred hives of bees. The bee business produces about 7,000 pounds of honey a year, which he and his wife extract, package and sell out of the honey sales office. Over the last few years the McBurney's have enlisted the aid of a local resident named Delbert Swihart which I also talked to.

Delbert said McBurney makes all the management decisions and all Delbert does is the heavy lifting. Hot or cold weather McBurney goes to work the bees with Delbert.

McBurney also tends a large garden every year. His diet consists mainly of vegetables, fruits, whole grain cereals, beans and legumes.

Longevity runs in the family. He has a living brother age ninety-five years of age. On his mothers side four have lived past ninety and two past eighty.

McBurney started life in a sod house on the Kansas Prairie. His daughter and daughter-in-law are helping McBurney with his book hopefully ready to go to the publisher later this year. The tentative title is "My First Hundred Years from the Sod House."

While doing the interview with McBurney I was amazed at the focus. Never did he drift from the conversation as older people do at times.

My interview with McBurney took place at the March 2004 meeting of the Kansas Honey Producers. He and his wife try to attend every year. He is also a member of the American Beekeeping Federation, American Honey Producers Association and the Northeast Kansas Beekeepers association.

McBurney has been able to handle both mites without problems by keeping up on research. I asked Gary Ross (retired Kansas State bee inspector) about McBurney. Gary and I have been friends for years and I have the utmost respect for his opinion. Gary said he has been to the McBurney bee operation many times. Gary has given advice and unlike many beekeepers McBurney listens and follows advice. In my opinion your state bee inspector can be a tremendous asset to a bee business if you ask for his help.

I learned a great amount of beekeeping through the years from our former Missouri State bee inspector Joe Franca

And try and work closely with our new state bee inspector Michael Brown.

As far as beekeeping goes I found out McBurney likes to sell his honey in Gallons. Cuts a notch in the top of his telescoping covers to match an inner cover hole for ventilation. Uses entrance reducers and likes to keep his equipment in good repair. He started beekeeping in 1926 but did not take the bee business serious until around 1950. Although most of McBurney's life has been spent around the farming lifestyle for many years he did income tax preparation at tax time which we all know is not an easy task when tax laws are always changing.

As I pulled out on the highway after the Kansas meeting I thought to myself I sincerely hope I can put the words of McBurney into a story worthy of one of the most amazing beekeepers I ever met! I watched with amazement when McBurney picked up his bee supplies from Draper's Super Bee of Auburn, Nebraska ran by Larry & Brenda Draper He was as happy as a kid at Christmas was. You could see the twinkle in his eyes as he talked about the prospects for an excellent honey crop in 2004. I think I have learned one of the keys to longevity is to look forward to each day and live each day to the fullest! Best of luck to Waldo McBurney during his second hundred years! BC

A Beekeeper's Primer On Navigating The Legal System

Syva A **Ezenwa, J.D.**

Our nation is governed by laws; laws that regulate virtually every aspect of our public lives. So it is not unusual for citizens to believe that their adherence to the laws will insulate them from any litigation. Not so. Why? First, because law is not an exact science; it is not subject to a single interpretation. Different courts may examine the same set of facts and come to different conclusions. Second, existing laws are constantly being amended, and new laws are being passed; conduct that is prohibited one day, might be allowable the next. And finally, legislators, when writing the laws, often use complex language; language that a layman may find difficult to understand.

For all these reasons, ordinary citizens (i.e., non-lawyers) are often confused and intimidated by the legal system, and are unsure of just where to begin when faced with a lawsuit. This is particularly true of beekeepers, because beekeeping is still – or is at least viewed as being – somewhat esoteric. As such, there are very few legislators, judges, and attorneys who are familiar with beekeeping and the laws that regulate it. This often makes it difficult for a beekeeper to find a knowledgeable attorney to represent him.

The solution? Well, for starters, any beekeeper in legal trouble should ask four basic questions: (1) What types of laws regulate beekeeping in my state or municipality and where do I find them? (2) How are beekeeping laws enforced in both administrative and judicial proceedings? (3) Do I need to hire an attorney to represent me? and (4) How do I find an attorney knowledgeable about beekeeping and beekeeping laws. The answers to these questions comprise four steps critical to a beekeeper's successful navigation of the legal system. Those four steps are described below.

Step I: Types of Laws Regulating Beekeeping and Where to Find Them

Beekeeping is regulated by statutory, administrative, and case law. Statutory law is the law generated by a federal, state, or municipal legislative body It takes the form of federal and state statutes and municipal ordinances. Administrative law is the law generated by administrative agencies, such as the United States Food and Drug Administration or the Environmental Protection Agency. It takes the form of administrative rules, regulations, orders, and decisions. Case law is the law generated by the judicial decisions on a particular subject. And those judicial decisions may interpret the various forms of statutory or administrative laws that regulate that particular subject.

Of course, a beekeeper cannot follow a law that regulates beekeeping unless he is aware of the law's existence. Therefore, the first step for a beekeeper to take in navigating the legal system is finding the laws that regulate beekeeping in his particular state and municipality and studying their requirements.

For example, a beekeeper in El Paso, Texas, needs to be familiar with the State of Texas and the City of El Paso laws on beekeeping; specifically, Texas Agriculture Code, Title 6 (Production, Processing, and Sale of Animal Products), Chapter 131 (Bees and Honey); and El Paso Municipal Code, Title 7 (Animals), Chapter 7.08.010 (Nuisances designated). In the Texas Agriculture Code, the beekeeper will find the rules for keeping bees and producing and selling honey; while the El Paso Municipal Code will inform the beekeeper that beekeeping is considered unlawful and a public nuisance when it prevents the lawful use of adjacent property or endangers personal health and welfare.

> "Ordinary citizens are often confused and intimidated by the legal system, and are unsure of just where to begin when faced with a lawsuit, this is particularly true of beekeepers."

State and municipal codes can be found in bound volumes at public libraries; at law libraries in law schools and courthouses; and at city or county buildings and offices, such as city hall, the city or county clerk and recorder's office, etc. State codes can also be found on the Internet at the websites of the individual states. However, Internet access to municipal codes is a bit more problematic, since small, cash-strapped communities are often unable to maintain a web pres-

Continued on Next Page

"Statutory law is the law generated by a federal, state, or municipal legislative body. It takes the form of federal and state statutes and municipal ordinances."

ence, and when they do, may choose not to post their municipal codes online.

Official state websites are located at www.[name of beekeeper's state].gov (e.g., www.texas.gov); while a general Internet search of the name of the beekeeper's city or town should generate a link to that city or town's website, if one exists.

Step II: Enforcement of Beekeeping Laws

There is no single method of enforcement of beekeeping laws; each state has its own administrative and judicial procedures. Therefore, the second step for a beekeeper to take in navigating the legal system is finding out how the beekeeping laws in his particular state and municipality are enforced.

For example, the beekeeper from El Paso, Texas, should again refer to Texas Agriculture Code, Title 6, Chapter 131, which, in addition to rules for the keeping of bees, also contains procedures for enforcing those rules, and civil and criminal penalties for non-compliance; likewise, for El Paso Municipal Code, Title 7

Despite the enforcement procedures varying from state to state, they typically take place in either an administrative or judicial proceeding. And though such procedures are ultimately carried out by the state or municipality, state or municipal officials are usually alerted to potential violations of the laws through complaints of neighbors and adjoining property owners.

Enforcement of Beekeeping Laws in Administrative Proceedings

If a state or municipality suspects a beekeeper to have violated a particular law, the state or municipal official or administrative agency responsible for enforcement of that law may serve the beekeeper with written notice of the violation. Such notice will likely contain both an order to stop the violation and an opportunity to appeal the order by requesting a public hearing within a certain number of days of receiving the notice. If the beekeeper requests a hearing, he will be notified of its time and place.

At the hearing, the beekeeper will be expected to present evidence as to why he is not guilty of the alleged violation, and he is entitled to engage the services of an attorney to represent him. Evidence may also be heard from any other party affected by the proceedings. After hearing all the evidence, the state or municipal officer or administrative agency will make a final determination.

Any final determination made by the state or municipal officer or administrative agency that is adverse to the beekeeper may be appealed to a court. Courts generally require that all administrative remedies be exhausted before they will hear a case. In other words, all forms of administrative relief provided for in the beekeeping laws must be pursued and denied before a judicial appeal is allowed.

An attorney is best able to examine the record and transcript of the public hearing for any procedural or substantive errors that would justify the time and cost of an appeal.

Enforcement of Beekeeping Laws in Judicial Proceedings

If a state or municipality suspects a beekeeper to have violated a particular law, the state or municipal official or administrative agency responsible for enforcement of that law may bring a civil action against the beekeeper in a trial court. The civil action will likely seek to enjoin or stop the beekeeper from violating the law; and the state or municipal official or administrative agency will be represented by the state attorney general or the city or county attorney.

Since violations of the laws regulating beekeeping are typically classified as misdemeanors, a state or municipal official or administrative agency responsible for enforcement of those laws may bring a criminal action against a beekeeper in a trial court. The state or municipal official or administrative agency will be represented by the state attorney general or the city or county prosecuting or district attorney. Misdemeanor violations of beekeeping laws are punishable by fines, or perhaps even imprisonment, as determined by a judge or jury.

Any final ruling made by a trial court in a civil or criminal action that is adverse to the beekeeper may be appealed to a higher or appellate court. And again, an attorney is best able to examine the record and transcript of the trial for any procedural or substantive errors that would justify the time and cost of an appeal.

Step III: The Necessity of Hiring an Attorney

Before a beekeeper decides whether to hire an attorney to represent him in either an administrative or judicial proceeding, he must first consider whether the cost of an attorney is a financial risk worth taking in light of the benefits of having the attorney's expertise and experience on his side. This decision is the third step for a beekeeper to take in navigating the legal system, and the answer may differ depending on the strength of the state or municipality's case. That being said, hiring an attorney is generally a good idea for the following reasons:

- An attorney can understand and interpret the legal jargon that appears in beekeeping laws, and can give the beekeeper's case a solid legal foundation.
- An attorney can assess how best to bolster a beekeeper's case with documentation (e.g., permits, certificates, etc.) or expert testimony (e.g., apiarists), and can compile the documentation or retain the necessary expert.
- An attorney may be able to negotiate a settlement in a civil action or a plea bargain in a criminal action.

- If a state or municipal officer or administrative agency or trial court decides against a beekeeper, an attorney can examine the records and transcript of the public hearing, or of the trial court, for any procedural or substantive errors that could be raised in an appeal to a higher or appellate court. An attorney can also advise the beekeeper of the likelihood of success of an appeal; and can either handle the appeal for the beekeeper, or else recommend another attorney who specializes in appellate law.

Step IV: Finding a Knowledgeable Attorney

Once a beekeeper has made the decision to hire an attorney, the next hurdle is finding an attorney familiar with beekeeping and beekeeping laws. So finding such an attorney is the fourth step for a beekeeper to take in navigating the legal system.

Because bee law is an area of legal practice that is neither common nor lucrative enough to entice many attorneys to engage in it, beekeepers in legal trouble may end up educating their attorneys, not only about the basics of beekeeping, but also about the applicable beekeeping laws. This is certainly not cost-effective if the attorney is billing the beekeeper by the hour

Fortunately, there are resources available to the public that can help a beekeeper locate a knowledgeable attorney in his community, including the following:

- **Martindale-Hubbell** – Martindale-Hubbell is a comprehensive, nationwide directory of lawyers and law firms. It can be found in several bound volumes at public or law libraries and on the Internet at **www.martindale.com**. It categorizes lawyers by name, firm, location, areas of practice, etc. And although bee law is not listed as an area of practice, beekeepers can search for lawyers in their communities that practice in related areas, such as agricultural law If involved in nuisance or zoning disputes, beekeepers can search for lawyers who practice in the areas of real estate law or zoning, planning, and land use law.
- **State and local bar associations** – State and local bar associations often run lawyer referral services. Such services match potential clients with lawyers who practice in the area of law coinciding with the client's need. These associations are listed in the Yellow Pages.
- **Yellow Pages** – Yellow Pages list attorneys, not only by name and firm, but also by areas of specialization. Again, bee law will most likely not be listed as an area of specialization. However, beekeepers can contact lawyers who practice in related areas, such as animal law or agricultural law If lucky, one or more of them might have previously handled a bee case.

"Before a beekeeper decides whether to hire an attorney to represent him in either an administrative or judicial proceeding, he must first consider whether the cost of an attorney is a financial risk worth taking in light of the benefits of having the attorney's expertise and experience on his side."

Conclusion

Navigating the legal system is not easy; particularly for beekeepers who may – because of their chosen occupation or hobby—experience unique difficulties in finding attorneys knowledgeable about beekeeping and beekeeping laws. However, these four steps will hopefully make the process much less daunting. BC

Sylvia A. Ezenwa is a Texas licensed attorney and freelance writer based in Superior, Colorado.

The information in this article is not intended to constitute legal advice. Please consult an attorney regarding your specific situation.

Jm **Ovbey** & DuRant **Warwick**

DOWN IN SMOKE

Being a Hobby Beekeeper has its advantages. You can try things with your bees from time to time and no one really notices or cares. My friend DuRant and I do just that on occasion. Sometimes what we try works and sometimes . well, let's not talk about it. We both have nine to 12 hives most of the year, but it varies due to swarming and overwintering success. We have three hives with Russian Queens and the others have Italians. We are trying to determine if there is any significance in the *Varroa* mite population between these Russian hives and those Italians. We both live close to our beeyards and we can visit them often. In the Winter we go around once a month and in the Spring and early Summer we are there every couple of days to a week.

Last Spring I purchased screened bottom boards for all my hives. I had read how well they were supposed to help with the control of *Varroa* mites. DuRant also purchased several but being the "conservative soul" he is, he wanted additional confirmation before he purchased more.

We do medicate our bees for the various common ills, quite sparingly I might add.

DuRant slid some stiff plastic sheeting under the screen board in order to collect anything falling through the screening to the ground. Before inserting the plastic, he sprayed it with a vegetable oil used to prevent food from sticking to a pan. He removed the plastic the next day and, much to his dismay, there were a significant number of mites on the tray, enough to dictate that treatment was appropriate. We also did the same procedure to one of my hives and found that the mite infestation was not as great, but was significant. Both hives met the "threshold."

We wanted to try some "home remedies", and decided that smoking the bees, using a variety of materials, would be something we could do with a somewhat layman's approach. We decided to try pine straw from local trees, commercially packaged cedar shavings (no chemical additives) for pet bedding, and dried staghorn sumac berries that we had gathered from wooded areas close to our beeyards. We had gathered and dried the berries the previous Fall.

In order to add a bit of scientific credibility to this saga, we numbered the hives and plotted their location on a chart. As mentioned earlier, we had already installed the screened bottom boards. Within several days a reading of the mite population, utilizing the plastic sheeting sprayed with vegetable spray, was made again. I used a marking pen to draw off a grid on each plastic sheet which enabled me to count mites more accurately. I'm gling to purchase a hand-controlled counter too. I also used a hand-held magnifying glass so I could see the mites more readily.

Our first reading was made without smoke, just counting mites that fell off the bees due to grooming, etc., and onto the board to die within a 24-hour period. After

Sumac flowers in late Spring and early Summer.

counting we realized that we were at the threshold on most of the hives. We chose our first treatment: pine straw smoke. With the smoker producing a robust cloud of smoke, we gave each brood chamber seven slow, long puffs of smoke, and quickly closed the inner and outer cover The bees, I am sure, did not appreciate this and immediately began to disperse the smoke. The effects of the pine smoke on the mites were noteworthy, ranging from a low of 70 to a max of 90 mites in the 24-hour span of time.

Mite reduction seemed to occur with pine straw, but could we find something better? After taking the count and recording the results, we cleaned the plastic sheeting, waited for three days and returned to the beeyard. The three-day wait was to give the mites an opportunity to replenish themselves in order to present a somewhat equivalent count of mites for each smoke encounter

We followed the same procedure as before except this time we used cedar shavings in the smoker. This is the product that I have been using for quite sometime. The chips are easy to start and keep going, last a relatively long time, and give off bountiful clouds of pleasant-smelling smoke. After a 24 hour period, the trays were removed and mites counted. The cedar smells good, and, I might add, helps quiet the bees when they are excited...but it is not very effective when it comes to eradicating mites. In fact, the range was from eight to 20 mites from the nine hives.

Lastly, we used the sumac, again after the three-day interval. The berries were not the easiest things to get started. I shredded up newspaper and placed it in my smoker Using the lighter, I got a little fire going and then added several clusters of berries. Once they became hot, they started to smoke.

We placed the cleaned plastic sheets (sprayed with vegetable oil) in the bottom of each hive, and began the smoking procedure of seven slow puffs of smoke. We left the trays for 24 hours and then removed them for the count.

We were amazed at the results! The count went from an 8 to 20 mite range all the way to a range of 124 to 220.

DuRant had one heavily infested hive that had a count of 394 dead mites in a 24-hour period using the sumac treatment. After seeing the positive results, we continued to smoke each hive every three days until all were below the threshold level.

This little study indicated to us that we could have some effect on the mite population by utilizing particular smoker fuels, and that sumac appeared to have the most significant effect with regard to the fuels we were using.

Staghorn sumac is quite prevalent in wooded areas around Georgia and also is found throughout most of the eastern U.S. You have to locate and harvest the sumac and let it dry for a short period (approximately a week) before using it, but, after that, it works fine. We surmised also that this did not have to be a primary fuel and could be used every third or fourth visit to the bee yard and still keep the mites in check. We will have to do more investigating to verify this theory.

What does staghorn sumac look like? It is a rather stalky, tall bush with antler-like limbs and long narrow leaves, mainly at the top of the bush. It has an umbrella effect. In late Spring to early Summer the bush flowers at the top (honey bees love these flowers). This cluster of flowers forms into a conical shape. The limbs and fruit have a fuzzy appearance; thus, the name derivation: staghorn. The berries form later. At first, they are a light green, later nearly pink, and toward Fall they ripen and turn dark red. The leaves do the same. The berry clusters are easy to harvest. We cut the berry clusters from the bush and keep them in a paper bag. The bag protects the rather fragile berries, so they don't drop from the cluster BC

Berries are at first pink, ripening to a fuzzy dark red color. Pick, dry, burn and drop mites.

Here's a safe, easy way to reduce mites in your hives without chemicals.

Getting By . . .

"Beekeepers do not measure their success by bumper crops, which occur but rarely. Their true standard of success is determined by the average yield per colony over a period of years."

– Brother Adam, in *Beekeeping at Buckfast Abbey, 1975.*

Over the Summer I drove through parts of the Great Lakes area, into the "heartland" of Kentucky and Tennessee, and went north up the Shenandoah Valley to return to New England. I intentionally took state roads through large sections of Ohio, where I was once extension bee specialist, and through Western Michigan, where I was a boy and later a graduate student doing pollination research. I then drove south through the length of Indiana, using the interstate as little as possible.

The travel reinforced how much beekeeping has changed in these regions. There may be only 20% of the people keeping bees, as were doing so in the 1970s when I promoted beekeeping through Ohio State. Of course, there are still large sections of open space, planted to corn, soybeans, but many areas of former farmland now support houses and businesses. In some areas there were nearly sections of alfalfa, cut for hay before it blooms. The sweet clover was limited to roadsides and freshly disturbed fields. Basswood bloomed in towns and cities along the streets, but was rarely spotted in the woodlots.

Clearly, the past two or three decades have not been easy for beekeeping as either an industry or as a hobby. Not one HONEY FOR SALE sign caught my eye during 2800 miles except for three beekeepers I was visiting. Not one sign from Traverse City, Michigan to Nashville, Tennessee back to middle Connecticut! There are clearly fewer beekeepers, and many fewer selling honey to the public. A few roadside markets had honey, but often a single producer in a single size.

We, of course, can blame the mites, the hive beetles, and the consequences of modern life. Who leaves honey by the road anymore for neighbors to leave their coins and bills in payment? I am sure some do, even today. I just did not see one of them. And who has time to run a honey-at-home sales operation, with the added traffic, liability and safety issues?

From the early 1970s to 2004 we have moved from minimal chemical management culture to an intense chemical dependency for mite and disease control. Both American foulbrood and *Varroa* mites have developed resistance to one or more chemicals. We are making progress toward bees that **tolerate** mites at low levels (**resistance** is the term which is often used, but is incorrect to describe for what we see in our research reports). By selecting for various genetics, we now have bees that tolerate mites by biologically delaying mite development (SMR), by cleaning the cells of developing mites (hygienic behavior), by biting mites through grooming behavior, and by other traits or behaviors. USDA has traveled to Russia to introduce 'resistant' (=tolerant) stocks, and it appears we have made amazing progress against *Varroa* over the past decade.

In the 1970s beekeepers were primarily concerned with foulbrood, wax moths and disappearing disease. Under those threats it was possible to develop a colony manipulation scheme that allowed for a gradual improvement of colony performance. This growth was both gradual and highly variable – a lot like the stock market – but the overall trend was generally upward. This growth was due to greater efficiencies of beekeeping and better use of nectar flows. Beekeepers spoke of the key to success as "location, location, location" as the sole and dominant part of their beekeeping practice. Trucks loaded with bees moved into nectar-rich areas and back again. This still continues today, perhaps more than ever commercially.

Larry **Connor**

. . . IS NO LONGER GOOD ENOUGH

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In about a week after the empty supers were added, with the nectar flow underway, extracted combs had been repaired and nectar stored.

The opening quote by Brother Adam reinforces a key principle of beekeeping for many commercial beekeepers: operating the same number of colonies in the same general locations, while gradually improving average honey yields. Many beekeepers did and still operate with this as the key to growth and success in their operation. This was true of commercial beekeepers and of serious hobbyists. I suggest it is time we return to that guideline.

[Certainly, there are variations to this rule. One may work to produce the largest profit per hive, or at the lowest cost or a combination of several goals.]

Brother Adam and his staff at Buckfast Abbey did not move many bees for nectar gathering. Their locations were largely permanent. He also wrote:

"I have to point out that South Devon is no bee paradise. Our rainfall averages no less than 65 inches, and is one of the highest in the British Isles. Only the most intensive form of beekeeping will, in such environmental conditions prove profitable."

Editor Flottum tells me that many *Bee Culture* readers have kept bees for a decade or more. Some of you have identified yourselves during my travels, and I thank you for acknowledging these words. I know many of you to be serious, focused and innovative individuals. I know many of you have production records dating back to the very first beehive you purchased.

Based on my very unscientific study of ***beekeeper behavior***, I have several observations I dare make about your beekeeping activities:

1. You know which yards support certain nectar flows, although it is never exactly the same. You know that while some yards are in the middle of a nectar flow, others are in a holding pattern, waiting for something to hit.
2. You probably have abandoned certain locations because they are constantly a disappointment. You tried fewer hives, but maybe the fields have wooded over, or the farmers no longer grow what they once did.
3. You carefully observe what farmers are planting and how they manage their farms. Which farmers let the alfalfa bloom at the end of the season (after the final cutting)? Where is there a diversity of plants for Spring buildup and crops for honey flows?
4. You have yards near organic farms, farms owned by the Amish or the Mennonites, where the crops seem stronger and lusher–perhaps because they have lots of robust, pastured animals producing natural fertilizers.
5. You know which local towns and villages have an enlightened approach to landscaping their roadways, walking/bike trails and parks; where basswood and other nectar producing trees were planted a generation ago and are now producing a nectar flow for the local beekeepers. [Tell me; is the daylily the most commonly planted perennial grown east of the Mississippi River?]
6. You have colonies headed by queens (and their daughters) from a variety of queen stocks, including Russian, SMR, Carniolan and others. You have a few colonies you trace back to survivor colonies you found alive in yards otherwise destroyed by mites.

As a rule, beekeepers today seem a bit brighter, better informed, and more willing to try things than beekeepers 30 years ago. Some of you are just as secretive and stubborn as ever The rest of you I learn from because you are eager to share your experiences.

We must all ask ourselves – Are we doing the best job we can with our bees? If we apply Bro. Adam's *Rule of the Golden Mean* to our operation, how can we change our practices to improve our average production?

W*hat else* can we change to improve production? I have no secrets,

"As a rule, beekeepers today seem a bit brighter, better informed, and more willing to try things than beekeepers 30 years ago. Some of you are just as secretive and stubborn as ever."

but here are a few suggestions:

1 ***Be systematic about trying new stocks and management methods.*** Learn and use the scientific method for making observations. Use two groups, a **control** that stays the same, and a **treatment** or test group that includes the stock or item to be tested. **Equalize everything to remove all other variability.** Unless you have a background in statistics, do not compare two or three things at a time, or you may not be able to see what was responsible for any differences. Here is an example: If you purchase new queens for testing, don't compare them to old queens in established colonies – compare them with your old strain, but use new queens from the old strain, and compare them in the same yard locations and in identical colonies. Eliminate variability as much as you can. If I want to compare Russian queens with my survivor stock, I could do it this way:

a. I obtain a Russian breeder queen and graft queens from her[1]. At the same time and using the same colonies I also graft queens from my best survivor colony.
b. I install the queen cells into 5 frame nucs[2] I make up midsummer
c. I feed the colonies and build them up during the rest of the season, feeding as necessary, but doing it equally.
d. Keep equal numbers of both stocks in each apiary where you are running the test. If you obtain 18 queens laying in colonies from both the Russian and the survivor stock, then divide them into two or three yards when you set them out. This way you will have either nine or six of each stock in each location. Position them randomly to minimize drifting.
e. Make observations (keep records) on how well the stocks Winter, how they build up during the Spring, if any swarm, compute the honey production either by colony or by yard (weight of the supers filled and after extraction). Note if there are any significant differences in stinging behavior (you will likely feel the difference before you collect any data!), and record mite populations using the same sampling method.
f. If you treat with a chemical (I ask WHY if you are trying to develop tolerance?), treat all the colonies.
g. Test all colonies the same. Use the same equipment.
h. Compare the final results both statistically and realistically. If all colonies from one group are always more productive, you don't need statistics do you? If you find a great deal of variation within each apiary and from yard to yard, it will be more difficult to reach a usable conclusion.

"The addition of drone combs into colonies that are from a particular stock (Russian, SMR, hygienic, etc.) will help to flood an area with drones of desirable genetics."

When finished you will have some very valuable information, especially if you have a number of apiary locations with side-by side colonies for comparison with same-aged queens in the same locations. If you repeat the study year after year, you will soon learn which stock is better (although you will now have another dimension added to the picture: the drone supply may now be a mixture of all your neighborhood drones).

2 ***Understand how bees mate, how drone congregation areas operate and why queens do not mate with the drones you intend them to find.***

During a trip to a beeyard recently, I saw newly produced nucs

White sweet cover on the left and hairy vetch on the right, left by the farmer for the bees, provided valuable forage.

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[1] Not all beekeepers are queen producers, or have time to raise queens. Using young purchased queens will probably provide valid results, but does add one more variable to the test. Generally, the larger the number of bees and colonies, the more useful your observations will be.

[2] The size of the unit is not important. What will grow and develop so it will over winter in you area? If five frame units will work, use it. If you need to make larger colonies to ensure survival, then use them.

containing virgin queens that apparently were to mate with the drones in the yard. In fact, the nucs seemed to be placed very close to the colony whose drones seemed to be the target of the beekeeper's mental mating. Maybe I misread the arrangement. Maybe the beekeeper liked to add frames of brood and bees to boost new colonies, and by keeping them close to the strong colonies it was easy to boost them.

Nature fights inbreeding whenever possible. We have a growing mountain of evidence that shows that a virgin from a particular colony is **NOT LIKELY** to mate with drones from her parent colony. Any brother-sister matings increase the chance of inbreeding.

We know that drones and virgins go to **drone congregation areas** that develop naturally near apiaries, but rarely in them. In fact, they may be a mile away from the parent colony, or more. There is some evidence that they develop along natural features in the landscape. They persist from year to year, yet drones do not.

In the DCAs as they are called, drones patrol 30-50 feet off the ground while searching for virgin queens. Detection is by eyesight and detection of the queen's pheromones. (Remember, drones have the largest eyes). Drones fly in a comet-shaped pattern, and a lead drone is often the one to mount the queen, mate and be cast aside as another drone mounts and mates the queen. She will mate with 12-20 drones in a matter of a few minutes.

The drones in these DCA's have traveled miles to congregate, and the virgin queen may not stop at the closest DCA for her mating. This ensures out-crossing.

It pretty well eliminates any hope of a beekeeper controlling a particular mating. Certainly single colony beekeepers, which have no chance of controlling mating unless they put their hive near a larger operator with a certain stock of bees.

Beekeepers with hundreds or thousands of colonies are in a position to influence the average mating – dealing with a population of queens but not any one specific queen – by saturating the areas with drones from a desirable source or two. The addition of drone combs into colonies that are from a particular stock (Russian, SMR, hygienic, etc.,) will help to flood an area with drones of desirable drones. Just as important, these beekeepers can prohibit some colonies from entering the DCA's by pulling drone comb, destroying drone brood, and otherwise discouraging drone production in non-desirable colonies.

I have often wondered why area beekeepers do not cooperate in a general mating area, where drones of certain stocks are produced in large numbers by many beekeepers and mating nucs and increase colonies may be mated over the season. It sounds like a nice bee club project, but the pitfalls are many and need not be listed here.

3. *Don't be afraid to leave a location which fails to produce honey for you.*

If you have kept a dozen colonies in a location and watched honey production drop over the past few years, there may be a very good reason why this is happening. Nectar forage changes over time. I need to tell you about my observations on spotted knapweed (often called star thistle) (*Centaurea maculosa*) in Michigan.

This is an immigrant plant, and it spread into my parent's farm near Kalamazoo Michigan during the early 1950s, and, combined with the sweet clover in the waste fields and roadsides, produced an excellent honey. (I still think all honey should taste like this). I have photos of fields lavender with the bloom—a very rich pollen and nectar source for bees.

Over time, some open fields near the family farm became woodlots, other fields are now lawns, and my mother has mowed nearly every plant on her farm as part of growing Christmas trees (a wiry, woody herb, spotted knapweed will deform a young pine trees).

Now there is apparently an insect pest of knapweed that feeds on the 'boll' of the flower (the base of the flower) and interferes with both nectar production and reproduction. After 50 years, the invasive plant is no longer as successful as it once was.

Maybe spotted knapweed is still a fantastic nectar plant in your area (it has a huge range). But if it does not produce the yields you saw 10 years ago, it may be time to move the yard.

I do not suggest you invite a new weed into the neighborhood[3] We seem to have our share of them.

If you do not understand what happens in nature, attend a program on *ecological succession*, where open fields turn into mature woodlots. I see that happen in lots of the farmland, at least the parts that escape being turned into lawns. Instead, learn to recognize the first stages of such a process (like abandoned pastures lush with goldenrod bloom) and move colonies into those areas for forage.

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[3] The new dominant plant I saw in much of Ohio and Michigan is an old forage plant, hairy vetch (*Vicia villosa*), a member of the pea family. Usually kept in check by a seed-dwelling beetle, there was more vetch in bloom on my trip than I have seen in my life of looking.

AFB Beyond Academic Discussions – Real World Questions & Answers

James E **Tew**

To make wise decisions about AFB you need to know more about what it does. The pathology comes next.

First of all...

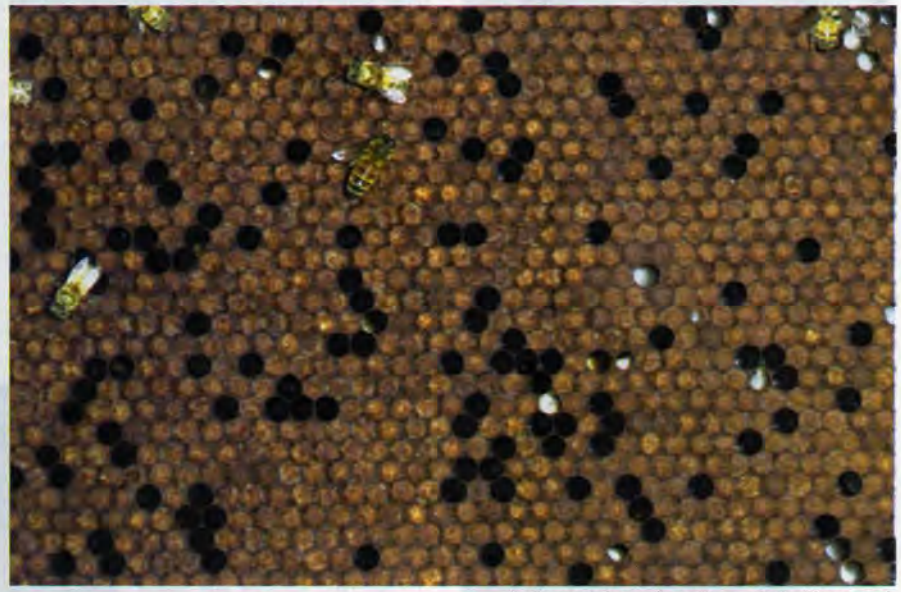
Before I write another word, I must insist that you follow your state's honey bee inspection laws. States vary in their strictness and regulatory enforcement. Don't hope to use the argument that you read something I wrote as your defense when you are facing your bee inspector with a case of AFB.

American foulbrood characteristics

Specific characteristics describing American foulbrood are in every bee book; in fact sheets; on web pages – in essence – if it is an in-depth discussion of beekeeping, AFB will get some of the discussion. This bacterial disease seems to have been around since bee-time began. If you need basic information concerning American foulbrood (AFB), look at the USDA's web page at: http://www.barc.usda.gov/psi/brl/bd-amfb.htm or http://maarec.cas.psu.edu/beeaware/Dis_Info/Brood-Dis.html. For written information, review the American foulbrood section in *Honey Bee Pests, Predators, and Diseases*[1] In this particular article, I would like to try to discuss the beekeeper and bee ancillary attributes and anxieties of AFB rather than the traditional pathological discussions.

Where did your first AFB case originate?

Sometimes you know, sometimes you don't know, sometimes you *think* you know from whence a new AFB case originated. Sloppiness in a bee operation and bee diseases always seemed to be linked.



A decent brood pattern, but diseased.

Though it appears logical to assume that a messy operation has more disease than a clean operation, I really have no conclusive proof to support that notion. Even so, clean beekeepers are quick to suspect the more messy beekeepers among us as being the AFB source. Maybe or maybe not. Suppose the messy beekeeper is the source of the present AFB outbreak. Did the disease just spontaneously generate in his operation or did he, in turn, get it from yet another messy beekeeper? So where does a new outbreak come from – a long string of messy beekeepers?

I'm not a pathologist and I don't want pathologists beating up on me, but it appears that AFB spores are present in our hives more often than we realize. Sometimes a susceptible colony succumbs to the spores that are present and the disease gets a foothold. But clearly, robber bees do get into trouble visiting other diseased hives – possibly from messy beekeepers. I sus-

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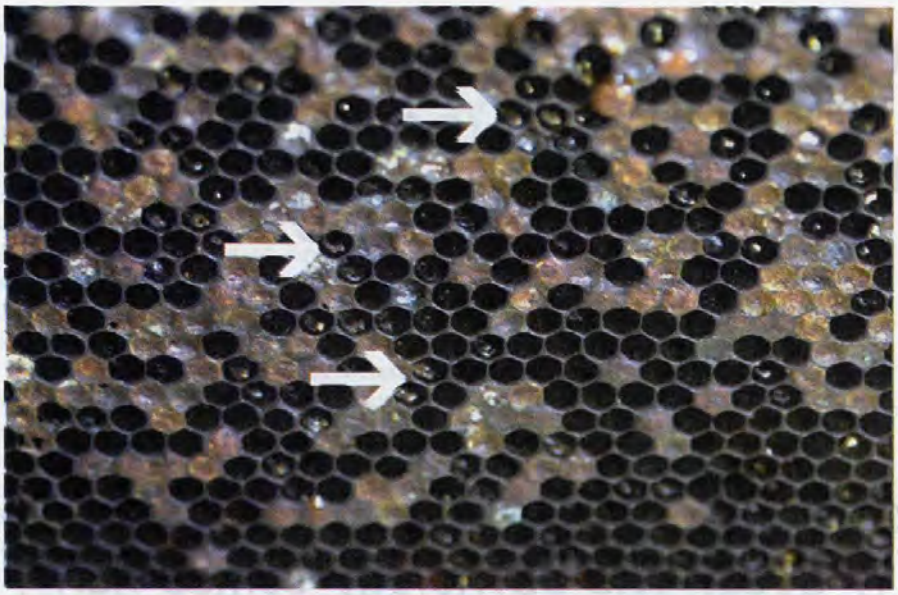
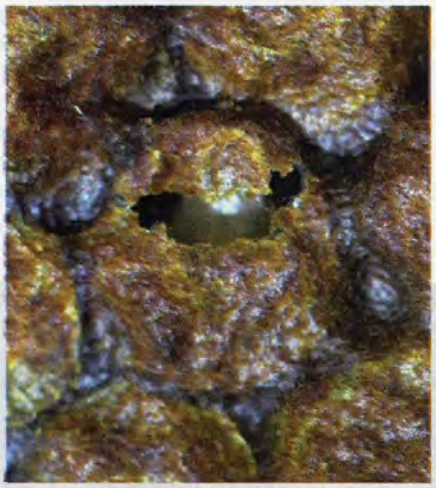
[1] Morse, R.A., Kim Flottum. 1997 Honey Bee Pests, Predators, and Diseases. 3rd edition. A.I. Root Company. Medina, OH 718 pp.



This colony has a serious AFB infection.



A ragged hole in the cappings indicating AFB.

The ropey phase of AFB.

pect that our hives are exposed to AFB far more than we realize.

Do all AFB infested colonies die from the disease?

No, occasionally, a hive seems to recover Or did I just misidentify the disease? No doubt I do make identity mistakes, but I am sure that some colonies do recover without any assistance from me. But you can't tell which colonies will recover and which will break down into a raging case of AFB. Most of the time beekeepers are playing with fire when they baby an AFB colony, *hoping* that it will recover

If one hive gets AFB, all hives in the yard get it, right?

Maddeningly, no. All colonies within the same yard do not necessarily come down AFB just because others in the same yard do get it. These disease-free colonies clearly have some kind of physiological resistance or, at least, blind luck. Again, you can't tell which colonies will get AFB and you can't tell which colonies will recover.

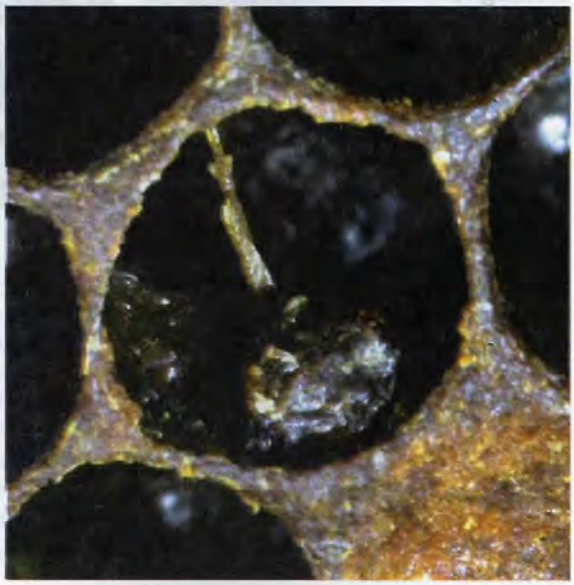
Now stay with me on this point. You have a colony in your yard that has AFB so you destroy it. How much confidence do you have in the (apparently) uninfected survivors that are still in the yard? Are they carriers for future outbreaks? Will some of these uninfected hives come down with the disease a few weeks or months later? I don't know and neither do you. You need to develop your own opinion on the prophylactic use of antibiotics.

A spotty brood pattern is a dead giveaway. Right?

Probably, but how spotty? Sometimes it's just a poor queen causing the spotty pattern problems. Sometimes a good queen and bees with some hygienic behavior are able to restrict the AFB outbreak, but not eliminate it.

The pattern in the figure is a decent pattern, but AFB and other possible diseases are present. Will this colony recover or get worse? I don't know. To treat or not to treat? That will be my question.

In the second photo, the pattern is clearly worse and AFB is more advanced. The comb is darker; many of the cappings are sunken. And then there's the odor If you know what you are looking for, scales are visible. The arrows show



The pupal tongue of a larvae killed by AFB.

examples of scales. This colony is in serious trouble and will probably not recover. At the very least, the brood frames should be destroyed.

Punctured cappings.

Ragged, punctured cappings are a feature of AFB. With a punctured capping every here and there, you are only suspicious; but with punctured cappings being commonly seen, you can be reasonably certain that this particular hive has a major problem. In early stages, the prepupa inside the cell may appear to be healthy. But in reality, the pupa is already near death.

The ropey phase.

As the dead larvae pass through degradation phases approaching the scale phase, they go through a phase colorfully known as the "ropey" phase. At this particular point, the putrefying tissue will have a mucilaginous texture and will string out about 1 – 1 ½ inches.

The ropey stage does not last too long and to make matters worse, some of the pupae will rope less than an inch. You will need to try several to determine an average length of the string.

The pupal tongue phase.

As tissue degradation occurs, the pupal tongue, which had begun to form just as the pre-pupa died is clearly visible. This feature is not present in all dead larvae, but is an unmistakable feature of AFB.

What to do with all this information?

I should have a clear AFB personal policy at this time in my bee career. In fact I suppose I do, but it seems to be changing. To newer beekeepers, it is a good thing if AFB terrifies you. This disease is highly contagious to susceptible bee strains and may infect colonies beyond the home yard. Before you attempt to treat this disease have a firm foundation in general beekeeping principles. Most of the time the hive should be destroyed. But you just never know. Sometimes, it can be turned around – at least for a while.

When to burn, what to burn, how much to burn?

I wish there was a standard answer for those short, but important question. In some cases one AFB infected cell = one fire. In other cases antibiotics will be used for years to suppress the vegetative stages of American foulbrood. The ultimate answer, ultimately, is up to you. What do you want to do? Is the equipment new or newish? Really hate to burn that, don't you? If it's old, used up equipment, send it up in flames. Brood frames? I would simply burn all of them. Outer covers, bottom boards, inner covers? The fate of this equipment remains with you, also. Is equipment such as this a source of future infections? Though remote, there is a slight chance. But, if you destroy this equipment do you eliminate all risks of AFB? No, you don't. You could destroy the equipment and still have your colonies exposed to the AFB pathogen that initiated all of this.

"Identification is critical to control. Learn the signs of trouble."

This is just my procedure. You work out your own procedure. I burn all old equipment or anything needing repair that is AFB infected. I generally burn all brood frames. I don't scorch the insides of hive bodies or supers and I don't otherwise try to sterilize the equipment with gasses, steam, lye, hot paraffin dips, or any of the other things beekeepers have tried through the years. Simply, most of these processes are too much work only to have the disease turn up again. It's not always an easy call and short of burning every bee thing you own, you still won't have a guarantee that AFB won't turn up in the future.

Shaking bees to combat AFB.

Shaking bees to control AFB is much like taking bees from the wall of a house. We should all try it one time and get it out of our system. You probably can, however, set back AFB or even eliminate the present outbreak by shaking all the bees onto new equipment. In most cases the shaken colony will require intensive feeding to get comb built and preovision the colony with winter stores. If you use Terramycin, feeding the colony this antibiotic may help restrict the disease, but it may not be necessary. The basic premise behind the concept is that the AFB spore-infested nurse bees are required to use up all of their internal food stores without having brood to feed. All of the brood combs have been removed so the primary source of infection has been eliminated.

I readily shake bees and destroy the remaining equipment if the bee population is great enough and if enough of the season remains to feed the bees sugar stores in preparation for Winter But there is a significant point to be considered – if the shaken colony came down with AFB once, why will it not come down with the disease a second time? It probably will. Shaking the colony onto new equipment will not make the colony AFB resistant. That means that in a few months, you could be burning more frames and shaking more bees.

What I've been trying to say.

There is no sin in finding American foulbrood in your colonies. It happens. If there is a sin, it is in not being able to recognize the disease, allowing it to run rampant through your hives, potentially causing your beekeeping neighbors problems. If there is yet another sin, it would be to find AFB, try to treat it, blotch the treatment and make matters worse.

AFB is here to stay. Recognize it. Respect it. Treat it or burn it, but do not ignore it. It will make your bee life real messy. BC

Dr. James E. Tew, State Specialist, Beekeeping, The Ohio State University, Wooster, OH 44691, 330.263.3684, Tew.1@osu.edu; http://www2.oardc.ohio-state.edu/agnic/bee/ ; http://beelab.osu.edu/

New Reads For The Fall –

Bad Beekeeping, by Ron Miksha. 302 pages, black & white, soft cover Available from Ron Miksha, 324 Cedarille Cr SW, Calgary AB, Canada T2W 2H7, $25US or $30Canadian.

Don't for one minute associate the word bad with anything about this book. The author suggests that the way he kept bees was bad, as in not very good, but don't believe it.

Ron learned beekeeping on the family farm in Pennsylvania, kept bees in Florida (where his brother Dave still raises queens) and Wisconsin. But it was the promise of a 200 pound average in Canada that led him to Saskatchewan. In between were dozens of beekeeping adventures – truck rides that would scare most of us to death, beekeepers from mythology and dozens of entertaining weeks, days and moments.

But the best part of this book is the perspective offered from a commercial beekeeper behind the closed Canadian border We seldom hear both sides of this nearly 20 year debate, and even less often the gritty stories of the results of that decision.

Since Ron has roots in both the States and Canada he offers a unique look at what happened, why it happened, and what, perhaps, should have been done.

From the perspective of a good read, there's nothing better available, but *Following The Bloom* is close. There's more beekeeping on these pages than any book you'll find. And there's more about beekeepers' families, and the family of beekeepers everywhere than imaginable.

Ron didn't survive the border closure and the years-long drought, and moved on to a successful career as a geophysicist.

A good profession, he says, but not as challenging, as interesting or as fun as beekeeping.

There's no doubt this book will be one of those historians will use to document the beekeeping industry in North America. I don't think that was the initial purpose of Ron's book. He even said so a few times. He wanted to show how to not keep bees so others would be successful.

Instead, he certainly showed governments some things that perhaps they will learn from. Maybe.

The Honey Bee, Inside Out, by Celia F Davis. 160 pages, soft cover, color photos and drawings. Available from Bee Craft Limited, Stoneycraft, Back Lane, Little Addington, Kettering, Northamptonshire NN14 4AX, for $45.50US, includes shipping and handling regular mail or $50 for airmail.

This book is designed to present detailed information about the anatomy and physiology of the honey bee in a clear and concise format. Each of the chapters covers an aspect of bee biology and all are copiously illustrated. The author has drawn most of the diagrams from her own dissections, giving a realistic rather than idealistic impression of the parts involved.

The sections are: External bodywork; Internal workings; Control systems; Breeding; Growing up; Keeping it all together; Colony reproduction; Inside and outside influences.

Also included are an appendix giving the background to scientific terminology, a wide-ranging glossary including phonetic spellings and suggestions for further reading. This is a book based on the examination modules set by the British Beekeepers' Association, but this text will prove interesting for anyone wanting to know more about our honey bees.

Pollinator Conservation Handbook, published by the Xerces Society in association with *The Bee Works*, by Matthew Shepard, Stephen Buchman, Mace Vaughan and Scott Hoffman Black. 145 pages, soft cover, color throughout, 6" x 9" $22.45 includes postage in the U.S. Available from The Xerces Society, 4828 Southeast Hawthorne Blvd., Portland, OR 97215, 503.232.6639 or visit www.xerces.org.

Managing, studying and enjoying honey bees offers many, perhaps most beekeepers a solid connection with the many facets of the natural world their bees contact, affect and are affected by. Definitely a big part of this natural world are the interactions of honey bees and the plants they visit to collect pollen, nectar and even propolis.

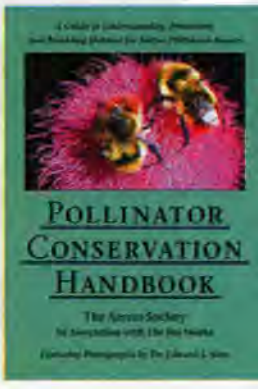
It's no secret that that natural world is changing – that the plants bees visit, the honey bees themselves, plus the thousands and thousands of other insects that interact with these plants are daily challenged by encroaching development, monoculture farming, pesticides, roads and the effects of expanding population.

These challenges have reduced the plants, and the pollinators these plants need. For some, this has become critical, and for many it soon will be critical – unless people step in and make changes.

This book does that. It shows how to plan habitats, provide foraging habitats, enhance nesting and egg laying and overwinter sites, plus it has ideas for educational programs, lists of resources and plant lists.

All this can happen in country size plots, or small, backyard gardens – any size counts, and all sizes help.

If you've wondered where to begin, start here. Your bees will be better off.



Autumn Garden Recipes With Honey

Ann **Harman**

National Honey Month comes at a very convenient time of year Most of the Summer fruit and vegetable harvest is over – except, perhaps, for a determined zucchini plant – and the Autumn harvest begins. Apples, pears, Winter squashes, pumpkins, late cabbages, root vegetables, among others – and all benefit from cooking and serving with honey.

This month is the time to celebrate honey and its many flavors and uses. Yes, you can give all your neighbors and relatives some honey in a jar And you can give them recipes to use that honey. But what is more fun, feed them something you have made with honey.

Many who buy honey feel that the end product has to be sweet – cookies, cakes, or some type of dessert. Here is a great opportunity to make something other than dessert. What about making a salad dressing and giving a jar of it to a neighbor You could do the same with a barbecue sauce for your friends with a nice big grill. Please tell everyone that you are celebrating National Honey Month and you would like everyone to enjoy it along with you.

Your garden has produced some nice acorn squash. The usual treatment is butter and perhaps some brown sugar. Well, forget the sugar Try this recipe. The blend of herbs is wonderful.

SCARBOROUGH FAIR BAKED SQUASH

3 small acorn squash, halved
1-1/2 teaspoon parsley, chopped fine
1 teaspoon sage
1 teaspoon crushed rosemary
1 teaspoon crushed thyme
3 tablespoons butter, melted
1/3 cup honey

Preheat oven to 350°F Place squash halves in greased baking dish. Melt butter and blend in parsley, sage, rosemary and thyme. Brush herb-butter mixture over squash and bake 40 minutes or until almost tender Drizzle honey over squash and continue baking until tender Brush with remaining herb-butter and serve. Serves 6.

The Honey Kitchen
ed. By Dadant & Sons

Butternut squash is an easy vegetable to grow. Perhaps you can find some green beans and green peppers still growing and ready to harvest. Dig through the dirt and find some small potatoes – they do not have to be the red ones. Although this next recipe does not use much honey the effect is enhanced flavor without sweetness. This vegetable dish goes well with chicken or beef and leftovers can be used to make a vegetable soup.

OVEN ROASTED VEGETABLES

1 butternut squash, peeled and cut into 2-inch pieces
1 pound of green beans
2 red onions, quartered
1 pound small red potatoes, cut in half
2 green peppers cut into large chunks
1 pound fresh, small mushrooms
1/2 cup olive oil
2 teaspoons rosemary
1 teaspoon sage
2 teaspoons parsley
1 teaspoon minced garlic
salt and pepper to taste

Place all of the prepared vegetables in a lightly greased roasting or baking pan. Mix the olive oil, honey, rosemary, sage, parsley, garlic and salt and pepper together in a small mixing bowl until well blended. Pour over the vegetables and toss gently until well-coated. Bake uncovered at 350°F for 1 to 1-1/2 hours or until the vegetables test done with a fork. Yield 6 servings.

Honey For All Seasons
Diana Bricker

Some people are quite lucky to have a persimmon tree. Although persimmons have a reputation for being inedible, those that understand persimmons wait until frost has tempered their puckery sensation. This recipe is for those who appreciate the good qualities and flavor of persimmons. Besides it uses gobs of honey – most appropriate for National Honey Month.

PERSIMMON PUDDING

1-3/4 cup honey
3 cups persimmon pulp
5 eggs
1/2 cup melted butter
1 teaspoon vanilla
1 teaspoon cinnamon
3 cups all-purpose flour
2 teaspoons baking powder
1 teaspoon baking soda
1 teaspoon allspice
1 teaspoon nutmeg
1 cup milk

Mix honey and persimmon pulp. Beat eggs until lemon-colored. Add persimmon mixture to the eggs. Sift

Continued on Next Page

dry ingredients together. Add butter and vanilla to the persimmon mixture. Add flour alternately with the milk. Spoon into a greased and floured 14"x9"x3" pan. Bake at 300°F for 1 to 1-1/4 hours.

Stanly County, NC, Beekeeper's Association Cookbook

At this time of year children are hoping for caramel apples. This next recipe is designed for the kids to make. Yes, some adult help may be needed for the younger ones. Just be sure to include their friends in celebration of National Honey Month.

HONEY CARAMEL DIP FOR APPLES

1/4 cup honey
one 14-oz package caramels
1/2 cup evaporated milk
5 or 6 unpeeled, cored apples, sliced into thin wedges

Combine the first three ingredients in a heavy saucepan. Heat over low heat, stirring constantly until the caramels are melted and the mixture is smooth. For a thinner sauce, heat with a little more evaporated milk (You don't want it too thin so add a few drops at a time.). Cool to room temperature and use as a dip for the apple wedges. It's also good as an ice cream topping or drizzled over unfrosted cake squares. And it keeps in the refrigerator for weeks.

Suebee Honey's Cooking With Kids

OK kids, you finished making the dip – now clean up the kitchen!

At this time of year pears should not be neglected. Pears can be made into a pie just like making apple pie. And pears can be baked or broiled. Pears can also make a sensational crisp. Yes, the topping uses sugar but that is the only way you will get a crumbly topping for this recipe.

HONEY PEAR CRISP

1/3 cup honey
1 tablespoon butter or margarine, melted
1/2 teaspoon nutmeg
1/2 teaspoon lemon juice
1/4 teaspoon salt
3 cups quartered, peeled fresh pears
(yes you can use 2 16-oz cans pear halves, drained)
1/4 cup butter or margarine
1/3 cup sugar
2 tablespoons all-purpose flour
2 cups oat flakes

Bake pears uncovered for 30 minutes. Combine honey, butter, nutmeg, lemon juice and salt. Stir in pears. Pour mix into 8-inch square baking pan. Set aside. Cream butter, blend in sugar and flour. Stir in oat flakes and sprinkle over pear mixture. Cover and bake at 375°F for 20 minutes. Then remove cover and continue baking 20 to 25 minutes longer or until pears are tender. Garnish with whipped cream if desired. Makes 4 to 5 servings.

Mississippi Homegrown – Cooking With Honey
Mississippi Beekeepers Assn.

As you go through your Autumn garden this month continue cooking those fruits and vegetables with honey. Think of other ways you can celebrate honey this month. Those of you baking breads with honey, bake some of the little loaves then fix a label saying "This bread was made with honey so that you can celebrate National Honey Month." Give a little loaf to all those people whom you encounter during the month. Even if those people never cook with honey at least they will have a better appreciation for it. Then continue to use honey even after September is over. BC

Ann Harman is cooking her Autumn veggies in Flint Hill, VA.

?DO YOU KNOW?

Basic Biology & Behavior

Clarence **Collison**
Mississippi State University

Understanding basic biology and behavior of the individual castes making up the honey bee colony is essential in understanding the factors that affect colony development and survival. The social structure of the colony is based on the principles of division of labor, kin recognition and specialized reproductive castes. Numerous forms of communication are used within the honey bee colony to integrate their various social activities.

Please take a few minutes and answer the following questions to determine how familiar you are with these important topics.

Level 1 Beekeeping

1. ____ When two virgin queens fight to the death within a colony they are either full or half sisters. (True or False)
2. ____ Worker honey bees produced in the Summer live longer than those produced in late Summer early Fall. (True or False)
3. ____ Brood production shortens the life of the worker honey bee. (True or False)
4. ____ As queens chew their way out of their queen cells, workers sometimes provide them with food. (True or False)
5. ____ When a honey bee egg hatches, the larvae breaks it way through the chorion or shell. (True or False)
6. ____ The presence of drones in the hive during the Winter is an indication that the queen has continued to lay eggs throughout the Fall and Winter (True or False)
7. ____ Young honey bee worker larvae have an excess of food available to them until they are four days old. (True or False)
8. ____ Bad weather can significantly reduce a virgin queen's mating success. (True or False)
9. The honey bee larva undergoes ____ stages of growth during its development.
   A. Six B. Four C. Seven D. Five E. Three
10. ____ All colony activities are controlled by the queen. (True or False)
11. ____ An abundance of pollen, nectar (honey) and drones are necessary if you are rearing queens. (True or False)
12. ____ Honey bees use the round dance to communicate information about the distance, direction, and quality of resources at distances greater than about 100 meters from the hive. (True or False)
13. ____ Communicative dances are used to recruit foragers to sources of nectar, pollen, and water (True or False)

Advanced Beekeeping

14. ____ Virgin queens produce a pheromone that repels workers and other queens. (True or False)
15. ____ In *Apis cerana* colonies, *Varroa* mites reproduce only in drone brood cells. (True or False)
16. ____ Maximum production of Nassanoff pheromone occurs in nurse bees. (True or False)
17. The predominant component of the mandibular glands of virgin queens and worker bees is _____
    A. (E)-10 hydroxy-2-deconic acid
    B. 10-hydroxydeconic acid
    C. (E)-9-hydroxy-2-deconic acid
    D. (E)-9 oxo-2-deconic acid
    E. 8-hydroxyoctanoic acid
18. ____ The Koschevnikov gland is more developed in workers than it is in queens. (True or False)
19. ____ Nurse bees produce 10-hydroxy-(E)-2-decenoic acid and this chemical is the main component of the brood food fed to larvae. (True or False)
20. ____ Compound that stimulates the food-hoarding behavior in bees.
    A. Isopentyl acetate
    B. 2-Heptanone
    C. (E)-9 Hydroxy-2-deconic acid
    D. geraniol
    E. (E)-9-oxo-2-deconic acid
21. ____ Virgin queens exhibit a 24-hour cycle in the production of (E)-9-oxo-2-deconic acid, synthesizing most of this compound during the night. (True or False)
22. Glyceryl-1,2 dioleate-3 palmitate is known as the _____ pheromone.
    A. queen larva recognition
    B. drone larva recognition
    C. worker larva recognition
    D. queen pupa recognition
    E. drone pupa recognition
23. Arnhart glands are associated with the worker's _____.
    A. abdomen B. tarsal segments C. proboscis
    D. stinger E. antennae
24. ____ Dufour (alkaline) glands are much larger in queens than they are in workers. (True or False)
25. ____ Drones have more plate organs on their antennae than either queens or workers. (True or False)
26. The bee's nervous system consists of a brain and ___ ganglia or nerve centers at various junctions throughout the body.
    A. Four B. Eight C. Five D. Seven E. Six

ANSWERS ON NEXT PAGE

?Do You Know? Answers

1. **True** Virgin queens produced within a colony have the same mother and either the same or different fathers. If they have the same father they are full sisters and if they have different fathers, then the virgin queens would be half sisters. Regardless of their relatedness, they fight to kill each other.

2. **False** The general pattern in temperate climates is for worker honey bees to be short lived in the Summer; mean longevities of 15-38 days. Workers during the Spring and Fall have intermediate life spans, usually 30 to 60 days, whereas life spans in Winter average about 140 days.
3. **True** Research has shown that the length of a worker honey bee's life is determined to a great extent by pollen consumption and brood rearing. As a result of their brood-rearing activities, the protein stored in their hypopharyngeal glands and fat bodies that originated from consumed pollen, soon become exhausted and their life spans are reduced.
4. **True** Bees have been observed feeding queens through small openings in their queen cells, and on occasion the queen may stop her work of cutting off the capping and stick her tongue through as if to "ask" for food of an attendant bee.
5. **False** Prior to the hatching of a honey bee egg, the young larva produces a secretion that dissolves the egg chorion or shell, starting at the top and proceeding downward toward the attached base.
6. **False** Drone production is seasonal and dependent upon colony conditions. With the advent of cooler weather and limited food sources in the Fall, drones are normally evicted from the hive. As a survival mechanism, drone production and tolerance of drones by workers is encouraged by the presence of a failing queen. Finding drones in a colony during the Winter is usually an indication that the colony is queenless.
7. **False** During the first two days after hatching, nurse bees continuously supply the tiny larvae with far more food that can be consumed (mass provisioning), so that larvae appear to float in the milky-white food. During the third day, somewhat less food is provided in advance of needs, so that by the end of the day all excess has been consumed, and thenceforth a larva in a worker cell receives food only at intervals (progressive feeding).
8. **True** Bad weather can significantly reduce a virgin queen's mating success or simply reduce the number of times she can mate. Mating normally occurs when the weather is warm, and the wind is fairly calm.
9. D) Five
10. False The queen honey bee has considerable influence on the orderly life processes in the colony. She, however, is not actively and consciously guiding or organizing worker bee activities.
11. **True** To successfully raise queens it is important that the cell building colony have abundant supplies of pollen, nectar (honey) and that there be an adequate drone population available for mating. Large quantities of pollen are necessary for nurse bees to produce large amounts of royal jelly. Continuous feeding of sugar syrup or dilute honey is essential to assure optimum conditions for the production of the queen cells.
12. **False** Honey bees use the waggle dance, not round dance, to communicate information about the distance, direction and quality of resources at distances greater than about 100 meters from the hive.
13. **True** Communicative dances are used in the hive to recruit foragers to nectar, pollen, and water sources. Dancing bees distribute droplets of nectar or water to potential foragers while doing their dance. Incoming workers laden with pollen are antennated closely by potential recruits and their dances are also followed. The dancing of water collectors is closely related to the time it takes to distribute its load to house bees. When unloading takes less than 40 seconds, there is nearly always a dance. With the increase in delivery time, dancing decreases and completely stops when the delivery time takes more than two minutes.
14. **True** When virgin queens are about 24 hours old, they produce a pheromone that repels workers and other queens. This pheromone is produced for about two weeks and is discharged as a fecal exudate from the rectum.
15. **True** In *Apis cerana* colonies, *Varroa* mites are forced to reproduce in drone brood cells because the workers detect mite-infested sealed worker cells and remove the infested brood. On the other hand, *Apis cerana* bees do not care about mite-infested sealed drone brood, not even when the drone brood is dead.
16. **False** Production of the Nassanoff pheromone varies with the age of the honey bee and with the time of the year Newly emerged workers have little or no secretion in their glands, but production increases rapidly during the next four weeks reaching a maximum when workers are foraging.
17. A) (E)-10 hydroxy-2-deconic acid
18. **False** The Koschevnikov gland is not as well developed in workers as it is in queens. This exocrine gland is reported to have different functions for each caste, although its precise roles still remain to be determined.
19. **True** Nurse bees produce 10-hydroxy-(E)-2-decenoic acid in their paired mandibular glands and this compound is the main component of the brood food fed to larvae.
20. B) 2-Heptanone
21. **False** Virgin queens produce a maximum amount of (E)-9-oxo-2-deconic acid (9-ODA) in the Spring at the time of mating flights and swarming. Virgin queens exhibit a 24 hour cycle in the production of 9-ODA, synthesizing most of this com-

pound during the late morning and afternoon, the period in which nuptial flights occur Therefore, the production of this pheromone is maximal during the period when the virgin female is utilizing it as a sex pheromone on mating flights.

22. E) drone pupa recognition
23. B) tarsal segments
24. **True** The Dufour or alkaline gland discharges its content into the sting chamber of both workers and queens. The specific function of this secretion is unknown, however, several possible functions have been suggested: poison secretion, sting lubrication, secretion of a waxy covering for the egg, and attachment of eggs to the bottom of cells. The Dufour gland is larger and more developed in queens than workers, possibly because of their egg laying functions.
25. **True** Drones have 30,000 olfactory plate organs on their antennae, about 10 times the number found in workers. Workers have 3000 plate organs and queens have 1600.
26. D) Seven

There were a possible 13 points in each test level this month. Check the table below to determine how well you did. If you scored less than six points, do not be discouraged. Keep reading and studying- you will do better in the future.

Number Of	Points Correct
13-11	Excellent
10-8	Good
7-6	Fair

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

BOTTOM ... Cont. From Pg. 64

The officer informed me that he was "contacting" me because I had turned without signaling. He repeatedly called me "Sir" in a way that was genuinely polite and not at all condescending. I did not point out to him the absurdity of signaling at an empty intersection. I know when to shut up.

When he took my license and registration back to his car, I said to Linda, "Sunday night in New Castle. He must be bored."

Linda said, "Ed, he's very polite. He's just doing his job."

I suppose deep down I look at cops as authority figures with guns and occasionally a mean streak. I'm sure this comes from getting harassed for hitchhiking and certain other youthful indiscretions. But Linda sees the police as the guardians of civilization. This is evident in the way we talk. I call them "cops." Linda always refers to them respectfully as "police officers."

After cautioning me to signal next time, the officer gave me his personal card, "so you'll know who contacted you." I had to admit that was a nice touch.

As I started to turn back onto that empty street, Linda said, "You'd better put on your turn signal." BC

INNER ... Cont. From Pg. 10

fending chemicals. Some say it worked, others debate the success of the technique. Nevertheless, in the last two years millions of pounds of this ultracheap, ultrafiltered, ultrablend sweetener derived from honey made its way to the U.S., replacing actual honey. It's the 'Tastes-just-like-maple-syrup' marketing school, don't you know?

Are you surprised that contaminated honey was bought and illegally resold? Are you surprised that ultracheap, ultrafiltered stuff was bought to replace actual honey? Does anything surprise us anymore?

Let me share a bit about Chinese honey production with you.

Data supplied by an international organization called FoodProductionDaily.com on the Chinese honey market sheds some interesting light on this subject.

According to these folks, in 2003 China produced 621.5 million pounds of honey which is roughly 40% of all honey produced in the *world*. (U.S. production was 181.1 million pounds.) How much of that stays in China? According to this report, fully 47% was consumed at home in 2003. That's a lot of honey if you think about it. Per capita consumption, however, was only 1.4 oz. (yes, ounces) and that's up 30% from the year before. They expect that to increase to 1.8 oz. for each person by 2008. Of course there are a lot of per capitas (3.1 billion) in China, so the 1.8 oz. adds up to 68,000 tons.

Exports, of course, are what concern U.S. beekeepers at all levels, and China exports lots of honey. Japan, Germany and the U.S. are their main customers, but Belgium, the U.K. and Spain (all members of the E.U.) are high on the list, too.

In 2003 the U.S. imported 42.8 million pounds of honey from China. That's only 13% of what they didn't eat themselves, and only 6.9% of their total production. We're pretty small potatoes actually. Through June, 2004, we've brought in 26.6 million pounds. Interestingly, China imported almost three million pounds of specialty honey (varietal marketing can sell *anywhere*!) in 2003, which amounted to 0.04 percent of the food dollar spent that year.

When the contamination problem could no longer be ignored Chinese beekeepers began making management changes to reduce the use of these chemicals. It appears to be working as some countries now no longer outright ban Chinese honey imports, notably the E.U., starting this Summer.

There have been reactions to this change, and, especially in the E.U. and the U.K. country of origin labeling, and even county of origin labeling is becoming mandatory. The question, obviously, is this labeling consumer driven, or producer driven?

There is no doubt that Chinese honey is, and will remain a major player in the U.S. honey market. And, it will, even with a significant tariff, continue to sell at prices most U.S. beekeepers find outrageous, uncompetitive and unfair. Even if the increased costs of better (or at least some) quality control move the price upward, and, the cost of greater scrutiny on imports adds even more cost, that Chinese barrel will still cost a U.S. packer less than any barrel produced in the U.S.

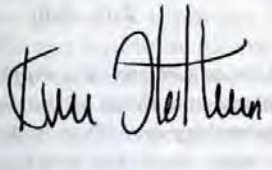
If that quality control scrutiny is applied to U.S. honey, and don't for a moment think it won't, the cost of U.S. honey will rise further. Eventually most of the world's honey will be the same – blended to average, uncontaminated by sugar or water, or antibiotics or pesticides, and pretty much otherwise the same. The only difference will be price, set by production costs and government subsidies. (Chinese honey is not taxed when it is sold, as are other ag products.) And, like all commodities, location affects price – the cost of getting something from there to here adds up.

None of this is new, certainly. It's just happening again. Is there a way to compete with cheap honey when your cost of production is more than theirs? When your labor is 100 times higher? (Here's a sobering comparison. A full time waitress in central China earns, on average, $25/month. This according to an NPR report.) Permits, restrictions, licenses, fuel, insurance everything is higher than theirs? No matter who 'they' are?

Well, the current administration has made country of origin labeling a non-event until at least 2006, so there's no hope there. Apparently the consumer isn't loud enough, or the suppliers are. Moreover, in 15 years the National Honey Board's efforts at promoting that commodity have not proven useful since U.S. per capita consumption has remained flat at just over a pound/person.

Definitely, a new direction must be chosen. If U.S. producers are to compete with Wal-Mart, K-Mart and other store brands, and with the even worse stuff that the commodity buyers are using just because of price, two things gotta happen. One – it absolutely has to be local. And local may be your town, county, state or the U.S. That absolutely, positively *MUST* be on the label. And second, it has to be a variety. It has to be something other than 'honey.' Even clover is better than nothing. U.S. Clover is better. Montana Clover is best. Can't do that? Or haven't tried?

Over the next few months we'll explore the value, and the how-to of marketing varietal honey. It is the only future of honey production in the U.S.



GLEANINGS

SEPTEMBER, 2004 • ALL THE NEWS THAT FITS

SUSTAINABLE AG BRIEFS

The Northeast Sustainable Agriculture Research and Education (SARE) program will host a conference in Burlington, VT, October 19 -21, 2004. The thematic emphasis is on regional food systems, and there will be workshops on marketing, ecological production, food policy and planning, learning from exemplary farmers, and sessions on communications in the agricultural community.

The keynote speaker fort he conference will be Russell Libby, executive director of the Maine Organic Farmers and Gardeners Association, and the closing speaker will be Bill McKibben, author and scholar-in-residence and Middlebury College.

A full conference program and registration materials are on line at www.uvm.edu/~nesare. Scholarship funds are available.

Contact Helen Husher at Northeast SARE 802.656.0471, Helen.husher@uvm.edu.

The Northeast Region Sustainable Agriculture Research and Education program (SARE) has now released application materials for its Farmer/Grower grant program. These grants support Northeast farmers who want to explore innovative sustainable practices on their farms.

The Farmer/Grower Grant program, initiated in 1993, allows farmers to conduct experiments, try new approaches, and test new ideas that advance good stewardship, improve farm profitability, and strengthen rural communities.

In 2004, grants ranged from $1,121 to determine how an early planting of peas affects the nitrogen needs of pumpkins to $10,000 to see if chemical residues are contributing to health problems in honey bees. The average grant was about $5,00; grants are capped at $10,000.

To apply, you must be a farmer in Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, West Virginia, Vermont, or Washington, DC

The deadline for the 2005 grant round is December 7, 2004, and applications can be downloaded from the Northeast SARE web site at www.uvm.edu/~nesare. Farmers can also request a printed application by calling 802.656.0471 or by sending email to nesare@uvm.edu.

VIRUS CAUSES AGGRESSION?

Worker bees change with age from attentive nurse to aggressive guard to persistent forager. In a quest to identify genes associated with aggressive behavior researchers at the University of Tokyo extracted a novel picorna-like virus from the brains of worker bees. The researchers now believe that the virus could be responsible for aggressive behaviors among such bees during the guard phase of their life cycle.

"This is the first suggestion that viral infection can affect intrinsic aggressive behaviors," says Kubo, the main researcher. He and his colleagues named the virus Kakugo, meaning "ready to attack" and determined that it is closely related to two other honey bee-infecting viruses, the sac brood virus plus another virus, whose genome sequence is known but is being further characterized.

"It will be important to survey honey bee colonies more broadly to see how robust this association is, so that other explanations can be ruled out," says Gene E. Robinson, who is professor of entomology and director of the neuroscience program at the University of Illinois at Urbana-Champaign. However, the possi-

Continued on Next Page

MIDEAST HONEY NEWS

The government care and interest in solving problems and hindrances facing Yemeni honey production have led to achieving a qualitative leap in exports of this commodity, especially after the establishment of Bee Honey Centre at the University of Hadramout for Science and Technology. The honey exports value has exceeded $10 millions annually. Sources in Mukalla have mentioned that the center has built training and research apiary and a laboratory for examining honey. The center has also held training courses for apiculturists and publishing guidance bulletins and books as well as marketing Yemeni honey in participations abroad. The sources made it clear that the center would work in future for organization of courses and researches on honey and ways of increasing its production, in addition to keeping record of apiaries in the country.

According to statistical figures the types of bees in Yemen exceeded a million producing more than 350 tons at a total value of over 10 million. Despite these accomplishments the Yemeni honey is still confronted with challenges and impediments, mainly the methods of maintaining its reputation and quality in external markets. For this reason the honey bee center at Hadramout University works for preparing standard specifications for types of the Yemeni honey, building a laboratory for examining honey under fun ding by the rural development project as well as preparing a perception on organizing the exported portion of local production along with enlightenment on preservation of Christ-thorn trees.

Iran's total honey production will reach 29,680 tons by the end of the current Iranian calendar year of 1383 (March 21, 2004-March 20, 2005) surpassing last year's total of 28,810 tons by 870 tons.

Beekeeping department director with the Ministry of Agriculture Jihad Masha-Allah Jamshidi said here Sunday that this amount of honey is more than was projected in the Third Economic Development Plan (2000-2005).

By the end of the Fourth Economic Development Plan (2005-2010), the total production of honey could register a 5.5 percent hike, reaching 39,800 tons per year, Jamshidi predicted, adding that production of 50,000 tons a year is projected by the end of 1392 (2014).

Iran produces 2.1 percent of the world's total production of honey.

According to statistics, world per capita consumption of honey is 200 grams annually while the figure for industrial countries stands at 1.2 kilos. Iranians consume 394 grams.

In 1381 (March 21, 2002-March 20, 2004) Iran exported 1,800 tons of honey to 28 countries including the United Arab Emirates, the Azerbaijan Republic, and Saudi Arabia.

45,000 beekeepers are currently working in the sector, 9,000 of whom are from the northwestern province of East Azarbaijan.

ITALY LABELS LOCAL HONEY

A legislative decree now requires honey sold in Italy to be labeled with its region of origin.

Honey produced in Italy has to be labeled as such. If it is blended with product from other members of the European Union it has to be labeled as a "mixture of honey originating from the European Community."

Honey imported into Italy from outside the EU has to be identified as "honey not originating from the European Community" or as a "mixture of honey originating and not originating from the European Community."

This year Italy's 75,000 beekeepers are expected to produce 10,000 to 12,000 tons of honey, up 40% on the previous year. – *Alan Harman*

NHB NEWS

The National Honey Board has announced results from the limited-time, reduced-fee testing funded by the Board and conducted in cooperation with Columbia Food Laboratories, Incorporated. The offer allowed honey packers and importers to submit samples of imported honey for a determination of whether the sample was pure honey or suspected to be an altered sweetener product being sold as pure honey. The testing program ended May 2, 2004.

For a reduced fee of $50 per sample, Columbia Food Laboratories analyzed imported product submitted by honey packers and importers during February, March and April of this year. In total, 107 samples were tested from 24 companies. **Of the 107 samples, 13 (12.1 percent) were suspected of being an altered sweetener product** rather than pure honey. Eleven of the suspect samples were from China, one was from Turkey and the origin of one sample was unknown.

The program, authorized by the Agricultural marketing Service, USDA, is part of the National Honey Board's voluntary program to ensure and protect the quality, purity and image of honey. Over the years the Board has sponsored multiple projects, including adulteration detection technology, to assist the honey industry to protect the purity of honey offered to consumers. The Board began funding research to design a methodology to identify altered sweetener products in June 2003 in response to industry concerns about a sweetener product being imported into the country as pure honey.

The newly formed national Honey Board Scientific Advisory Board (SAB) met July 6-7 in Denver with the primary goal of identifying directions for future research.

Led by Dr. Katherine Beals, the group evaluated recently completed and current NHB-sponsored basic research projects for potential follow-up studies and to determine reasonable next steps. The following research priorities were identified by the group:

- Honey consumption for cough suppression and/or sore throat relief
- Honey as a pre-exercise carbohydrate source
- Honey consumption for the reduction of risk factors for coronary heart disease

Several topic areas were also identified as research priorities worthy of continued focus including honey for allergy relief/prevention, in dental health, in wound healing and honey as a nutritional Rx for diabetes. Of particular significance was the recently initiated study examining the glycemic index of honey varieties. Data from this study is anticipated to lead to promising research in the areas of sport nutrition and dietary guidance for individuals with type-2 diabetes. The NHB has also been in contact with a research from the University of Connecticut who is seeking National Institutes of Health funding for a study investigating honey consumption for the prevention of Allergic Airway Disease in children (2-5 yrs. of age).

David Ropa of TJP Market Development demonstrated how the gap between basic and applied research may be bridged by offering examples of basic research projects that have translated into applied research projects and new product development.

Advisory board members participating included Stephen Davis, DVM, Dip. ACPV, Colorado Quality Research Inc.; Nicki Engeseth, PhD, University of IL; Mark Kern, PhD, RD, San Diego State University; and Yanyun Ahao, PhD, Oregon State University. Tierona Low Dog, MD, the holistic medicine specialist on the SAB provided input via a conference call held the week prior to the meeting. Members of the National Honey Board attending included Gene Brandi, immediate past chairman of the Board; Tom Hamilton, chairman of the NHB research committee; Bruce Boynton, CEO and Bruce Wolk, director of marketing. Also in attendance was Janet Greenlee of Fleishman-Hillard, Inc.

Funded by the honey industry and operating under USDA oversight, the National Honey Board is a research and promotion Board dedicated to increasing the demand for honey and honey products in the marketplace.

The National Honey Board has announced the availability of three new items to assist honey industry members publicize the versatility of honey; *Honey, Let's Celebrate* recipe brochure and supporting Web pages, *Bee Fit* brochure and complementing *Bee Fit* Fling® toy for kids.

Available in English and Spanish languages, *Honey Let's Celebrate* features six recipes for celebrations throughout the year. Designed to fit in recipe boxes, each full-color recipe card directs consumers online where a full Web page is dedicated to each celebration. The Web sire offers additional recipes for a complete party menu, decoration and activity ideas and information about honey and the programs of the Board. Assessment-paying industry members can order 500 *Celebration* brochures at no charge (industry associations may receive up to 1,000 brochures free).

The *Bee Fit* brochure introduces our newest, most agile honey bees in active poses – driving, playing soccer, rollerblading and the like. Sure to be a hit with kids and get them moving (and cooking), this full-color brochure features healthy honey tips and recipes for active kids. Also available are lightweight "Flings®" - Frisbee® - like toys that feature the *Bee Fit* bees. *Bee Fit* brochures and Flings® are available at our cost (including shipping and handling) of $.12 (12 cents) and $1.50 respectively.

Call to place your order on our toll-free order line 888.421.2977. Be sure to leave your name and full address (no P.O. Boxes!), payment information, the quantity desired for each item and whether you want the English or Spanish version of *Honey, Let's Celebrate*. You can also mail order information with payment to National Honey Board, 390 Lashley Street, Longmont, CO 80501-6045.

VIRUS ... Cont. From Pg. 57

bility that infectious pathogens affect social behavior is intriguing, he says, adding, "The authors were careful to point out the work doesn't directly address this." He also notes another example of infections affecting other types of behavior among bees. Specifically, when infected with protozoan *Nosema apis*, bees begin foraging when younger than do uninfected bees.

Another basic unknown is whether the virus shortens the lifespan of bees that it infects. If so, their aggressive behavior might help not only to protect the hive against intruders but also to remove the pathogen from the colony by more quickly ending the lives of those insects that are infected, the Japanese investigators note, pointing out that bees die during the aggressive act of stinging.

To distinguish aggressive worker bees from nonaggressive "escapers," Fujiyuki and Kubo dangled a live hornet, *Vespa mandarinia japonica*, in front of a beehive. The aggressive workers, which "scrambled and grappled with the hornet...were collected with tweezers and immediately anesthetized on ice." Escapers, those that fled the scene, were also collected. Only attackers carried the virus, and only in their brains, not elsewhere in their bodies.

To test whether the virus was infectious, the researchers pureed guard bee brains and injected some of that material into the brains of noninfected foragers. Meanwhile, they also ground up brains from uninfected forager bees or used buffered solutions to inject still other forager bees. The bees inoculated with guard-bee brain lysate showed increasing levels of virus over three days, whereas the other bees did not.

"Our research could be an important clue towards understanding the regulation of aggressive behavior," Kubo and Fujiyuki say. The work may also be medically significant, Kubo ads, citing an example from human medicine. "Some researchers find a weak correlation between viral infection in the human brain with behavioral and mental disorders, like the infection of borna disease virus. The molecular and neurological basis of this phenomenon is totally unknown, and it is quite difficult to analyze mechanisms of how viruses could affect human behaviors." On a mundane but potentially practical level, understanding and perhaps learning to control aggressive behavior among bees could prove helpful to apiary workers, he suggests.

reprinted from ASM News

Kashmir Bee Virus In British Columbia

Alan **Harman**

Researchers in British Columbia are trying to determine why the Kashmir bee virus (KBV) has apparently become more deadly after living a benign existence in the Canadian province for a quarter of a century.

But one reason for the apparent change may be that bee deaths previously attributed to the *Varroa* mite may have in fact been caused by KBV

In early spring this year a commercial beekeeping operation in British Columbia's Fraser Valley reported large-scale colony declines, eventually resulting in 80% to 90% colony losses.

The cause was subsequently diagnosed as KBV.

Provincial Apiculturist Paul van Westendorp said as a result a survey of all primary beekeeping areas in the province has been undertaken and the preliminary results indicate that KBV is widely distributed and may even be endemic in the honey bee population.

Researchers in Europe and the U.S. concluded that KBV is a highly contagious and virulent pathogen of honey bees in the presence of *Varroa* mites.

KBV was first diagnosed in British Columbia in the early 1980s in honey bee stock originally imported from Australia and New Zealand.

"At that time, well before the *Varroa* mite arrived, no symptoms had ever been observed and therefore KBV was not a concern," van Westendorp said. "KBV was more of an academic curiosity rather than a threat.

"But then, *Varroa* was introduced into B.C. in 1990. So, since 1990, *Varroa* and KBV have been in our bee population but no apparent damage by KBV was ever recorded.

"It is possible however that KBV may have been responsible for some colony losses in the last few years which were generally attributed to *Varroa*.

"While we are undoubtedly concerned about the latest developments, this concern is probably because we know little.

"What conditions cause this normally benign or latent virus to switch into virulence?" van Westendorp asked.

"Merely the presence of *Varroa* mites – which have been identified as the primary vectors – is not enough because we have shown that many colonies with KBV have low or even non-detectable mite levels.

"Some other factors must be involved also. Over the course of the next few months as well as next year, we hope to get a better understanding about the behavior of KBV."

"It is possible however that KBV may have been responsible for some colony losses in the last few years which were generally attributed to Varroa."

Van Westendorp said that in 1995, a small U.S. survey confirmed KBV in seven states including California, Washington State, Florida and Maine – all four corners of the U.S.

"It is conceivable that further surveying may indicate that KBV is widespread throughout North America."

The on-going B.C. survey has confirmed KBV in the Fraser Valley, Okanagan Valley, Peace River, Vancouver Island and West Kootenays regions.

Van Westendorp said it is not known at this time whether KBV virulence remains incidental and localized or that its virulence will increase in the next few years.

"No control product or definitive remedial action is available," he said. "Queen replacement may be helpful, together with effective mite control, hygienic apiary management practices, and stress reduction."

Van Westendorp said large-scale annual migration of honey bee colonies from and to Alberta, would almost certainly indicate that KBV's distribution is not limited to B.C.

The Kashmir Bee Virus is a natural disease of the eastern honey bee *Apis cerana*. After the introduction of the western honey bee *Apis mellifera* into the distribution range of *A. cerana* in southern Asia, the virus made a "species-jump" and began to parasitize its new host.

KBV is an RNA virus in the newly established family Dicistroviridae.

RNA viruses – in comparison to DNA-viruses – are very small and associated with the mitochondria of host cells.

KBV's virulence is made possible because of its association with the *Varroa* mite. Mites carry the viruses externally and internally and by piercing the honey bee's cuticle, they transfer viral particles into the host's tissue.

The bee's pupal stage appears most susceptible to infection. In the confined space of the capped pupal cell, viruses are not only transferred from mite to bee, but also from mite to mite.

After several mite generations in the honey bee colony, the majority of mites will be KBV carriers. As more bees become infected, the transfer of food, grooming and other physical contact between bees facilitates the further spread of the virus.

There is no prescribed set of symptoms confirming KBV in the field. Definitive diagnosis is carried out in the laboratory through Polymerase Chain Reaction analysis.

However, beekeepers may observe various symptoms that may point to viral infection.

These include:

* Weakening of the colony without any apparent presence of brood diseases and mites.

Continued on Page 62

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KASHMIR ... Contr. From Pg. 59

* Increasing numbers of dead or dying bees on the inner cover, landing board or in front of the hive. Dying bees may be trembling and display uncoordinated movement.

* Affected bees are partly or completely hairless where the upper surface of the thorax is especially dark.

* Older adult bees have a greasy or oily appearance while recently emerged bees may appear opaque as if pigmentation of the tissue had not been completed prior to emergence.

For definitive identification, whole adult bees must be analyzed in the laboratory.

KBV diagnosis of a sample of bees collected from one colony does not limit the viral infestation to that single colony Due to the highly contagious nature of KBV, the entire apiary is suspect and should be considered KBV positive. As a result, a single composite apiary sample can also be collected, with a number of colonies contributing bees to the sample.

There is no product available for controlling KBV Most viral infections become evident when bees have been stressed due to other diseases, weather conditions or management practices.

Some bee stocks have shown higher susceptibility to viral infection than others; this can be remedied by replacing the queen with a queen from another source.

To minimize the impact of KBV and other viral infections:

* Reduce stress to bees by applying good management practices.

* Provide plenty of food stores especially pollen,

* Keep mite levels low through frequent monitoring and applying mite control products when necessary

* Apply hygienic management practices in the apiary.

Display Advertisers

A convergence of events led to my being "contacted" by the local police last May.

It started with the crop duster He called to say he'd be in Peach Valley "any day now" to spray for alfalfa weevil. He generally sprays Furadan – an organophosphate insecticide highly toxic to bees – about the time the dandelions here in the Colorado River Valley are finished. I customarily move my bees out of his range. This time I took them to safety up Garfield Creek.

There was actually a silver lining to the bee move. On Garfield Creek the dandelions were in mid-bloom, so their new location gave them a second feeding.

I'd moved all the hives but one – a colony that bounced back from American foulbrood last year. I decided to keep it separate from my other hives, so I left it at home. I'd take my chances with the crop duster

Then my neighbor Butch called to say we had a bear on our ditch. Well, great. By day the bees would face toxic chemicals. By night, a bear But I could always put up some electric fence.

Later that same day I noticed that the bees had discovered some honey supers in the garage, which has no glass in the window. I'd just had 30 packages parked right outside that window and no problem. Now, with only one hive left on the property, the little darlings were making mischief. I guessed I'd just have to repair the window.

Then suddenly I decided enough was enough. I said, "Linda, I'm taking this hive to Garfield Creek tonight and not worrying about it anymore. You're coming with me."

Linda is always stressing out about something, and she uses this as an excuse to thwart my plans.

"I can't do it tonight," she said.

"Why?" I said.

"Because the church "Cabaret Night" is in a week," she said. "Nobody is practicing. I'll never direct another production like this again."

"You always say that," I said. "Then you always pull it off, and when the audience goes wild, it's all worth it."

"This is my first and last Cabaret Night. I don't know why I got myself into this," she said.

"Well then take a break and go with me," I said.

"Stop bugging me," she said.

A while later she lost her billfold. When I found it for her, I said, "Now you owe me."

She said, "OK, what?"

I said, "You have to go with me to take the bees.

God fashioned no place on Earth lovelier than Garfield Creek at twilight. The jumble of low mountain peaks looming over the Colorado Valley looks like a scene from one of those dramatic Japanese nature paintings. Linda held the flashlight as I carried the hive across the ditch and set it next to its sister colonies inside the solar electric bear fence.

On the way back home I took it easy, as we savored the last lingering shards of celestial crimson. Linda instructed me to brake for Bambis and bunnies. You feel like you're in a Walt Disney movie on that road. Suddenly Linda threw her arm against my chest. "Stop!" she said earnestly. There's a little rabbit over there!"

But basically Linda always calms down in the truck. She stops muttering about George Bush and Donald Rumsfeld. She folds her arms and sits there in a sort of altered state. You couldn't imagine a more contented person.

Back in New Castle, I stopped at the convenience store for a quart of beer At this place you have to prove your age, even if you're an old beekeeper I remarked to the girl behind the counter that maybe this policy went a little overboard, but I couldn't get a rise out of her She solemnly said, "We check everybody" – as if this were some provision of the Patriot Act.

Former New Castle mayor Pete Mattivi is pushing 100. I said, "You'd check Pete Mattivi?"

"We check everybody," she said without cracking a smile.

When I turned left onto Main Street, there wasn't a headlight in sight. Linda said, "That's a police car parked over there."

When the car's lights flashed behind me, I thought, "Now what?"

Continued on Page 55

Ed **Colby**

The Police Officer

BOTTOM BOARD